

Closure Documentation For
Solid Waste Management Unit 10
Biological Treatment Plant Equalization Basin
Radford Army Ammunition Plant, Radford, VA
EPQ ID# VA1210020730

Volume 1 Of 2

Rec'd ENV 12-15-98



98-183

C: Jake
Redden
Olson
McKenna
ENV file
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COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

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Mailing address: P.O. Box 10009, Richmond, Virginia 23240

Fax (804) 698-4500 TDD (804) 698-4021

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James S. Gilmore, III
Governor

John Paul Woodley, Jr.
Secretary of Natural Resources

Dennis H. Treacy
Director

Closure
Documentation

HWMU 10

(804) 698-4000
1-800-592-5482

December 8, 1998

C.A. Jake
Alliant Techsystems Inc.
Radford Army Ammunition Plant
P.O. Box 1
Radford, VA 24141-0100

**RE: Radford Army Ammunition Plant (RAAP)
EPA ID# VA12100207306
Equalization Basin Closure
Closure Verification**

Dear Ms. Jake:


On August 7, 1998, RAAP submitted the required closure certifications and report for its Equalization Basin. Additionally, on March 27, 1998, RAAP's Equalization Basin, SWMU #10, was visited by Mike Scott of the Virginia Department of Environmental Quality's (DEQ) West Central Regional Office. This information has been reviewed.

Based on this closure inspection and the closure certifications and report, clean closure by background comparison was achieved for all constituents, except Fluoranthene. Clean closure to a residential risk-based determination was achieved for Fluoranthene. Therefore, the DEQ concurs that clean closure for soils only has been achieved for RAAP's Equalization Basin. Please note, however, that the U.S. Environmental Protection Agency retains the authority to address possible corrective action of continuing releases pursuant to the Hazardous and Solid Waste Amendments of 1984. The groundwater underneath the Sludge Drying Bed is still undergoing closure and may be subject to the post-closure permit process established under Title 9 of the Virginia

Administrative Code, Chapter 20-60 (9 VAC 20-60 et seq.), if clean closure cannot be achieved.

If you have any questions regarding this letter, please contact Debra A. Miller, Environmental Engineer Senior, of my staff at (804) 698-4206.

Sincerely,


for Dennis H. Treacy

c: Claire Ballard - DEQ
Melissa Porterfield- DEQ
Glenn VonGonten-DEQ
Aziz Farahmand-DEQ/WCRO
Central Hazardous Waste File



98-142

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September 4, 1998

C.A. Jake
Environmental Manager
Alliant Techsystems Inc.
Radford Army Ammunition Plant
Route 114
P.O. Box 1
Radford, Virginia 24141-0100

**RE: Radford Army Ammunition Plant, EPA ID#VA1210020730
Closure of Bioplant Equalization Basin
Submittal of Closure Certification and Risk Assessment**

Dear Ms. Jake:

On August 7, 1998, the Department received Radford Army Ammunition Plant's closure certification and supporting information for the Bioplant Equalization Basin. Review of the submitted information will commence within the next few weeks. If there are any questions or concerns regarding the review, please contact me at (804) 698-4206.

Sincerely,



Debra A. Miller
Environmental Engineer Senior
Office of Waste Permitting

cc: Aziz Farahmand, DEQ-RRO
Clarie Ballard, DEQ
Melissa Porterfield, DEQ

Alliant Techsystems Inc.
Radford Army Ammunition Plant
Route 114
P.O. Box 1
Radford, VA 24141-0100

July 28, 1998

98-815-164

Ms. Debra Miller
Virginia Department of Environmental Quality
Office of Permitting Management
629 East Main Street
Richmond, VA 23219

Subject: Risk Assessment and Closure Certification
Bioplant Equalization Basin (HWMU 10)
Radford Army Ammunition Plant
EPA ID# VA1210020730

Dear Ms. Miller:

Enclosed are two copies of the "Risk Assessment and Closure Certification for the Former Bioplant Equalization Basin Radford Army Ammunition Plant." This report has been prepared in accordance with the "Closure, Contingent Closure & Contingent Post-Closure Plans Equalization Basin HWMU-10 & SWMU-10, Radford Army Ammunition Plant."

If you have questions or comments please contact Jerry Redder at (540) 639-7536 or Arne Olsen at (540) 639-8220.

Very Truly Yours,



C. A. Jake, Supervisor
Environmental Affairs

Enclosure

cc: Mike Jacobi, USEPA Region III
Rob Thompson, USEPA Region III
Devlin Harris, DEQ West Central Regional Office - Roanoke
Mike Scott, DEQ West Central Regional Office - Roanoke
R. L. Richardson, RFAAP ACO

V:\815-164

Coordination:


M. L. Griffith


R. L. Richardson

bc: Administrative File
 R. Davie, RFAAP ACO - w/o enclosure
 Jim Small, IOC - w/o enclosure
 D. W. Shead - w/o enclosure
 C. A. Jake - w/o enclosure
 J. J. Redder - w/o enclosure
 Env. File

Rec'd 7-13-98-008

C. Jake
Barker
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ENV file
Barker-ACD



98-102

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

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Dennis H. Treacy
Director

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John Paul Woodley, Jr.
Secretary of Natural Resources

Certified Mail
Return Receipt Requested

July 9, 1998

C.A. Jake
Environmental Manager
Alliant Techsystems, Inc.
Radford Army Ammunition Plant
P.O. Box 1
Radford, VA 24141-0100

RE: Radford Army Ammunition Plant
EPA ID# VA12100207306
Equalization Basin Closure
Closure Extension

Dear Ms. Jake:

Your letter requesting an extension to the closure schedule for the Equalization Basin's closure activities was received on June 29, 1998. This extension request is necessary to allow the facility to pursue risk-based closure of the Equalization Basin.

As the closure activities will, of necessity, take longer to complete than the current closure schedule allows, a 90-day extension until September 28, 1998, is approved. Please note, a 90-day extension has been allowed, not the 180-day extension requested. As no further sampling is required, only a 90-day extension to complete the closure activities can be allowed. Please update the approved closure plan to reflect this revised closure completion date. During this extension period, RAAP shall continue to take all steps to prevent threats to human health and the environment from the Equalization Basin that is no longer operating but has not completed formal closure.

If there are any additional questions, please contact Debra A. Miller, Environmental Engineer Senior, of my staff at (804) 698-4206, or you may send electronic mail to Mrs. Miller at the following Internet address, damiller@deq.state.va.us.

Sincerely,

Leslie A. Romanchik
for Dennis H. Treacy

cc: Leslie Romanchik, DEQ
Debra Miller, DEQ
Glenn VonGonten, DEQ
Melissa Porterfield, DEQ
Claire Ballard, DEQ
Aziz Farahmand, DEQ-RRO

Alliant Techsystems Inc.
Radford Army Ammunition Plant
Route 114
P.O. Box 1
Radford, VA 24141-0100

June 24, 1998

98-815-146

Debra Miller
Office of Permitting Management
629 East Main Street
Richmond, VA 23219

Subject: Request for Extension of Closure Schedule
Bio-Plant Equalization Basin, HWMU 10
Radford Army Ammunition Plant, Radford Virginia,
EPA ID# VA1210020730

Dear Ms. Miller:

Construction activities associated with the Closure of Hazardous Waste Management Unit 10 have been completed and the closure documentation is being prepared. The Norfolk District Corps of Engineers has contracted with Environmental Resource Management to complete the risk assessment in accordance with the amended closure plan. Once completed this risk assessment will be combined with the other information outlined in your March 10, 1998 letter and submitted as the closure report. To complete this effort Alliant Techsystems requests an 180-day extension of the closure schedule to December 27, 1998.

If you have any questions or concerns please contact Jerry Redder (540) 639-7536 (Jerome_Redder@ATK.com) or Arne Olsen (540) 639-8220 (Arne_Olsen@ATK.com)

Sincerely



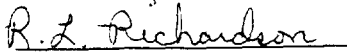
for C. A. Jake, Supervisor
Environmental

/AEOlsen:815-146

c: West Central Regional Office - Roanoke
R. L. Richardson, RFAAP ACO

Coordination:


M. L. Griffith


R. L. Richardson

bc: Adm. File
Env. File
D. W. Shead - MN11-2143
C. A. Jake
J. J. Redder
A. E. Olsen -

Rec'd 3-12-98

98-44



C: Jake
Redden
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COMMONWEALTH of VIRGINIA

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Thomas L. Hopkins
Director

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March 10, 1998

C.A. Jake
Alliant Techsystems Inc.
Environmental Manager
Radford Army Ammunition Plant
P.O. Box 1
Radford, VA 24141-0100

RE: Radford Army Ammunition Plant (RAAP)
EPA ID# VA1210020730
Equalization Basin Revised Sampling

Dear Ms. Jake:

Revised analytical results for the Equalization Basin's confirmatory sampling were received by the Department of Environmental Quality (DEQ) on December 17, 1997. The data submitted was for the resampling of Grids #1 and #10. RAAP decided to resample these grids because of the high practical quantitation limits (PQLs) achieved during the first round of sampling. These high PQLs were due to the dilution of the samples.

Based on the information submitted, use of the November 11, 1997, data for Grid #1 and Grid #10 is acceptable since the quantitation limits achieved with the resampling are within an appropriate range for background comparison. At this time, RAAP should complete the closure in accordance with their approved plan and, when completed, submit the required certifications and closure report, including the information necessary for background closure and risk-based closure of the unit. The following information shall be included in the closure report, at a minimum:

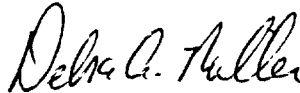
- a summary of all closure activities;
- a summary of results for background and unit sampling including the depth of samples for soil sampling results;
- the depth of excavation;
- results of all statistical calculations (i.e., for background closure demonstration) and an example calculation demonstrating compliance with relevant guidance;
- all risk assessment reports including calculations and conclusions;

- all sampling results as an appendix to this report (please note, this sample data is currently in-house at DEQ and will not need to be resubmitted);
- all applicable explanation/justification for the data used or conclusion reached during closure activities, including a summary of QA/QC findings;
- a synopsis on the proper disposal of waste generated during closure activities.


It is noted that much of this information has already been submitted. However, a detailed closure report which includes both the background and risk-based closure information should be submitted in support of the certifications and may reference previous submittals or repeat the information in the closure report, whichever is more convenient.

Once received, the certifications and closure report will be subject to DEQ review. Closure of the units will not occur until the DEQ has verified closure in accordance with this approved closure plan. If you should have any questions, concerning this matter, please contact me at (804) 698-4206.

Sincerely,



Debra A. Miller
Environmental Engineer Senior
Office of Waste Permitting

cc:  Jerry Redder, Alliant Techsystems-RAAP
Robert Greaves, EPA Region III
Glenn VonGonten, DEQ
Aziz Farahmand, DEQ/RRO-Compliance
CENTRAL HW FILES

Rec'd 3-12-98

6845



c: Jake
Redder
Barker
File

COMMONWEALTH of VIRGINIA

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Secretary of Natural Resources

DEPARTMENT OF ENVIRONMENTAL QUALITY

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Thomas L. Hopkins
Director

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Certified Mail
Return Receipt Requested

March 9, 1998

C.A. Jake
Alliant Techsystems Inc.
Environmental Manager
Radford Army Ammunition Plant
P.O. Box 1
Radford, VA 24141-0100

RE: Radford Army Ammunition Plant (RAAP)
EPA ID# VA1210020730
Equalization Basin Closure Plan Amendment

Dear Ms. Jake:

Your letter requesting an amendment to the approved closure plan for RAAP's Equalization Basin was submitted to the Department of Environmental Quality (DEQ) on December 17, 1997. This amendment will allow RAAP to pursue closure to risk-based standards for the referenced hazardous waste management unit.

Based on the information submitted, the amendment requested is approved. An update to the closure plan's pages are attached and will need to be added to the closure plan. Please update your closure plan, as needed.

As provided in Rule 2A:2 of the Supreme Court of Virginia, you have 30 days from the date of service of this decision to initiate an appeal by filing a notice of appeal with:

Thomas L. Hopkins, Director
Virginia Department of Environmental Quality
629 East Main Street
P.O. Box 10009
Richmond, Virginia 23240-0009


An Agency of the Natural Resources Secretariat

In the event that this decision is served to you by mail, the date of service will be calculated as three days after the postmark date. Please refer to Part Two A of the Rules of the Supreme Court of Virginia, which describes the required content of the Notice of Appeal, including specifications of the Circuit Court to which the appeal is taken, and additional requirements concerning appeals from decisions of administrative agents.

If you should have any questions, concerning this matter, please contact Debra Miller, Environmental Engineer Senior, of my staff at (804) 698-4206.

Sincerely,



 Thomas L. Hopkins

Attachment

cc: Jerry Redder, Alliant Techsystems-RAAP
Robert Greaves, EPA Region III
Debra Miller, DEQ
Glenn VonGonten, DEQ
Claire Ballard, DEQ (w/out Attachment)
Aziz Farahmand, DEQ/RRO-Compliance
Melissa Porterfield, DEQ (w/out Attachment)
CENTRAL HW FILES

The plan described below was developed in accordance with sound standard statistical methods. All data obtained will be reviewed, summarized, and analyzed according to the methods described in this section. Statistical techniques used throughout the analysis will be clearly explained and will be supported by citing appropriate references. Full citations can be found in the References. The closure plan consists of the following aspects:

- * Background characterization
- * Initial random sampling of the subsoils
- * Possible excavation and repeated sampling, or initiation of risk-based closure or contingent closure
- * Repeat excavation and sampling or, initiation of risk-based closure or contingent closure
- * "Hot spot" sampling of subsoils, if random sampling indicates hot spots exist.

The initial random sampling will be conducted to determine if clean closure can be achieved and whether soil removal will be required to achieve clean closure. A "hot spot" sampling approach may be used to better delineate contaminated areas for excavation and subsequent disposal, depending on the results from the random sampling. The samples will be discrete samples. Radford Army Ammunition Plant reserves the option, at any point during the EQ Basin subsoils assessment, to abandon attempts to demonstrate clean closure and immediately implement one of the following options:

- Continue with removal activities and sampling of soil layers, as detailed above;
- Perform closure to risk-based standards as detailed in Section 3.8.5 and Appendix A of this closure plan; or
- Implement contingent closure and post-closure procedures of this plan.

The subsoils will be evaluated by collecting a minimum of seven soil borings, randomly distributed across the grid nodes. Samples will be collected at the surface (0-3 inches, 6 inches, 12 inches, 18 inches, and

3. If the background critical value (X_{cv}) is equal to or greater than the individual EQ Basin node sample value, that particular node is considered “clean” with respect to the closure parameter being evaluated. If, on the other hand, the background critical value (X_{cv}) is less than the node sample, then:
4. Based on the results from surrounding sample location nodes, hot spot area(s) within the defined areal extent of the EQ Basin will be delineated for subsequent soil removal efforts.
5. Additional subgrid sampling may be performed to further refine delineation of identified “hot spots” for soil excavation.
 - a. After excavation of the existing surface soil (0-6 inch) layer within defined hot spot(s), resampling will be performed at all established grid nodes, within the “hot spot” area(s). Samples will be analyzed for all clean closure parameters (HCOCs) for which clean closure has not been demonstrated.
 - b. Following resampling, comparison to background¹ along with additional 6-inch soil layer excavation (if required) will be performed in accordance with the protocols previously outlined.

If upon following the protocols detailed in Section 3.8 in an attempt to achieve clean closure, the basin subsoils sampling results still remain above the background values of one or more constituents, Radford Army Ammunition Plant (RAAP) will:

- Continue with removal activities and sampling of soil layers, as detailed above;
- Perform closure to risk-based standards as detailed in Section 3.8.5 and Appendix A of this closure plan; or
- Implement contingent closure and post-closure procedures of this plan.

As previously stated, the facility reserves the option, at any point during EQ Basin subsoils assessment, to abandon attempts to demonstrate clean closure to either background or risk-based standards and immediately implement contingent closure and post-closure.

¹(Optional) The background critical value described thus far will have been computed from the top layer (0-6 inches) of the background area. It may be necessary to sample background at lower intervals (6-12 inches, 12-24 inches) for comparison at lower intervals to avoid bias. The option should be implemented, if, for example, distinctly different soil types are encountered at depth, thereby necessitating re-establishment of background.

3.8.5 Risk Assessment for Closure

As discussed in Section 3.2, an alternative to the clean closure to background standards or in conjunction with clean closure to background standards for some, but not all, constituents, RAAP may demonstrate that the concentrations of hazardous constituents, which were shown to be statistically above background, do not pose an unacceptable level of risk to human health or the environment. RAAP may propose this to the DEQ following the requirements as outlined in this section and as detailed in Appendix A.

In order to estimate the risk for HCOCs, a risk assessment will be conducted according to the DEQ document titled "Guidance for development of health based cleanup goals using decision tree/REAMS program (herein after "Virginia Risk Guidance"), November 1, 1994, prepared by Old Dominion University and the approved closure plan. The risk goals/performance standards will be a hazard index of 1.0 for non-carcinogens and an individual carcinogenic risk of 1×10^{-6} and cumulative carcinogenic risk of 1×10^{-4} . This risk assessment will be conducted assuming a future residential use of the property.

The Department will review the risk assessment report to determine that it conforms to risk assessment requirements for residential risk-based protocols. If acceptable, attainment of the closure standards may then be demonstrated using the residential risk-based assessment in lieu of the clean closure to background standards established under Section 3.8.1 Background Soil Sampling and Section 3.7.6 Subsoil Investigation.

Note, if the EQ Basin cannot meet the residential risk closure standards, then RAAP may propose to modify this closure plan for industrial risk-based closure. Modification will require notification of the DEQ and the submittal of a closure amendment, in accordance with 9 VAC 20-60-580.C.

For the remaining sections of the closure plan, any discussions of "clean" closure of the EQ Basin's unsaturated subsoils, will signify either clean closure to background levels and/or closure to risk based closure standards, as described in this section.

3.9 Field Quality Control

To ensure the collection of representative samples, the following field quality control procedures will be utilized during the closure operations.

Equipment blanks will be collected after every 20th sample. If equipment blanks indicate contamination, then resampling will occur only if sample results are above cleanup levels. Samples will be analyzed for the hazardous constituents of concern identified in this document. Laboratory quality control will be according to the methods detailed in SW-846, Chapter 1, (as updated).

3.9.1 Sample Preservations and Maximum Holding Times

Soil samples usually require no preservation other than storing at 4°C until analyzed. The maximum holding times vary for different measurements. Table 3-2 provides the maximum holding times for certain inorganic and organic analyses. Although these criteria were specifically designed and tested for water samples, they are also applicable for soil sampling studies (Barth and Mason, 1984).

RISK-BASED CLOSURE

1. Introduction

This document discusses the protocol for conducting a risk assessment to implement closure of a hazardous waste management unit (HWMU) in accordance with the Virginia Hazardous Waste Management Regulations (VHWMR) as codified in Title 9 of the Virginia Administrative Code, Agency 20, Chapter 20 (9 VAC 20-60-10 et seq).

2. Risk-Based Evaluation

In order to estimate the risk for hazardous constituents of concern (HCOC) associated with the materials remaining in a HWMU, a risk assessment will be conducted according to the Virginia DEQ document titled "Guidance for Development of Health Based Cleanup Goals Using Decision Tree/REAMS Program (herein after "Virginia Risk Guidance") (November 1, 1994) prepared by Old Dominion University and the approved closure plan. The risk assessment report will contain the following sections:

- site evaluation,
- development of a site conceptual model,
- identification of contaminants of concern,
- identification of media and exposure pathways,
- toxicity assessment,
- estimation of contaminant concentration at the point of exposure, and
- summary of health risk.

The submission instructions contained in Appendix IX of the Virginia Risk Guidance will be reviewed prior to submitting the report to confirm that all necessary risk issues have been addressed. The risk goals associated with the closure performance standards (risk goals) will include:

- i. a hazard index of 1.0 or less for non-carcinogens;
- ii. a risk of $1\text{E-}06$ or less for individual carcinogens;
- iii. cumulative risk of $1\text{E-}04$ or less for all carcinogens; and
- iv. the concentrations of HCOC remaining in the HWMU will not result in contamination of other environmental media of concern, including the groundwater underneath the unit.

Compliance with the closure standard shall be verified by comparing the calculated individual and cumulative risk/hazard for all HCOC that failed the background statistical comparison (if such comparison is preformed) to the risk goals.

The risk assessment will be conducted assuming a future residential/industrial use of the property. The methodology and equations for estimating the exposure concentration are presented in subsequent sections.

The initial step in the risk assessment will be to develop a site conceptual exposure model (SCEM) which depicts all potential exposure routes and media for the site and the receptors which may be exposed. Then HCOC for the risk assessment are identified (See Section 3 of this document).

In the next step, the exposure assumptions outlined in the Virginia Risk Guidance will be employed to estimate the risk. Information will also be taken as needed from U.S. EPA documents and databases (e.g., the Risk Assessment Guidance for Superfund (RAGS), and the Integrated Risk Information System (IRIS)). The chemical intake equations and exposure parameter assumptions

used to estimate risk (obtained from the Virginia Risk Guidance) are shown in Tables 1 through 4. Additional details on the approach and assumptions used for each potential exposure pathway are provided below.

As a part of the Risk Exposure and Analysis Modeling System (REAMS) evaluation, fate and transport modeling is conducted to demonstrate that the residual soil concentrations of contaminants of concern would not result in contamination of other environmental media of concern including the groundwater underneath the closure unit. For this purpose, representative soil sample(s) will be collected around the unit (subjected to closure) for analysis of the properties listed on page 62 of the REAMS document. In certain situations, groundwater sampling is preferable.

3. Identification of Hazardous Constituents of Concern for Risk Assessment

For the purpose of REAMS evaluation associated with a HWMU, HCOC are those closure constituents present at concentrations statistically exceeding the background levels. If the concentrations of a closure constituent did not statistically exceed the background levels, no further risk-based evaluation for such constituent is required.

4. Exposure Assessment

The exposure assessment will identify transport mechanisms for the contaminants of concern that may potentially impact human receptors. The results of this assessment will be used to document the current and potential exposure posed by the HWMU.

With regard to the soil, a residential exposure will be assumed to document unrestricted closure of the soil. If the risk for potential residential exposure does not exceed the performance standards, unrestricted closure of soil will be accepted. If the site cannot be clean closed for residential use, then the option to pursue restricted closure (commercial/industrial) will be exercised. Closure to commercial/industrial scenario will require the facility to enact a deed restriction that eliminates the possibility of future residential use of the site. The requirements

for establishing such a deed restriction are detailed in VDEQ's Guidelines for Developing Health-Based Cleanup Goals Using Risk Assessment at A Hazardous Waste Site Facility for Restricted Industrial Use, dated June 1995. (A copy of this document is attached.)

Exposure routes will include ingestion, dermal absorption, and inhalation of vapors and dust particles.

With regard to impact to the groundwater underneath the HWMU, REAMS fate and transport modeling² will be required to assess impact from residual soil contamination to the groundwater. If the groundwater does not qualify for clean closure, the scope of future groundwater monitoring will be discussed with VDEQ. The groundwater exposure routes to be evaluated include ingestion, dermal absorption, and inhalation of volatiles emitted from the contaminated groundwater.

The exposure assumptions presented in the following sections are based on residential exposure. These constitute a reasonable maximum exposure scenario (RME), an exposure which is unlikely to occur but is reasonably possible. The exposure pathways for residential exposure include ingestion of soil, dermal contact with soil, inhalation of resuspended soil particulates, and inhalation of volatile organic compounds.

4.1 Ingestion of Soil

The equation for potential chemical intake by soil ingestion on-site is included in Table

1. This scenario also assumes that weather or other conditions (e.g., frozen ground/ snow

REAMS includes the unsaturated zone fate and transport model SESOIL. The purpose of running the model is two fold: a) determine whether the contaminants will reach the groundwater table in next 30 years. b) calculate the risk associated with the estimated concentration in the groundwater. For constituents with a promulgated MCL, the estimated concentration will be directly compared against the MCL. However, prior to running the SESOIL model the facility should obtain all the information identified on page 62, of the Virginia Risk Guidance. The closure report must include evaluation of model results (concentrations reaching the groundwater) and a copy of SESOIL output file.

/other cover) do not affect exposure and that all soil ingested is from contaminated areas of the site. These assumptions are protective of human health and the environment.

4.2 Dermal Contact with Soil

The equation for calculating the potential absorbed chemical dose by dermal contact with contaminated soil is provided in Table 1. This scenario assumes that weather or other conditions (e.g., frozen ground/ snow or other cover) do not affect exposure, that contaminated soil remains on the skin long enough for the HCOC to be absorbed and that all soil adhering to the skin is from contaminated areas of the site.

The skin surface areas (SA) used in the dermal pathway have been identified in Virginia Risk Guidance as 4,860 cm² for adults, which is the 50th percentile value for the arms, hands and lower legs (U.S. EPA, 1989b - See Attachment A).

A skin-soil adherence factor of 1.45 mg/cm² will be used in the dermal intake calculations. The U.S. EPA guidance for dermal exposure assessment (*Dermal Exposure Assessment: Principles and Applications*, EPA/600/8-91/011B) states that a range of values from 0.1 mg/cm² to 1.5 mg/cm² per event appear possible for dermal adherence factors (AF). In order to estimate the amount of a particular HCOC which may potentially be absorbed through the skin, chemical-specific dermal absorption factors (ABS_{derm}) are used.

4.3 Inhalation of Resuspended Soil

The equation for potential chemical intake by inhalation of resuspended contaminated soil is included in Table 1. An inhalation rate of 0.83 m³/hr will be used as specified in the Virginia Risk Guidance. This scenario assumes that the concentration of HCOC in indoor dust will be equal to that in outdoor soil and that weather or other conditions, (e.g., frozen ground/snow or other cover) do not affect resuspension or exposure.

However, an appropriate model or equations in Table 1 will be used to estimate the potential amount of respirable particulate matter generated by wind erosion. The estimated generation rate for eroded particulate matter will then be used to derive an ambient air particulate concentration. Justification for and documentation of the model(s) used will be submitted to the Department as part of the risk assessment.

4.4 Inhalation of Volatilized HCOC in Soil

Since the HCOC have appreciable vapor pressures, they are expected to volatilize from soil. Inhalation of HCOC as volatilized vapors is considered for this risk assessment. The equations in Table 1 will be considered for estimating the intake for this condition.

5. Toxicity Assessment

The two principle indices of toxicity used in risk assessment are the reference dose (RfD) and the cancer slope factor (SF). An RfD is the intake or dose per unit of body weight (mg/kg-day) that is unlikely to result in toxic (non-carcinogenic) effects to human populations, including sensitive subgroups (e.g., the very young or elderly). The RfD allows for the existence of a threshold dose below which no adverse effects occur.

The SF is used to express the cancer risk attributable to a discrete unit of intake; that is, the cancer risk per milligram ingested per kilogram of bodyweight per day ([mg/kg-day]⁻¹). The SF is an estimate of the upper-bound probability of an individual developing cancer as a result of exposure to a particular carcinogen. Unlike the RfD, the SF assumes that there is no threshold dose below which the probability of developing cancer is zero. Note that SFs are only developed for those chemicals which have been shown to be carcinogens in man or in at least several animal species. A carcinogenic weight of evidence rating is used to describe the strength of the experimental evidence for carcinogenicity. The U.S. EPA has developed SFs for most chemicals

with weight of evidence ratings of "A" (known human carcinogen) or "B" (probable human carcinogen).

RfDs and SFs are derived by the U.S. EPA for the most toxic chemicals generally associated with chemical releases to the environment for which adequate toxicological data are available. If both the carcinogenic and non-carcinogenic effects of a particular compound are significant, both values may be established. However, in most cases only one value is available.

5.1 Inhalation and oral RfDs and SFs

RfDs and SFs pertinent to the oral and inhalation exposure pathways will be obtained from U.S. EPA's IRIS database. The IRIS (Integrated Risk Information System) on-line database was established by the U.S. EPA to provide risk assessors with peer reviewed toxicological data on chemicals commonly encountered at environmental sites of contamination. If data is not available from IRIS, it will be obtained from the Health Effects Assessment Summary Tables (HEAST), a compilation of toxicity values produced by the USEPA on a quarterly basis. The hierarchy presented in Appendix III of Virginia Risk Guidance will be followed for using these sources.

5.2 Dermal RfDs and SFs

Chemical specific oral-route absorption values (ABS_{oral}) are used to adjust the oral RfD or SF, which is computed from an administered dose, for use in the dermal exposure pathway. This correction is necessary due to the differences in absorption between the skin and the gastrointestinal tract. By correcting the administered-dose oral RfD or SF for the fraction expected to be absorbed in the gut, a dermal absorption factor can be used to estimate the correct dose received through the skin.

6. Evaluation of Risk

Using the toxicity criteria and identified exposure pathways discussed above, and the procedures described in the Virginia Risk Guidance, the risk presented by the HCOC will be estimated. The estimated risk will consider the effects from multiple constituents and all routes of exposure. The risk goals will be a total cumulative hazard index of 1.0 for multiple noncarcinogens and a total cumulative carcinogenic risk of $1\text{E-}04$ for multiple carcinogens. However, the risk from each individual carcinogen shall not exceed $1\text{E-}06$ (i.e., one case of cancer per 1,000,000 population).

6.1 Estimation of exposure concentration

For the contaminants detected at the site, an exposure point concentration (EPC) for each exposure pathway will be calculated for each contaminant by estimating the 95th upper confidence limit (UCL) on the arithmetic mean of the concentrations. If the calculated 95th UCL is greater than the maximum detected concentration, then the maximum detected concentration will be used as the EPC. The risk for contaminants will be calculated as per the equations and assumptions described in Tables 1 through 4. If for a contaminant both carcinogenic and noncarcinogenic risk-based cleanup goal exists, the lower of the two will be used as a pathway specific to estimate the risk.

6.2. Risk Estimation

Health risk assessments are based on the relationship involving intake, contaminant concentration, risk, and toxicity. Chronic daily intake (CDI), a product of intake and contaminant concentration, are estimated using the exposure equations and assumptions associated with each route of exposure. CDIs are then combined with the RfDs or SFs to determine the resulting risk. For carcinogen(s), cumulative potential risk (RISK_c) can be calculated as follows:

$$\text{RISK}_c = \text{CDI}_{\text{ingestion}} * \text{SF}_{\text{ingestion}} + \text{CDI}_{\text{dermal}} * \text{SF}_{\text{dermal}} + \text{CDI}_{\text{inhalation-VOCs}} * \text{SF}_{\text{inhalation-VOCs}} \\ + \text{CDI}_{\text{inhalation-particles}} * \text{SF}_{\text{inhalation-particles}}$$

For noncarcinogen(s), cumulative hazard index (HI_c) can be calculated as follows:

$$\text{HI}_c = \text{CDI}_{\text{ingestion}} / \text{RfD}_{\text{ingestion}} + \text{CDI}_{\text{dermal}} / \text{RfD}_{\text{dermal}} + \text{CDI}_{\text{inhalation-VOCs}} / \text{RfD}_{\text{inhalation-VOCs}} \\ + \text{CDI}_{\text{inhalation-particles}} / \text{RfD}_{\text{inhalation-particles}}$$

where, taking into account all HCOC and relevant exposure pathways, the excess cancer risk is 10^{-6} or the hazard index is 1.0.

Table 1
Risk Assessment Algorithm for Carcinogenic Exposure

<u>Exposure Route</u>	<u>Chronic Daily Intake (CDI), mg/L-day</u>	
	<u>Residential Exposure</u>	<u>Occupational/Industrial Exposure</u>
Ground Water		
Ingestion	$\frac{CW \times IRW_{adj} \times EF}{AT_c}$	$\frac{CW \times IRW_a \times EF_o \times ED_o}{BW_a \times AT_c}$
Inhalation	$\frac{CW \times IRA_{adj} \times EF \times K}{AT_c}$	$\frac{CW \times IRA_a \times EF_o \times ED_o \times K}{BW_a \times AT_c}$
Dermal	$\frac{CW \times SAW_{adj} \times PC \times ET \times EF \times CF}{AT_c}$	$\frac{CW \times SAW_a \times PC \times ET \times EF_o \times ED_o \times CF}{BW_a \times AT_c}$
Soil		
Ingestion	$\frac{CS \times IRS_{adj} \times CF \times FI \times EF}{AT_c}$	$\frac{CS \times IR \times CF \times FI \times EF_o \times ED_o}{BW_a \times AT_c}$
Dermal	$\frac{CS \times CF \times SAS_{adj} \times AF \times ABS \times EF}{AT_c}$	$\frac{CS \times CF \times SAS_a \times AF \times ABS \times EF_o \times ED_o}{BW_a \times AT_c}$

Inhalation of vaporizing VOCs from soil	$\frac{VF \times IRA_{adj} \times ET \times EF}{At_c}$	$\frac{VF \times IRA_s \times ET \times EF_o \times ED_o}{BW_s \times AT_c}$
Inhalation of emitting particles from soil	$\frac{PEF \times IRA_{adj} \times ET \times EF}{AT_c}$	$\frac{PEF \times IRA_s \times ET \times EF_o \times ED_o}{BW_s \times AT_c}$

Table 2
Risk Assessment Algorithm for Non-carcinogenic Exposure

<u>Exposure Route</u>	<u>Chronic Daily Intake (CDI), mg/L-day</u>	
	<u>Residential Exposure</u>	<u>Occupational/Industrial Exposure</u>
Ground Water		
Ingestion	$\frac{CW \times IRW_c \times EF \times ED_c}{BW_c \times AT_n}$	$\frac{CW \times IRW_a \times EF_o \times ED_o}{BW_a \times AT_n}$
Inhalation	$\frac{CW \times IRA_c \times EF \times ED_c \times K}{BW_c \times AT_n}$	$\frac{CW \times IRA_a \times EF_o \times ED_o \times K}{BW_a \times AT_n}$
Dermal	$\frac{CW \times SAW_c \times PC \times ET \times EF \times ED_c \times CF}{BW_c \times AT_n}$	$\frac{CW \times SAW_a \times PC \times ET \times EF_o \times ED_o \times CF}{BW_a \times AT_n}$
Soil		
Ingestion	$\frac{CS \times IRS_c \times CF \times FI \times EF \times ED_c}{BW_c \times AT_n}$	$\frac{CS \times IRS_a \times CF \times FI \times EF_o \times ED_o}{BW_a \times AT_n}$
Dermal	$\frac{CS \times CF \times SA_c \times AF \times ABS \times EF \times ED_c}{BW_c \times AT_n}$	$\frac{CS \times CF \times SA \times AF \times ABS \times EF_o \times ED_o}{BW_a \times AT_n}$

Inhalation of vaporizing VOCs from soil	$\frac{VF \times IRA_c \times ET \times EF \times ED_c}{BW_c \times AT_n}$	$\frac{VF \times IRA_a \times ET \times EF_o \times ED_o}{BW_a \times AT_n}$
Inhalation of emitting particles from soil	$\frac{PEF \times IRA_c \times ET \times EF \times ED_c}{BW_c \times AT_n}$	$\frac{PEF \times IRA_a \times ET \times EF_o \times ED_o}{BW_a \times AT_n}$

Note: Occupational noncarcinogenic risk assessment is based on adult exposure

Table 3
Age Adjusted Factors

$$IRA_{adj} = \frac{ED_c \times IRA_c}{BW_c} + \frac{(ED_{tot} - ED_c) \times IRA_a}{BW_a}$$

$$IRW_{adj} = \frac{ED_c \times IRW_c}{BW_c} + \frac{(ED_{tot} - ED_c) \times IRW_a}{BW_a}$$

$$SAW_{adj} = \frac{ED_c \times SAW_c}{BW_c} + \frac{(ED_{tot} - ED_c) \times SAW_a}{BW_a}$$

$$IRS_{adj} = \frac{ED_c \times IRS_c}{BW_c} + \frac{(ED_{tot} - ED_c) \times IRS_a}{BW_a}$$

$$SAS_{adj} = \frac{ED_c \times Sa_c}{BW_c} + \frac{(ED_{tot} - ED_c) \times Sa_a}{BW_a}$$

Note regarding age adjusted factor:

Because contact rate with tap water, ambient air, and residential soil are different for children and adults, carcinogenic risk during the first 30 years of life were calculated using age adjusted factor. These factors approximate the integrated exposure from birth until age 30 by combining contact rates, body weights, and exposure durations for two age groups - small children and adults.

Table 4
Exposure Variables Included in Tables 1, 2, and 3

Symbol	Term	Unit	Value	Reference
ABS	Absorption factor	-	User specified	
AF	Adherence factor	-	1.45	a, c
AT _c	Averaging time carcinogens	days	25550	
AT _n	Averaging time non-carcinogens	days	ED x 365	
BW _a	Body weight adult	kg	70	c
BW _c	Body weight child	kg	15	c
CF	Conversion factor	-	0.000001	-
CS	Chemical concentration in soil	mg/Kg-day	User specified	
CW	Chemical concentration in water	mg/L	User specified	
ED _c	Exposure duration child	years	6	c
ED _{total} ED	Exposure duration for carcinogen total or Residential	years	30	c
ED _o	Exposure duration occupational	years	25	c
EF	Exposure frequency residential	days	350	c
ET	Exposure Time General/Occupational Groundwater Surface Water - ingestion Surface water - dermal Air -inhalation	hrs/day	8.0 0.2 2.6 2.6 24.0	c, d
FI	Fraction ingested Residential Occupational	-	1.0 0.5	b
IRA _a	Inhalation rate air adult	m ³ /day	20	b

IRA _{adj}	Inhalation rate - air adjusted	-	11.66	
IRA _c	Inhalation rate child	m ³ /day	12	b
IRA _a	Inhalation rate adult	m ³ /day	20	b
IR	Ingestion rate food Fruit/veggies Fish	kg/day	0.28 0.122 0.054	c,d
IRS _a	Ingestion rate soil adult	mg/day	100	b
IRS _c	Ingestion rate soil child	mg/day	200	b
IRS _{adj}	Ingestion - soil adjusted	-	114.29	
IRS _c	Ingestion rate soil child	mg/day	200	b
IRW _a	Ingestion rate water adult	L/day	2	b
IRW _{adj}	Ingestion -water adjusted	L-y/kg-d	1.09	
IRW _c	Ingestion rate water child	L/day	1	b
K	Volatilization factor, water to air	-	0.5	
PC	Permeability constant	cm/hr	User specified	b
PEF	Particulate emission factor	kg/m ³	6.789926E08	f
SAW _c	Surface area child groundwater dermal surface water dermal	cm ²	7500	b,e
SAS _a SAS _c	Surface area soil occupational - adult child	cm ² /event	4500 1875	e
SAS _{adj}	Surface area soil adjusted	cm ² /event	2290	
SAW _a	Surface area for water contact adult	cm ²	820	b
SAW _{adj}	Surface area for water contact	cm ² /event	9200	
VF	Volatilization factor, soil to air	kg/m ³	User specified	-

References:

- a. Risk Assessment Guidance for Superfund, Volume I, EPA/540/1-89/002, December 1989.
- b. Region III values
- c. Exposure Factors handbook, EPA/600/8-89/043, July 1989
- d. Human health evaluation manual supplemental guidance, OSWER Directive 9285.6-03. March 25, 1991.
- e. Dermal exposure Assessment. Principles and Applications, Interim Report. EPA/600/8-91/011b. January 1992.
- f. Technical Background Document for Draft Soil Screening Level Guidance. Office of Solid Waste and Emergency Response. EPA/540/R-94/101. December 1994.

Rec'd ENV 1-23-98-aog



98-19

C: Jake
Kedder
Allen
ENV files
Barker

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

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Governor

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Becky Norton Dunlop
Secretary of Natural Resources

Thomas L. Hopkins
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(804) 698-4000
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January 16, 1998

C.A. Jake
Environmental Manager
Alliant Techsystems Inc.
Radford Army Ammunition Plant
Route 114
P.O. Box 1
Radford, Virginia 24141-0100

**RE: Radford Army Ammunition Plant, EPA ID#VA1210020730
Closure of Equalization Basin (HWMU 10)
Data Submittal and Risk-Based Closure Amendment Submittal**

Dear Ms. Jake:

The Department received Radford Army Ammunition Plant's closure plan amendment request and the resampling results for their Equalization Basin on December 17, 1997. Review of the submitted risk-based amendment to the approved closure plan and the resampling data will commence within the next few weeks. If there are any questions or concerns regarding the review, please contact me at (804) 698-4206.

Sincerely,

A handwritten signature in cursive script that reads "Debra A. Miller".

Debra A. Miller
Environmental Engineer Senior
Office of Waste Permitting

cc: Aziz Farahmand, DEQ-RRO
Clarie Ballard, DEQ-OTA
Melissa Porterfield, DEQ-OWP

C:

RADFORD ARMY AMMUNITION PLANT

ALLIANT TECHSYSTEMS

RADFORD, VIRGINIA

TELEPHONE CALL RECORD

CALL RECEIVED ()

DATE 12/22/97 11:35 AM

CALL PLACED (X)

BY: Christel Compton

NAME OF PARTY Debbie Miller

COMPANY OR ORGANIZATION VDEQ

ADDRESS Richmond, VA

SUBJECT OF CALL Unit 10 Risk-Based Closure

804/698-4206

SUMMARY OF CONVERSATION

I called Debbie to see whether she had received the Equalization Basin (Unit 10) Risk-Based Closure Amendment and the Basin Grid resampling results. She received both. I inquired when she thought she may review the Closure Amendment and the resampling results as the Corps of Engineers is planning to begin closure activities in January 1998. She indicated she has a Permit Application and several other submittals to review first. She anticipates review in 30 to 40 days. Because the Risk-Based Closure Amendment is similar to one she recently approved, review will be quick when she gets to it.

Alliant Techsystems Inc.
Radford Army Ammunition Plant
Route 114
P.O. Box 1
Radford, VA 24141-0100

December 18, 1997

97-815-265

Debra Miller
Office of Permitting Management
629 East Main Street
Richmond, VA 23219

Subject: Risked Based Closure Amendment
EQ Basin-HWMU 10
Radford Army Ammunition Plant, Radford Virginia,
EPA ID# VA1210020730

Dear Ms. Miller:

Enclosed is the amendment to the "Closure, Contingent Closure and Contingent Post-Closure Plans for Radford Army Ammunition Plant's Equalization Basin (HWMU-10 & SWMU-10)"; to include Risked Based Closure as an option for site closure. Your October 3, 1997 comments on the Risk-Based Closure Amendment of the Incinerator Spray Pond were included as part of this amendment.

The "Final Site Investigation/Evaluation, Bioplant Equalization Basin Closure" was submitted January 28, 1997. This report and the revised sampling results for Basin Grid #1 and Grid #10 submitted December 18, 1997 indicates that the only Hazardous Constituent of Concern detected above background concentration was Fluoranthene. The concentration of Fluoranthene in the basin subsoils is 9330 ppm, which is considerably lower than the Region III Risk-Based Criteria for residential oral ingestion of 3100 ppm. The fluoranthene concentration is also lower than the transfers to air and groundwater, 68 mg/kg and 980 ppm respectively. Although it is suspected the fluoranthene is a component of the basin liner that will be removed during closure activities, a risk assessment will be completed and submitted in support of the EQ Basin closure. Based on this information the Corps of Engineers is proceeding with closure activities. A closure schedule will be forwarded to you, when one becomes available.

The necessary documentation for risk based closure is being prepared in accordance with the enclosed amendment. If you have any questions or concerns please contact

Jerry Redder (540) 639-7536 (Jerome_Redder@ATK.com) or Christel Compton
(540)639-8211 (Christel_Compton@ATK.com).

Sincerely,

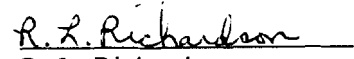


C. A. Jake, Supervisor
Environmental Affairs

Enclosures

c: West Central Regional Office - Roanoke
Marc Gutterman, Norfolk District Corps of Engineers

Coordination:


M. L. Griffith
R. L. Richardson

bc: Adm. File
Env. File, w/ enclosure
R. L. Richardson, ACO - w/ enclosure
~~D. W. Shead - w/o enclosure~~
C. A. Jake - w/o enclosure
J. J. Redder - w/ enclosure
C. Compton - w/ enclosure

[Beginning with Section 3.8, Page33, end of 3rd paragraph of the section....]

... The closure plan consists of the following aspects:

- Background characterization;
- Initial random sampling of the subsoils;
- Possible excavation, repeated sampling, initiation of risk-based closure, or contingent closure;
- Repeat excavation and sampling or initiation of risk-based closure or contingent closure;
- “Hot Spot” sampling of the subsoils if random sampling indicates hot spots exist.

The initial sampling will be conducted to determine if clean closure can be achieved and whether soil removal will be required to achieve clean closure. A “hot spot” sampling approach may be used to better delineate contaminated areas for excavation and subsequent disposal, depending on the results from random sampling. The samples will be discrete samples. Radford Army Ammunition Plant reserves the option, at any point during the EQ Basin subsoils assessment, to abandon attempts to demonstrate clean closure and immediately implement one of the following:

- Continue with removal activities and sampling of soil layers, as detailed below;
- Perform closure to risk-based standards as detailed in Section 3.8.5 and Appendix A of this closure plan; or
- Implement contingent closure and post-closure procedures of this plan.

[Beginning with Section 3.8.4, Page 42, beginning of 6th paragraph...]

If, upon following the protocols detailed in Section 3.8 in an attempt to achieve clean closure, the basin subsoils sampling results remain above the background values of one or more constituents, Radford Army Ammunition Plant (RAAP) will:

- Continue with removal activities and sampling of soil layers, as detailed above;
- Perform closure to risk-based standards as detailed in Section 3.8.5 and Appendix A of this closure plan; or
- Implement contingent closure and post-closure procedures of this plan.

As previously stated, the facility reserves the option, at any point during the EQ Basin subsoils assessment, to abandon attempts to demonstrate clean closure to either background or risk-based standards and immediately implement contingent closure and post-closure.

3.8.5 Risk Assessment for Closure

As discussed in Section 3.2, an alternative to the clean closure to background standards, the owner may propose to demonstrate that the concentrations of hazardous constituents statistically above the background values do not pose an unacceptable level of risk to human health and the environment. The facility may propose this to the DEQ following the requirements as outlined in this section and as detailed in Appendix A.

In order to estimate the risk for HCOCs statistically above the background values, a risk assessment will be conducted according to the DEQ document titled "Guidance for development of health based cleanup goals using decision tree/REAMS program (herein after "Virginia Risk Guidance") (November 1, 1994) prepared by Old Dominion University and the approved closure plan. The risk goals/performance standards will be a hazard index of 1.0 for non-carcinogens and an individual carcinogenic risk of 1×10^{-6} and cumulative carcinogenic risk of 1×10^{-4} . This risk assessment will be conducted assuming a future residential use of the property.

The Department will review the risk assessment report to determine that it conforms to risk assessment requirements for residential risk-based protocols. If acceptable, attainment of the closure standards may then be demonstrated using the residential risk-based assessment in lieu of the clean closure to background standards established under Section 3.8.1 Background Soil Sampling and Section 3.7.6 Subsoil Investigation.

Note, if the Equalization Basin (Unit 10) cannot meet the residential risk closure standards, then Radford Army Ammunition Plant may propose to modify this closure plan for industrial risk-based closure. Modification will require notification of the DEQ and the submittal of a closure amendment.

APPENDIX A
RISK-BASED CLOSURE

Appendix A

RISK-BASED CLOSURE

1. Introduction

This document discusses the protocol for conducting a risk assessment to implement closure of a hazardous waste management unit (HWMU) in accordance with the Virginia Hazardous Waste Management Regulations (VHWMR) as codified in Title 9 of the Virginia Administrative Code, Agency 20, Chapter 20 (9 VAC 20-60-10 et seq).

2. Risk-Based Evaluation

In order to estimate the risk for chemicals of concern (COCs) a risk assessment will be conducted according to the Virginia DEQ document titled "Guidance for development of health based cleanup goals using decision tree/REAMS program (herein after "Virginia Risk Guidance") (November 1, 1994) prepared by Old Dominion University and the approved closure plan. The risk assessment report will contain the following sections:

- site evaluation,
- development of a site conceptual model,
- identification of contaminants of concern,
- identification of media and exposure pathways,
- toxicity assessment,
- estimation of contaminant concentration at the point of exposure, and
- summary of health risks.

The submission instructions contained in Appendix IX of the Virginia Risk Guidance will be reviewed prior to submitting the report to confirm that all necessary risk issues have been addressed. The risk goals associated with the closure performance standards will include:

- a hazard index of 1.0 for non-carcinogens;
- a risk of $1E-06$ or less for individual carcinogens;
- cumulative risk of $1E-04$ or less for all carcinogens; and
- the concentrations of HCOCs remaining in the HWMU will not result in contamination of other environmental media of concern, including the ground water underneath the unit.

Compliance with the closure standard will be verified by comparing the calculated individual and cumulative risk/hazard for all the hazardous contaminants of concern (HCOC) that failed background statistical comparison to the risk-based goals.

The risk assessment will be conducted assuming a future residential/industrial use of the property. The methodology/equation for estimating the exposure concentration is presented in subsequent

sections.

The initial step in the risk assessment will be to develop a site conceptual exposure model (SCEM) which depicts all potential exposure routes and media for the site and the receptors which may be exposed. The HCOC are to be identified using the method in Section 3.

In the next step, the exposure assumptions outlined in the Virginia Risk Guidance will be employed to estimate the risk. Information will also be taken as needed from U.S. EPA documents and databases (e.g., the Risk Assessment Guidance for Superfund (RAGS), and the Integrated Risk Information System (IRIS)). The chemical intake equations and exposure parameter assumptions used to calculate estimated risks (obtained from Virginia risk assessment guidance/REAMS) are shown in Tables 1 through 4. Additional details on the approach and assumptions used for each potential exposure pathway are provided below.

As a part of the Risk Exposure and Analysis Modeling System (REAMS) evaluation, fate and transport modeling is conducted to demonstrate that the residual soil concentrations of contaminants of concern would not result in contamination of other environmental media of concern including the groundwater underneath the closure unit. For this purpose, representative soil sample(s) will be collected around the unit (subjected to closure) for analysis of the properties listed on page 62 of the REAMS document. [It is often less expensive to obtain this information from an agriculture lab rather than from an environmental lab]. In certain situations, groundwater sampling may be preferable.

3. Identification of Contaminants of Concern

For purposes of REAMS evaluations associated with a HWMU, HCOC are those closure constituents present at concentrations statistically exceeding the background levels. If the concentrations of a closure constituent did not statistically exceed the background levels, no further risk-based evaluation for such constituent is required.

4. Exposure Assessment

The exposure assessment will identify transport mechanisms for the contaminants of concern that may potentially impact human receptors. The results of this assessment will be used to document the current and future exposure potential posed by the site.

With regard to the soil, a residential exposure will be assumed to document unrestricted closure of the soil. If the risk for potential residential exposure does not exceed the performance standards, unrestricted closure of soil will be documented/accepted. If the site cannot be clean closed for residential use, then the option to pursue restricted closure (commercial/industrial) will be exercised. Closure to commercial/industrial scenario will require the facility to enact a deed restriction that eliminates the possibility of future residential use of the site. The requirements for establishing such a deed restriction are detailed in DEQ's Guidelines for

Developing Health-Based Cleanup Goals Using Risk Assessment at A Hazardous Waste Site Facility for Restricted Industrial Use, dated June 1995. (A copy of this document is attached.)

Exposure routes will include ingestion, dermal absorption, and inhalation of vapors and dust particles.

With regard to groundwater, REAMS fate and transport modeling¹ will be required to assess impact from residual soil contamination to the groundwater. If the ground water does not qualify for clean closure, the scope of future ground water monitoring will be discussed with DEQ and incorporated in the EQ Basin Ground Water Monitoring Plan. The groundwater exposure routes to be evaluated include ingestion, dermal absorption, inhalation of resuspended soil particles, and inhalation of volatiles emitted from the contaminated groundwater.

The exposure assumptions presented in the following sections are based on residential exposure. These constitute a reasonable maximum exposure scenario (RME), an exposure which is unlikely to occur but is reasonably possible. The exposure pathways for residential exposure include ingestion of soil, dermal contact with soil, inhalation of resuspended soil particulates, and inhalation of volatile organic compounds.

4.1 Ingestion of Soil

The equation for potential chemical intake by soil ingestion for residential scenario on site is included in Table 1. This scenario also assumes that weather or other conditions (e.g., frozen ground/ snow /other cover) do not affect exposure and that all soil ingested is from contaminated areas of the site. These assumptions are protective of human health and the environment.

4.2 Dermal Contact with Soil

The equation for calculating the potential absorbed chemical dose by dermal contact with contaminated soil is provided in Table 1. This scenario assumes that weather or other conditions (e.g., frozen ground/ snow or other cover) do not affect exposure, that contaminated soil remains on the skin long enough for the HCOCs to be absorbed and that all soil adhering to the skin is from contaminated areas of the site.

The skin surface areas (SA) used in the dermal pathway have been identified in REAMS guidance as 4,860 cm² for adults, which is the 50th percentile value for the arms, hands

REAMS includes the unsaturated zone fate and transport model SESOIL. The purpose of running the model is two fold: a) determine whether the contaminants will reach the groundwater table in next 30 years. b) calculate the risk associated with the estimated concentration in the groundwater. For constituents with a promulgated MCL, the estimated concentration will be compared against the MCL. However, prior to running the SESOIL model the facility should obtain all the information identified on page 62, of the Virginia guidance document. The closure report must include evaluation of model results (concentrations reaching the groundwater) and a copy of SESOIL output file.

and lower legs (U.S. EPA, 1989b - See Attachment A).

A skin-soil adherence factor of 1.45 mg/cm^2 will be used in the dermal intake calculations. The U.S. EPA guidance for dermal exposure assessment (Dermal Exposure Assessment: Principles and Applications, EPA/600/8-91/011B) states that a range of values from 0.1 mg/cm^2 to 1.5 mg/cm^2 per event appear possible for dermal adherence factors (AF). In order to estimate the amount of a particular HCOC which may potentially be absorbed through the skin, chemical-specific dermal absorption factors (ABS_{derm}) are used.

4.3 Inhalation of Resuspended Soil

The equation for potential chemical intake by inhalation of resuspended contaminated soil is included in Table 1. An inhalation rate of $0.83 \text{ m}^3/\text{hr}$ will be used as specified in the Virginia Risk Guidance. This scenario assumes that the concentration of HCOCs in indoor dust will be equal to that in outdoor soil and that weather or other conditions, (e.g., frozen ground/snow or other cover) do not affect resuspension or exposure.

However, an appropriate model or equations in Table 1, will be used to estimate the potential amount of respirable particulate matter generated by wind erosion. The estimated generation rate for eroded particulate matter will then be used to derive an ambient air particulate concentration. Documentation for and justification of these models will be presented to the Department as part of the risk assessment.

4.4 Inhalation of Volatilized HCOCs in Soil

Since the HCOCs have appreciable vapor pressures, they are expected to volatilize from soil. Inhalation of HCOCs as volatilized vapors is considered for this risk assessment. The equations in Table 1 will be considered for estimating the intake for this condition.

5. Toxicity Assessment

The two principle indices of toxicity used in risk assessment are the reference dose (RfD) and the cancer slope factor (SF). An RfD is the intake or dose per unit of body weight (mg/kg-day) that is unlikely to result in toxic (non-carcinogenic) effects to human populations, including sensitive subgroups (e.g., the very young or elderly). The RfD allows for the existence of a threshold dose below which no adverse effects occur.

The SF is used to express the cancer risk attributable to a discrete unit of intake; that is, the cancer risk per milligram ingested per kilogram of bodyweight per day ($[\text{mg/kg-day}]^{-1}$). The SF is an estimate of the upper-bound probability of an individual developing cancer as a result of exposure to a particular carcinogen. Unlike the RfD, the SF assumes that there is no threshold dose below which the probability of developing cancer is zero. Note that SFs are only developed

for those chemicals which have been shown to be carcinogens in man or in at least several animal species. A carcinogenic weight of evidence rating is used to describe the strength of the experimental evidence for carcinogenicity. The U.S. EPA has developed SFs for most chemicals with weight of evidence ratings of "A" (known human carcinogen) or "B" (probable human carcinogen).

RfDs and SFs are derived by the U.S. EPA for the most toxic chemicals generally associated with chemical releases to the environment for which adequate toxicological data are available. If both the carcinogenic and non-carcinogenic effects of a particular compound are significant, both values may be established. However, in most cases only one value is available. As part of the risk assessment, EPA Region III Policy and maximum contaminant levels (MCLs) will be utilized, where appropriate.

5.1 Inhalation and Oral RfDs and SFs

The RfDs and SFs pertinent to the oral and inhalation exposure pathways will be obtained from U.S. EPA's IRIS database. The IRIS (Integrated Risk Information System) on-line database was established by the U.S. EPA to provide risk assessors with peer reviewed toxicological data on chemicals commonly encountered at environmental sites of contamination. If data is not available from IRIS, it will be obtained from the Health Effects Assessment Summary Tables (HEAST), a compilation of toxicity values produced by the USEPA on a quarterly basis. The hierarchy presented in Appendix III of Virginia Risk guidance will be followed for using these sources.

5.2 Dermal RfDs and SFs

Chemical specific oral-route absorption values (ABS_{oral}) are used to adjust the oral RfD or SF, which is computed from an administered dose, for use in the dermal exposure pathway. This correction is necessary due to the differences in absorption between the skin and the gastrointestinal tract. By correcting the administered-dose oral RfD or SF for the fraction expected to be absorbed in the gut, a dermal absorption factor can be used to estimate the correct dose received through the skin.

6. Evaluation of Risks

Using the toxicity criteria and identified exposure pathways discussed above, and the procedures described in the DEQ risk guidance document (REAMS, November 1994), the risks presented by the HCOC will be estimated. The estimated risks will consider the effects from multiple constituents and all routes of exposure. The risk goals will be a total cumulative hazard index of 1.0 for multiple noncarcinogens and a total cumulative carcinogenic risk of $1E-04$ for multiple carcinogens. However, the risk from each individual carcinogen shall not exceed $1E-06$ (i.e., one

case of cancer per 1,000,000 population).

6.1 Estimation of exposure concentration

For the contaminants detected at the site, an exposure point concentration (EPC) for each exposure pathway will be calculated for each contaminant by estimating the 95th upper confidence limit (UCL) on the arithmetic mean of the concentrations. If the calculated 95th UCL is greater than the maximum detected concentration, then the maximum detected concentration will be used as the EPC. The risks for contaminants will be calculated as per the equations and assumptions described in Table 1 through Table 4. If for a contaminant both carcinogenic and noncarcinogenic risk-based cleanup goal exists, the lower of the two will be used as a pathway specific to estimate the risk.

6.2 Risk Estimation

Health risk assessments are based on the relationship involving intake, contaminant concentration, risk, and toxicity. Chronic daily intake (CDI), a product of intake and contaminant concentration, are estimated using the exposure equations and assumptions associated with each route of exposure. CDIs are then combined with the RfDs or SFs to determine the resulting risk. For carcinogens, cumulative potential risk (RISK_c) can be calculated as follows:

$$\text{RISK}_c = \text{CDI}_{\text{ingest}} * \text{SF}_{\text{ingest}} + \text{CDI}_{\text{derm}} * \text{SF}_{\text{derm}} + \text{CDI}_{\text{inhal-VOCs}} * \text{SF}_{\text{inh-VOCs}} + \text{CDI}_{\text{inh-part}} * \text{SF}_{\text{inh-part}}$$

For noncarcinogens, cumulative hazard index (Hi_c) can be calculated as follows:

$$\text{Hi}_c = \text{CDI}_{\text{ingest}}/\text{RfD}_{\text{ingest}} + \text{CDI}_{\text{derm}}/\text{RfD}_{\text{derm}} + \text{CDI}_{\text{inhal-VOCs}}/\text{RfD}_{\text{inhal-VOCs}} + \text{CDI}_{\text{inh-part}}/\text{RfD}_{\text{inh-part}}$$

where taking into account all HCOC and relevant exposure pathways, the excess cancer risk is 10⁻⁶ or the hazard index is 1.0.

Using REAMS software a maximum acceptable contaminant concentrations will be calculated which meets the cumulative risk criteria. This process will be used in this risk assessment to derive the health-based cleanup criteria for the site. If the estimated risks satisfy the risk based performance standards, the soils/groundwater will be considered clean closed.

Table 1
Risk Assessment Algorithm for Carcinogenic Exposure

<u>Exposure Route</u>	<u>Chronic Daily Intake (CDI), mg/l.-day</u>	
	<u>Residential Exposure</u>	<u>Occupational/Industrial Exposure</u>
Ground Water		
Ingestion	$\frac{CW \times IRW_{adj} \times EF}{AT_c}$	$\frac{CW \times IRW_a \times EF_o \times ED_o}{BW_a \times AT_c}$
Inhalation	$\frac{CW \times IRA_{adj} \times EF \times K}{AT_c}$	$\frac{CW \times IRA_a \times EF_o \times ED_o \times K}{BW_a \times AT_c}$
Dermal	$\frac{CW \times SAW_{adj} \times PC \times ET \times EF \times CF}{AT_c}$	$\frac{CW \times SAW_a \times PC \times ET \times EF_o \times ED_o \times CF}{BW_a \times AT_c}$
Soil		
Ingestion	$\frac{CS \times IRS_{adj} \times CF \times FI \times EF}{AT_c}$	$\frac{CS \times IR \times CF \times FI \times EF_o \times ED_o}{BW_a \times AT_c}$
Dermal	$\frac{CS \times CF \times SAS_{adj} \times AF \times ABS \times EF}{AT_c}$	$\frac{CS \times CF \times SAS_a \times AF \times ABS \times EF_o \times ED_o}{BW_a \times AT_c}$
Inhalation of vaporizing VOCs from soil	$\frac{VF \times IRA_{adj} \times ET \times EF}{AT_c}$	$\frac{VF \times IRA_a \times ET \times EF_o \times ED_o}{BW_a \times AT_c}$
Inhalation of emitting particles from soil	$\frac{PEF \times IRA_{adj} \times ET \times EF}{AT_c}$	$\frac{PEF \times IRA_a \times ET \times EF_o \times ED_o}{BW_a \times AT_c}$

Table 2
Risk Assessment Algorithm for Non-carcinogenic Exposure

Exposure Route	Chronic Daily Intake (CDI), mg/L-day	
	Residential Exposure	Occupational/Industrial Exposure
Ground Water		
Ingestion	$\frac{CW \times IRW_c \times EF \times ED_c}{BW_c \times AT_n}$	$\frac{CW \times IRW_a \times EF_o \times ED_o}{BW_a \times AT_n}$
Inhalation	$\frac{CW \times IRA_c \times EF \times ED_c \times K}{BW_c \times AT_n}$	$\frac{CW \times IRA_a \times EF_o \times ED_o \times K}{BW_a \times AT_n}$
Dermal	$\frac{CW \times SAW_c \times PC \times ET \times EF \times ED_c \times CF}{BW_c \times AT_n}$	$\frac{CW \times SAW_a \times PC \times ET \times EF_o \times ED_o \times CF}{BW_a \times AT_n}$
Soil		
Ingestion	$\frac{CS \times IRS_c \times CF \times FI \times EF \times ED_c}{BW_c \times AT_n}$	$\frac{CS \times IRS_a \times CF \times FI \times EF_o \times ED_o}{BW_a \times AT_n}$
Dermal	$\frac{CS \times CF \times SA_c \times AF \times ABS \times EF \times ED_c}{BW_c \times AT_n}$	$\frac{CS \times CF \times SA \times AF \times ABS \times EF_o \times ED_o}{BW_a \times AT_n}$
Inhalation of vaporizing VOCs from soil	$\frac{VF \times IRA_c \times ET \times EF \times ED_c}{BW_c \times AT_n}$	$\frac{VF \times IRA_a \times ET \times EF_o \times ED_o}{BW_a \times AT_n}$
Inhalation of emitting particles	$\frac{PEF \times IRA_c \times ET \times EF \times ED_c}{BW_c \times AT_n}$	$\frac{PEF \times IRA_a \times ET \times EF_o \times ED_o}{BW_a \times AT_n}$

<u>Exposure Route</u>	<u>Chronic Daily Intake (CDI), mg/L-day</u>	
	<u>Residential Exposure</u>	<u>Occupational/Industrial Exposure</u>
from soil	$BW_c \times AT_n$	$BW_A \times AT_n$

Note: Occupational noncarcinogenic risk assessment is based on adult exposure

Table 3
Age Adjusted Factors

$$IRA_{adj} = \frac{ED_c \times IRA_c}{BW_c} + \frac{(ED_{tot} - ED_c) \times IRA_a}{BW_a}$$

$$IRW_{adj} = \frac{ED_c \times IRW_c}{BW_c} + \frac{(ED_{tot} - ED_c) \times IRW_a}{BW_a}$$

$$SAW_{adj} = \frac{ED_c \times SAW_c}{BW_c} + \frac{(ED_{tot} - ED_c) \times SAW_a}{BW_a}$$

$$IRS_{adj} = \frac{ED_c \times IRS_c}{BW_c} + \frac{(ED_{tot} - ED_c) \times IRS_a}{BW_a}$$

$$SAS_{adj} = \frac{ED_c \times Sa_c}{BW_c} + \frac{(ED_{tot} - ED_c) \times Sa_a}{BW_a}$$

Note regarding age adjusted factor:

Because contact rate with tap water, ambient air, and residential soil are different for children and adults, carcinogenic risks during the first 30 years of life were calculated using age adjusted factor. These factors approximate the integrated exposure from birth until age 30 by combining contact rates, body weights, and exposure durations for two age groups - small children and adults.

Table 4
Exposure Variables Included in Tables 1, 2, and 3

Symbol	Term	Unit	Value	Reference
ABS	Absorption factor	-	User specified	
AF	Adherence factor	-	1.45	a, c
AT _c	Averaging time carcinogens	days	25550	
AT _n	Averaging time non-carcinogens	days	ED x 365	
BW _a	Body weight adult	kg	70	c
BW _c	Body weight child	kg	15	c
CF	Conversion factor	-	0.000001	-
CS	Chemical concentration in soil	mg/Kg-day	User specified	
CW	Chemical concentration in water	mg/L	User specified	
ED _c	Exposure duration child	years	6	c
ED _{total} ED	Exposure duration for carcinogen total or Residential	years	30	c
ED _o	Exposure duration occupational	years	25	c
EF	Exposure frequency residential	days	350	c
ET	Exposure Time General/Occupational Groundwater Surface Water - ingestion	hrs/day	8.0 0.2 2.6 2.6	c, d

Symbol	Term	Unit	Value	Reference
	Surface water - dermal Air -inhalation		24.0	
FI	Fraction ingested Residential Occupational	-	1.0 0.5	b
IRA _a	Inhalation rate air adult	m ³ /day	20	b
IRA _{adj}	Inhalation rate - air adjusted	-	11.66	
IRA _c	Inhalation rate child	m ³ /day	12	b
IRA _a	Inhalation rate adult	m ³ /day	20	b
IR	Ingestion rate food Fruit/veggies Fish	kg/day	0.28 0.122 0.054	c,d
IRS _a	Ingestion rate soil adult	mg/day	100	b
IRS _c	Ingestion rate soil child	mg/day	200	b
IRS _{adj}	Ingestion - soil adjusted	-	114.29	
IRS _c	Ingestion rate soil child	mg/day	200	b
IRW _a	Ingestion rate water adult	L/day	2	b
IRW _{adj}	Ingestion -water adjusted	L-y/kg-d	1.09	
IRW _c	Ingestion rate water child	L/day	1	b

Symbol	Term	Unit	Value	Reference
K	Volatilization factor, water to air	-	0.5	
PC	Permeability constant	cm/hr	User specified	b
PEF	Particulate emission factor	kg/m ³	6.789926E08	f
SAW _c	Surface area child groundwater dermal surface water dermal	cm ²	7500	b,e
SAS _a SAS _c	Surface area soil occupational - adult child	cm ² /event	4500 1875	e
SAS _{adj}	Surface area soil adjusted	cm ² /event	2290	
SAW _a	Surface area for water contact adult	cm ²	820	b
SAW _{adj}	Surface area for water contact	cm ² /event	9200	
VF	Volatilization factor, soil to air	kg/m ³	User specified	-

References:

- a. Risk Assessment Guidance for Superfund, Volume I, EPA/540/1-89/002, December 1989.
- b. Region III values
- c. Exposure Factors handbook, EPA/600/8-89/043, July 1989
- d. Human health evaluation manual supplemental guidance, OSWER Directive 9285.6-

- 03. March 25, 1991.
- e. Dermal exposure Assessment, Principles and Applications, Interim Report. EPA/600/8-91/011b. January 1992.
- f. Technical Background Document for Draft Soil Screening Level Guidance. Office of Solid Waste and Emergency Response. EPA/540/R-94/101. December 1994.

Rev'd ENV 11-4-97-adj



97-182

C: Jake
Redder
Olson
B. Richardson
ENV file

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

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Becky Norton Dunlop
Secretary of Natural Resources

**Certified Mail
Return Receipt Requested**

October 30, 1997

C.A. Jake
Environmental Manager
Alliant Techsystems, Inc.
Radford Army Ammunition Plant
P.O. Box 1
Radford, VA 24141-0100

**RE: Radford Army Ammunition Plant
EPA ID# VA12100207306
Equalization Basin Closure
Closure Extension**

Dear Ms. Jake:

Your letter requesting an extension to the closure schedule for the Equalization Basin's closure activities was received on October 7, 1997. This extension request is necessary to allow the facility to pursue risk-based closure of the Equalization Basin.

As the closure activities will, of necessity, take longer to complete than the current closure schedule allows, an extension until May 7, 1998, is approved. Please update the approved closure plan to reflect this revised closure completion date. During this extension period, RAAP shall continue to take all steps to prevent threats to human health and the environment from the Equalization Basin that is no longer operating but has not completed formal closure.

RAAP
Page 2

If there are any additional questions, please contact Debra Miller, Environmental Engineer Senior, of my staff at (804) 698-4206.

Sincerely,

Leslie A. Romanchik

for Thomas L. Hopkins

cc: Leslie Romanchik, DEQ
Debra Miller, DEQ
Glenn VonGonten, DEQ
Claire Ballard, DEQ
Aziz Farahmand, DEQ-RRO



Bob Richardson
Anne
Christel

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October 22, 1997

C.A. Jake
Environmental Manager, Alliant Techsystems Inc.
Radford Army Ammunition Plant
P.O. Box 1
Radford, VA 24141-0100

**RE: Radford Army Ammunition Plant (RAAP), EPA ID# VA12100207306
Equalization Basin/Background Data Approval**

Dear Ms. Jake:

RAAP's revision to the Site Investigation Evaluation report was received by the Department of Environmental Quality (DEQ) on April 3, 1997. Please forgive the delay in this response.

Based on the information provided, the background data, as presented in this report, is acceptable. By this letter, the DEQ approves the background data for the hazardous constituents of concern. Please note, however, that the compliance sampling and statistical comparisons, as presented in the report, are still under review and no decision regarding their acceptability has yet been made. Once this review is completed, a separate letter addressing any concerns or accepting the data presented will be sent to RAAP. If there are any questions regarding these comments or the background data review, please contact me at (804) 698-4206.

Sincerely,

Debra A. Miller
Environmental Engineer Senior

cc: Jerry Redder, Alliant Techsystems/RAAP'
Lisa Ellis, DEQ
Claire Ballard, DEQ
Aziz Farahmand, DEQ-RRO

Compton, Christel

From: damiller@deq.state.va.us[SMTP:damiller@deq.state.va.us]
Sent: Thursday, October 16, 1997 10:47 AM
To: Jerome_Redder@ATK.COM; Christel_Compton@ATK.COM
Subject: EQ Basin (HWMU#10)

Well - I have had a couple "free" hours so I decided to look at Eq Basin again [yes, I know something must be wrong with me if this is how I choose to spend some rare downtime!!].

I am still having problems with the dilutions for EQ Basin samples. Since I am not a PhD Chemist, I am going to run this by a couple of people before I make a call. However, I have looked at the background data - and it looks okay, so I am going to draft the approval letter (and lets hope the managers agree and let me sign off on it).

As for the Eq Basin sampling - let's see if I can explain the problem. For example, when we look at Aroclor-1221 - the background data shows non-detects, but the PQLs for these samples are in the range of 78-81. Then when you look at the basin sampling, non-detects are also indicated; however, the PQLs range from 84-17000. You cannot look at this data and say that they are statistically similar. Granted nothing is detected in either the background or the basin sampling - but the PQLs for the basin samples are factors beyond the background data (especially, #1 and #10).

I am going to check and see what the chemist and statisticians think. But right now, I am thinking that for the compounds that have this "problem" - it might be best to include them in the risk based amendment for closure (sort of what Jerry had indicated). I'll let you all know. Sorry - don't mean to be picky, but this might be a tough one to justify (as I am sure you can understand).

Let me know if there is anything else - and I will start on the background data approval letters. See you on the 22nd!!

Alliant Techsystems Inc.
Radford Army Ammunition Plant
Route 114
P.O. Box 1
Radford, VA 24141-0100

October 3, 1997

97-815-205

Debra Miller
Office of Permitting Management
629 East Main Street
Richmond, VA 23219


Subject: Request for Extension of Closure Schedule
Bio-Plant Equalization Basin, HWMU 10
Radford Army ammunition Plant, Radford Virginia,
EPA ID# VA1210020730

Dear Ms. Miller:

Based on results from the sub-soil investigation, fluoranthene was the only hazardous constituent of concern detected in the sub-soil above background concentrations. Therefore, the Norfolk District Corps of Engineers requested that they be allowed to close the Basin based on risk. Because the concentration of fluoranthene was significantly lower than the residential risk-based numbers in EPA's R.L. Smith Risk-Based Concentration tables, Alliant will be requesting to change the closure plan to a risk-based closure plan for the Bio-Plant Equalization Basin. The Norfolk District Corps of Engineers is currently bidding the removal of the Basin liner. The current schedule has a completion date of November 8, 1997. Alliant Techsystems is requesting a 180-day extension to the schedule. The new completion date will be May 7, 1998.

If you have any questions or concerns please contact Jerry Redder (540) 639-7536 (Jerome_Redder@ATK.com) or Christel Compton (540) 639-7536.

Sincerely


C. A. Jake, Supervisor
Environmental Affairs

c: West Central Regional Office - Roanoke
R. L. Richardson, RFAAP ACO

Coordination:

M. L. Griffith

M. L. Griffith

R. L. Richardson

R. L. Richardson

bc: Adm. File
Env. File
D. W. Shead-MN11-2115
C. A. Jake
J. J. Redder
C. E. Compton



RECV G ENV 5-1-71-aog
97-89
C: Jake
Lidder
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April 23, 1997

C.A. Jake
Environmental Manager
Alliant Techsystems, Inc.
Radford Army Ammunition Plant
P.O. Box 1
Radford, VA 24141-0100

RE: Radford Army Ammunition Plant
EPA ID# VA12100207306
Equalization Basin Closure
Closure Extension

Dear Ms. Jake:

Your letter requesting an extension to the closure schedule for the Equalization Basin's closure activities was received on March 7, 1997. Unfortunately, the Department approval letter, dated March 26, 1997, did not provide the requested 180-day extension from the May 12, 1997, closure completion date for this closure. That was an oversight, and by this letter, the closure extension until November 8, 1997, is approved, as the closure activities will, of necessity, take longer to complete than the current closure schedule allows. Please update the approved closure plan to reflect this revised closure completion date. During this extension period, RAAP shall continue to take all steps to prevent threats to human health and the environment from the Equalization Basin that is no longer operating but has not completed formal closure.

RAAP
Page 2

If there are any additional questions, please contact Debra Miller, Environmental Engineer Senior, of my staff at (804) 698-4206.

Sincerely,

Leslie A. Romanchik

for Thomas L. Hopkins

cc: Leslie Romanchik, DEQ-WD-OPM
Lisa Ellis, DEQ-WD-OPM
Debra Miller, DEQ-WD-OPM
Glenn Von Gonten, DEQ-WD-OPM
Claire Slaughter, DEQ-WD-OTA
Aziz Farahmand, DEQ-RRO

Rec'd ENV 4-28-97



97-88

C: Jake
Olsen
Redden
ENV file

Barker

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Becky Norton Dunlop
Secretary of Natural Resources

April 23, 1997

C.A. Jake
Environmental Manager
Alliant Techsystems Inc.
Radford Army Ammunition Plant
Route 114
P.O. Box 1
Radford, Virginia 24141-0100

**RE: Radford Army Ammunition Plant
EPA ID#VA1210020730
Closures Activities**

Dear Ms. Jake:

The Department has received Radford Army Ammunition Plant's revision to their Equalization Basin's closure data report and the background soil data revisions for the Incinerator Spray Pond. This revised report was received on April 3, 1997, and the background data revisions were received on April 21, 1997. Review of these revisions will commence within the next few weeks. If there are any questions or concerns regarding the review, please contact me at (804) 698-4206.

Sincerely,

A handwritten signature in cursive script, reading "Debra A. Miller".

Debra A. Miller
Environmental Engineer Senior
Office of Permitting Management

cc: Lisa Ellis, DEQ-OPM
Aziz Farahmand, DEQ-RRD
Clarie Ballard, DEQ-OTA

PM97-0175 and PM97-0209

Alliant Techsystems Inc.
Radford Army Ammunition Plant
Route 114
P.O. Box 1
Radford, VA 24141-0100

March 31, 1997

97-815-091

Debra Miller
Office of Permitting Management
629 East Main Street
Richmond, VA 23219

Subject: Response to VaDEQ comments on the Site Investigation/Evaluation
Closure Plan for Equalization Basin HWMU 10 & SWMU 10
Radford Army Ammunition Plant, Radford Virginia,
EPA ID# VA1210020730

Dear Ms. Miller:

Below are responses to comments 1 and 2 from your letter dated March 4, 1997. The enclosed letter from Radian International, LLC, addresses comments 3 through 6; comment 7 was addressed under separate cover from Radian International, LLC.

Comment 1. Please note, when the final closure report is submitted, the appropriate certifications of closure from the owner/operator and the independent registered professional engineer will need to be included.

When the final closure report is submitted, the appropriate certifications of closure from the owner/operator and the independent registered professional engineer will be provided. The Norfolk District Corps of Engineers has a registered professional engineer on staff who will act as the independent registered professional engineer.


Comment 2. The closure plan required hazardous waste characteristic determination for the concrete and the liner. Please note, only mentioned of the TCLP constituents testing is made. The other hazardous waste characteristics should also be noted and using either generator knowledge or testing, verify that these wastes do not meet the definition of hazardous waste. In the case of HWMU 10, as the waste handled is listed for reactivity, mention of reactivity is needed.

Based on generator knowledge of the constituents contained in HWMU 10 and their concentrations, the concrete wall and liner will not be hazardous for ignitability (D001), corrosivity (D002), or reactivity (D003).

Ms. Debra Miller
March 31, 1997
Page 2

If you have any further question or comments please contact Jerry Redder (540) 639-7536 (Jerome_Redder@ATK.com) or Arne Olsen (540) 639-8220 (Arne_Olsen@ATK.com).

Sincerely,

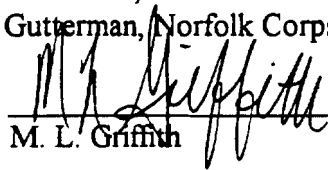


C. A. Jake, Supervisor
Environmental Affairs

Enclosures

c: West Central Regional Office - Roanoke
R. L. Richardson, RFAAP ACO
M. D. Gutterman, Norfolk Corps of Engineers - w/o enclosure

Coordination:


M. L. Griffith
R. L. Richardson

bc: Adm. File
Env. File
R. L. Richardson - w/enclosure
C. A. Jake - w/o enclosure
J. J. Redder - w/o enclosure
A. E. Olsen - w/ enclosure
D. W. Shead - w/o enclosure



97-73

Re: *Holder*
Olson
Barker
File

Due date 4/23

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March 26, 1997

C.A. Jake
Environmental Manager
Alliant Techsystems Inc.
Radford Army Ammunition Plant
P.O. Box 1
Radford, VA 24141-0100

**RE: Radford Army Ammunition Plant
Incinerator Spray Pond and Equalization Basin Closure
EPA ID# VA12100207306
Extensions to Closure Schedules**

Dear Ms. Jake:

Your letters requesting extensions to the closure schedules for the Incinerator Spray Pond's and the Equalization Basin's closure activities were received on March 7, 1997. As the closure activities will, of necessity, take longer to complete than the approved closure schedule, the DEQ will approve an extension until May 12, 1997, for completion of closure activities at the RAAP's Equalization Basin and until September 29, 1997, for the Incinerator Spray Pond. Please update the approved closure plans and submit the revised closure schedules to the Department within 30 days. During this extension period, RAAP shall continue to take all steps to prevent threats to human health and the environment from these units that are no longer operating but have not completed formal closure.

If there are any additional questions, please contact Debra Miller, Environmental Engineer Senior, of my staff at (804) 698-4206. Please note, any further requests for an extension to the closure period should be submitted with detailed justification at least 30 days prior to the

expiration date, as required by VHWMR 9 VAC 20-60-580.D.3.b. [previously VHWMR §9.6.D.3.b].

Sincerely,

Leslie A. Romanchuk

for Thomas L. Hopkins
Director

cc: Leslie Romanchuk, DEQ
Lisa Ellis, DEQ
Debra Miller, DEQ
Glenn Von Gonten, DEQ
Claire Slaughter, DEQ
Aziz Farahmand, DEQ-RRO

Alliant Techsystems Inc.
Radford Army Ammunition Plant
Route 114
P.O. Box 1
Radford, VA 24141-0100

January 28, 1997

97-815-035

Debra Miller
Office of Permitting Management
629 East Main Street
Richmond, VA 23219

Subject: Site Investigation/Evaluation
Closure Plan for Equalization Basin HWMU 10 & SWMU 10
Radford Army Ammunition Plant, Radford Virginia,
EPA ID# VA1210020730

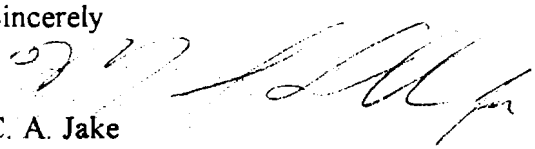
Dear Ms. Miller:

Enclosed is a copy of the "Site Investigation/Evaluation, BioPlant Equalization Basin Closure Site Investigation/Evaluation, Radford Army Ammunition Plant." This report contains the results of the basin subsoil, background soil and concrete wall and liner samples, as well as the statistical analysis of this data.

Fluoranthene, the only Hazardous Constituent Of Concern detected above background, was detected at 330 p.p.b. in one basin sample. This value is considerably less than EPA Region III's Risked Based Criteria (RBC). Therefore, according to your e-mail to Jerry Redder on January 20, 1997, the use of only the RBC, for oral ingestion is appropriate. The Risked Based Closure number for oral ingestion of fluoranthene is 3,100 p.p.m., for residential risk based closure. In addition, our concentration of fluoranthene is considerably less than the RBC's for transfer to air and groundwater, 68 p.p.m. and 980 p.p.m.

In you have any questions please call J. J. Redder (540) 639-7536 or A. E. Olsen (540) 639-8220.

Sincerely



C. A. Jake
Environmental Manager

AE Olsen: V\815-035
Enclosures

c: West Central Regional Office - Roanoke
R. L. Richardson, RFAAP ACO
M. D. Gutterman, Norfolk Corps of Engineers - w/o enclosure

Site Investigation/Evaluation

January 29, 1997

Page 2

Coordination: *V. Wolodkin*
V. Wolodkin

R. L. Richardson
R. L. Richardson

bc: Adm. File
Env. File
C. A. Jake - w/o enclosure
J. J. Redder - w/o enclosure
A. E. Olsen - w/ enclosure

Alliant Techsystems Inc.
Radford Army Ammunition Plant
Route 114
P.O. Box 1
Radford, VA 24141-0100

97-815-009

January 13, 1997

Debra A. Miller
Department of Environmental Quality
Office of Permitting Management, Hazardous Waste
629 East Main Street
Richmond, VA 23219

Subject: Analytical Results Background Soil Samples
Closure Plan for Equalization Basin HWMU 10 & SWMU 10
Radford Army Ammunition Plant, Radford Virginia, EPA ID# VA12100207306

Dear Ms. Miller:

Thank you for coming to Radford January 8, 1996 and meeting with my staff. At the meeting Jerry Redder handed you a copy of the Corps of Engineer's analytical results for background samples. The report contains the method used to calculate the critical values as well as the critical values for the equalization basin. As was discussed the values were calculated for the seven constituents that were detected.

The preliminary indications are that there is only one constituent that is above these critical values. If this preliminary assessment is correct we plan to request a modification to incorporate risk based closure performance standards or health based standards.

The first schedule modification dated April 17, 1996 extended the performance until March 1997. Once the critical values are approved by DEQ, we will supply you with a schedule that accommodates the Corps of Engineer's requirements to complete the project. Your understanding in this matter is appreciated.

If you have any questions or concerns please contact Jerry Redder (540) 639 7536

Sincerely



C. A. Jake
Environmental Manager
Enclosures

c: West Central Regional Office- Roanoke
R. L. Richardson, RAAP ACO
M. D. Gutterman, Norfolk Corps of Engineers - w/o encl

Debra A. Miller
January 13, 1997
Page 2

Coordination: unavailable
V. Wolodkin

R. L. Richardson
R. L. Richardson

bc: Adm. File
Env. File
C. A. Jake - w/o encl
J. J. Redder - w/o encl
A. E. Olsen - w/o encl



96-132
C: Jake
Barker
Redden
Encl. File

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

George Allen
Governor

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Thomas L. Hopkins
Director

(804) 698-4000
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Becky Norton Dunlop
Secretary of Natural Resources

August 26, 1996

Ms. C.A. Jake
Environmental Manager
Alliant Techsystems Inc.
Radford Army Ammunition Plant
Route 114
P.O. Box 1
Radford, Virginia 24141-0100

**Re: Equalization Basin
EPA ID# VA12100207306**

Dear Ms. Jake:

The Department of Environmental Quality (Department), Office of Permitting Management (OPM) has reviewed your letter dated July 17, 1996, which included a proposed amendment to the closure plan for the above referenced RCRA unit. The Department hereby approves the amendment. A copy of the approved amendment is enclosed.

As provided by Rule 2A:2 of the Supreme Court of Virginia, you have 30 days from the date of service of this decision to initiate an appeal by filing a notice of appeal with:

Thomas L. Hopkins, Director
Virginia Department of Environmental Quality
629 East Main Street
PO Box 10009
Richmond VA 23240-0009

In the event that this decision is served to you by mail, the date of service will be calculated as three days after the postmark date. Please refer to Part Two A of the

Ms. C.A. Jake
Page 2 of 2

Rules of the Supreme Court of Virginia, which describes the required content of the Notice of Appeal, including specifications of the Circuit Court to which the appeal is taken, and additional requirements concerning appeals from decisions of administrative agents.

If you should have any questions concerning this matter, please contact Khoa Nguyen of my staff at (804) 762-4128.

Sincerely,



for Thomas L. Hopkins

Enclosure

c: Robert Greaves (w/o enclosure) - EPA Region III
Khoa Nguyen (w/ enclosure) - VDEQ
Debbie Miller (w/ enclosure) - VDEQ
Claire Slaughter (w/o enclosure) - VDEQ
Mike Scott (w/o enclosure) - WCRO
Central Hazardous Waste Files (w/ enclosure)

Table 1

Analytical Limits for the RAAP Bioplant Equalization Basin Closure

Analyte	Required PQL ($\mu\text{g/kg}$)	Detection Limit ($\mu\text{g/kg}$)	Reporting Limit ($\mu\text{g/kg}$)
VOLATILES			
METHOD 8021A			
Benzene	0.09	0.37	5
Carbon Tetrachloride	0.03	0.94	5
Chlorobenzene	0.01	0.38	5
Chloroform	0.02	1.1	5
trans-1,2-Dichloroethene	0.02	0.93	5
Hexachlorobutadiene	0.20	1.3	5
Methyl Bromide	0.30	1.7	5
Methyl Chloride	0.10	0.94	5
Methylene Chloride	0.20	1.4	5
Naphthalene	0.60	3.4	5
Tetrachloroethene	0.01	0.21	5
Toluene	0.10	0.34	5
1,2,4-Trichlorobenzene	0.20	1.5	5
1,1,1-Trichloroethane	0.01	1.3	5
1,1,2-Trichloroethane	0.07	0.59	5
Trichloroethene	0.01	0.52	5
Trichlorofluoromethane	0.30	0.50	5
Vinyl Chloride	0.06	0.94	5
METHOD 8240B			
Acrolein	7	21	100
Carbon Disulfide	100	0.98	20
Methyl Ethyl Ketone	100	6.1	100

Table 1 (Continued)

Analytical Limits for the RAAP Bioplant Equalization Basin Closure

Analyte	Required PQL ($\mu\text{g/kg}$)	Detection Limit ($\mu\text{g/kg}$)	Reporting Limit ($\mu\text{g/kg}$)
<i>SEMIVOLATILES</i>			
METHOD 8070			
N-Nitrosodimethylamine	1.5	12	67
METHOD 8090			
2,4-Dinitrotoluene (FID/ECD)	13	82/0.56	330/10
2,6-Dinitrotoluene (FID/ECD)	7	82/0.65	330/10
METHOD 8110			
Bis(2-chloroethoxy) methane	5	16	30
Bis(2-chloroethyl) ether	3	9.9	30
Bis(2-chloroisopropyl) ether	8	24	30
METHOD 8121			
Hexachlorobenzene	3.8	0.12	3.3
Hexachlorocyclopentadiene	160	0.82	3.3
Hexachloroethane	1.1	0.11	3.3
METHOD 8151			
Pentachlorophenol	1.6	4.3	17
METHOD 8270B			
Bis(2-ethylhexyl) phthalate	180	27	330
Butyl benzyl phthalate	28	26	330
4-Chloro-3-methyl phenol	240	42	330
2-Chlorophenol	210	38	330
Di-n-butyl phthalate	220	27	330
Diethyl phthalate	170	21	330
2,4-Dimethylphenol	210	35	330
Dimethyl phthalate	190	24	330
4,6-Dinitro-2-methylphenol	3,300	27	330
Di-n-octyl phthalate	33	16	330
Phenol	94	38	330
2,4,6-Trichlorophenol	600	34	330
2,4,6-Trichlorophenol	390	33	330

Table 1 (Continued)

Analytical Limits for the RAAP Bioplant Equalization Basin Closure

Analyte	Required PQL ($\mu\text{g/kg}$)	Detection Limit ($\mu\text{g/kg}$)	Reporting Limit ($\mu\text{g/kg}$)
METHOD 8310			
Fluoranthene	140	0.27	10
Fluorene	140	1.0	10
METHOD 8330			
Nitrobenzene	260	12	250
PESTICIDES/PCBs			
METHOD 8080A			
Aldrin	3	0.58	1.7
Chlordane	9.4	3.5	17
Dieldrin	1.3	0.35	3.3
Endosulfan I	9.4	0.43	1.7
Endosulfan II	3	2.3	3.3
Endrin	4	0.30	3.3
Heptachlor	2	0.30	1.7
Heptachlor Epoxide	21	0.47	1.7
Methoxychlor	120	3.6	17
PCB 1016	2500	4.6	33
PCB 1221	2500	8.3	67
PCB 1232	2500	13	33
PCB 1242	2500	15	33
PCB 1248	2500	5.0	33
PCB 1254	2500	5.2	33
PCB 1260	2500	13	33
Toxaphene	57	34	170
METALS			
METHOD 6020			
Arsenic	10	0.85 $\mu\text{g/L}$	200
Barium	20	0.16 $\mu\text{g/L}$	100
Beryllium	3	0.15 $\mu\text{g/L}$	100
Cadmium	1	0.17 $\mu\text{g/L}$	200
Chromium	10	0.34 $\mu\text{g/L}$	100

Table 1 (Continued)

Analytical Limits for the RAAP Bioplant Equalization Basin Closure

Analyte	Required PQL ($\mu\text{g/kg}$)	Detection Limit ($\mu\text{g/L}^*$)	Reporting Limit ($\mu\text{g/kg}$)
Lead	10	0.36 $\mu\text{g/L}^*$	100
Nickel	0.2	0.67 $\mu\text{g/L}^*$	100
Selenium	20	0.51 $\mu\text{g/L}^*$	200
Silver	2	0.52 $\mu\text{g/L}^*$	100
Thallium	10	0.08 $\mu\text{g/L}^*$	100
METHOD 7471A			
Mercury	2	0.03 $\mu\text{g/L}^*$	100
METHOD 9018A			
Cyanide	20	8 $\mu\text{g/L}^*$	100

*These detection limits are based on a MDL study of an aqueous matrix.

COMMONWEALTH

DEPARTMENT OF ENVIRONMENTAL QUALITY

George Allen
GovernorBecky Norton Dunlop
Secretary of Natural ResourcesStreet address: 629 East Main Street, Richmond, Virginia 23219
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Director(804) 698-4000
1-800-592-5482

Post-It™ brand fax transmittal memo 7671		# of pages > 2	
To	Arne Olsen	From	K. Nguyen
Co.	RAAP	Co.	UDEA
Dept.		Phone #	
Fax #	540/639-7214	Fax #	804/698-4153

4254

August 5, 1996

Ms. C. A. Jake
Environmental Manager
Alliant Techsystems Inc.
Radford Army Ammunition Plant
Route 114
P.O. Box 1
Radford, Virginia 24141-0100

**Re: Proposed Background Sampling Locations for Closure of
Equalization Basin**

Dear Ms. Jake:

This letter responds to your letters dated July 15, 1996 and July 22, 1996, addressed to Debra Miller and proposing background sampling locations for closure of the Equalization Basin HWMU-10 and SWMU-10.

The Virginia Department of Environmental Quality approves your proposal with the following modifications:

- Sample RAAP-#10-06-YY-BG will be collected in the area indicated in the attached figure and at a location along the edge of the wooded area north of the rail road. This is to minimize any possible impact by the rail road operations.
- Sample RAAP-#10-02-YY-BG will not be collected at the location shown in the attached figure since the location might have been impacted by the operations associated with the basin. The new location for this sample would be in an open field approximately 2800 feet east of the basin. The sample will be collected in an area upgradient and not impacted by surface run off from the landfills located in this open field.

An Agency of the Natural Resources Secretariat

Ms. C. A. Jake
Page 2 of 2

- Samples RAAP-#10-01-YY-BG and RAAP-#10-01-YY-BG will be collected at locations approximately half way between the rail road and the access road shown in the attached figure.

If you have any questions regarding this letter, please contact me at (804) 698-4128.

Sincerely,



Khoa Nguyen, M.S.
Environmental Engineer Senior
Office of Permitting Management

c: Lisa Ellis, DEQ
Debra Miller, DEQ
Glenn VonGonten, DEQ
Doug Brown, DEQ
Mike Scott, DEQ-WCRO

Track ID: #PM96-0153

Alliant Techsystems Inc.
Radford Army Ammunition Plant
Route 114
P.O. Box 1
Radford, VA 24141-0100

July 17, 1996

96-815-197

Debra Miller
Department of Environmental Quality
Office of Permitting Management, Hazardous Waste
629 East Main Street, Suite 406
Richmond, VA 23219

Subject: Response to VaDEQ letter Concerning PQL Revisions

Dear Ms. Miller:

This letter addresses the Virginia Department of Environmental Quality (VaDEQ) concerns about proposed PQL revisions for the RFAAP Equalization Basin Closure project expressed in DEQ's letter of 11 July 1996. The DEQ's comments are repeated here for convenience:

1. The information submitted from Radian states that "commercial laboratories review the results of the MDL study and, to facilitate data reporting requirements and to account for inter-instrument variability, will make the reporting limit the same for all the analytes in that method. For instance, the reporting limit of 5 ug/kg is utilized for all constituents of Method 8021A. However, based on review of the Table 1 methods and reporting limits, this does not hold true for all methods. For Methods 8440B, 8080A, and 6020, the reporting limits vary for the specific constituents. Please explain the inconsistent use of a uniform reporting limits for the various methods. Note, it is preferable to have an individual reporting limit for each constituent. Under Method 8012A, many of the detection limits listed are low enough that a reporting limit of 5 ug/kg is excessive. Additionally, in the previous amendment request, many of the Method 8012A constituents were approvable at a 1 ug/kg limit (i.e. benzene, chloroform, hexachlorobutadiene, methyl bromide, methyl chloride, methylene chloride, toluene, 1,2,4-trichlorobenzene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, trichlorofluoromethane, and vinyl chloride); however, this new submittal requests a further PQL increase to 5 ug/kg."

To clarify RFAAP's use of some acronyms, our understanding of MDL, EQL, and PQL are listed below:

1. The Method Detection Limit (MDL) is referred to as the "detection limit" and is so used by RFAAP.
2. The Estimated Quantitation Limit (EQL) (known as the PQL in earlier editions of SW-846) commonly referred to as the "reporting limit", and is so used by RFAAP.

All reporting limits that were given in the letter of 23 May 1996 are the lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. Therefore, some of the reporting limits happen to be the same for all constituents in a certain Method while some of the reporting limits vary from constituent to constituent within a Method.

The reporting limits that are given in Radian Corporation's letter of 16 May 1996 were discussed and agreed upon in the meeting of 21 May 1996 with Doug Brown (VaDEQ), Debra Miller (VaDEQ), Jerry Redder (RFAAP), Bob Richardson (RFAAP), and the Corps of Engineers. The reporting limits for Method 8021A constituents were 5 ug/kg in this letter. However, the reporting limits for Method 8021A were 1 ug/kg in the original closure plan. These limits are unachievable during routine laboratory operating conditions.

2. In accordance with Radian's response, the laboratories will include analytical results less than the reporting limit in their results. Please provide information regarding how/if this data will be qualified.

The data will be "J" flagged. All calibration, lab QA/QC, and surrogate recoverables will be sent with this data.

3. Please note that for Method 6020, selenium is not one of the constituents approved for the ICP-MS determination (see Table 1 of Method 6020). Therefore, in accordance with the scope and application of Method 6020, the analyst performing this method will need to demonstrate accuracy and precision of the Method (i.e. Monitor interferences and take appropriate action to ensure data of known quality).

In the meeting of 21 May 1996 Method 6020 for selenium was accepted by VaDEQ per the letter from Radian 16 May 1996. To demonstrate accuracy and precision all calibration, lab QA/QC, and surrogate recoverables will be sent with this data.

4. For Acrolein, Radian proposed the use of 8240B as its detection limit is "lower than the 8030A detection limit". However, the previous amendment requested a


modification of the reporting limit to 15 ug/kg for Method 8030A, which is less than both Method 8240B's reporting and detection limits. Please provide further data/explanation supporting the conclusion that Method 8240B provides a lower detection limit. Note, based on available information, this conclusion is not supported.

In the meeting of 21 May 1996 Method 8030A for acrolein was accepted by VaDEQ per the letter from Radian 16 May 1996. In this letter the detection limit for Method 8030A was 25 ug/kg and the reporting limit was 100 ug/kg. Therefore, Method 8240B would provide lower detection limit (21 ug/kg) and the same reporting limit (100 ug/kg). Method 8240B was proposed to consolidated Methods so that Method 8030A would not be run for one constituent. In the original 7 March 1996 letter the reporting limit for Method 8030A for Acrolein was listed as 15 ug/kg this could have been an error.

Hopefully all of your questions regarding the proposed changes to Equalization Basin Closure have been answered. An amendment to the Closure Plan Section 3.5 Table 3-1 Hazardous Constituents of Concern is enclosed. We look forward to your approval of this amendment to the Equalization Basin Closure plan and commencing background sampling on 5 August 1996.

If you have any questions please contact, Jerry Redder at (540) 639-7536 or Arne Olsen (540) 639-8220, of my staff.

Very truly yours,


C. A. Jake
Environmental Manager

Enclosure

AE Olsen:V:\815-197

Coordination:


R. L. Richardson

bc: Administrative File (w/o encl)
R. L. Richardson (w/o encl)
C. A. Jake (w/o encl)
Steve Lantz Norfolk Corps of Engineers (w/ encl)
William Hearn Radian Corp. (w/o encl)
Lisa Ellis DEQ (w/o encl)
Glenn Von Gonten DEQ (w/o encl)
Doug Brown DEQ (w/o encl)
Khoa Nguyen (w/ encl)
Env. file (w/ encl)

Table 1

Analytical Limits for the RAAP Bioplant Equalization Basin Closure

Analyte	Required PQL ($\mu\text{g/kg}$)	Detection Limit ($\mu\text{g/kg}$)	Reporting Limit ($\mu\text{g/kg}$)
VOLATILES			
METHOD 8021A			
Benzene	0.09	0.37	5
Carbon Tetrachloride	0.03	0.94	5
Chlorobenzene	0.01	0.38	5
Chloroform	0.02	1.1	5
trans-1,2-Dichloroethene	0.02	0.93	5
Hexachlorobutadiene	0.20	1.3	5
Methyl Bromide	0.30	1.7	5
Methyl Chloride	0.10	0.94	5
Methylene Chloride	0.20	1.4	5
Naphthalene	0.60	3.4	5
Tetrachloroethene	0.01	0.21	5
Toluene	0.10	0.34	5
1,2,4-Trichlorobenzene	0.20	1.5	5
1,1,1-Trichloroethane	0.01	1.3	5
1,1,2-Trichloroethane	0.07	0.59	5
Trichloroethene	0.01	0.52	5
Trichlorofluoromethane	0.30	0.50	5
Vinyl Chloride	0.06	0.94	5
METHOD 8240B			
Acrolein	7	21	100
Carbon Disulfide	100	0.98	20
Methyl Ethyl Ketone	100	6.1	100

Table 1 (Continued)

Analytical Limits for the RAAP Biopant Equalization Basin Closure

Analyte	Required PQL ($\mu\text{g/kg}$)	Detection Limit ($\mu\text{g/kg}$)	Reporting Limit ($\mu\text{g/kg}$)
<i>SEMIVOLATILES</i>			
METHOD 8070			
N-Nitrosodimethylamine	1.5	12	67
METHOD 8090			
2,4-Dinitrotoluene (FID/ECD)	13	82/0.56	330/10
2,6-Dinitrotoluene (FID/ECD)	7	82/0.65	330/10
METHOD 8110			
Bis(2-chloroethoxy) methane	5	16	30
Bis(2-chloroethyl) ether	3	9.9	30
Bis(2-chloroisopropyl) ether	8	24	30
METHOD 8121			
Hexachlorobenzene	3.8	0.12	3.3
Hexachlorocyclopentadiene	160	0.32	3.3
Hexachloroethane	1.1	0.11	3.3
METHOD 8151			
Pentachlorophenol	1.6	43	17
METHOD 8270B			
Bis(2-ethylhexyl) phthalate	180	27	330
Butyl benzyl phthalate	28	26	330
4-Chloro-3-methyl phenol	240	42	330
2-Chlorophenol	210	38	330
Di-n-butyl phthalate	220	27	330
Diethyl phthalate	170	21	330
2,4-Dimethylphenol	210	35	330
Dimethyl phthalate	190	24	330
4,6-Dinitro-2-methylphenol	3,300	27	330
Di-n-octyl phthalate	33	16	330
Phenol	94	38	330
2,4,5-Trichlorophenol	600	34	330
2,4,6-Trichlorophenol	390	33	330

Table 1 (Continued)

Analytical Limits for the RAAP Biopant Equalization Basin Closure

Analyte	Required PQL ($\mu\text{g/kg}$)	Detection Limit ($\mu\text{g/kg}$)	Reporting Limit ($\mu\text{g/kg}$)
METHOD 8310			
Fluoranthene	140	0.27	10
Fluorene	140	1.0	10
METHOD 8330			
Nitrobenzene	250	12	250
PESTICIDES/PCBs			
METHOD 8080A			
Aldrin	3	0.58	1.7
Chlordane	9.4	3.5	17
Dieldrin	1.3	0.35	3.3
Endosulfan I	9.4	0.43	1.7
Endosulfan II	3	2.8	3.3
Endrin	4	0.50	3.3
Heptachlor	2	0.80	1.7
Heptachlor Epoxide	21	0.47	1.7
Methoxychlor	120	3.6	17
PCB 1016	2,500	4.6	33
PCB 1221	2,500	8.8	67
PCB 1232	2,500	13	33
PCB 1242	2,500	15	33
PCB 1248	2,500	5.0	33
PCB 1254	2,500	5.2	33
PCB 1260	2,500	13	33
Toxaphene	57	34	170
METALS			
METHOD 6020			
Arsenic	10	0.85 $\mu\text{g/L}$	200
Barium	20	0.16 $\mu\text{g/L}$	100
Beryllium	3	0.15 $\mu\text{g/L}$	100
Cadmium	1	0.17 $\mu\text{g/L}$	200
Chromium	10	0.34 $\mu\text{g/L}$	100

Table 1 (Continued)

Analytical Limits for the RAAP Bioplant Equalization Basin Closure

Analyte	Required PQL ($\mu\text{g/kg}$)	Detection Limit ($\mu\text{g/L}^*$)	Reporting Limit ($\mu\text{g/kg}$)
Lead	10	0.36 $\mu\text{g/L}^*$	100
Nickel	0.2	0.67 $\mu\text{g/L}^*$	100
Selenium	20	0.51 $\mu\text{g/L}^*$	200
Silver	2	0.52 $\mu\text{g/L}^*$	100
Thallium	10	0.08 $\mu\text{g/L}^*$	100
METHOD 7471A			
Mercury	2	0.03 $\mu\text{g/L}^*$	100
METHOD 9018A			
Cyanide	20	8 $\mu\text{g/L}^*$	100

*These detection limits are based on a MDL study of an aqueous matrix.



Post-It™ brand fax transmittal memo 7671		# of pages	2
To	Anne Olsen		
From	K. Nguyen		
Co.	RAAP	Co.	UDEA
Dept.		Phone #	
Fax #	540/639-7214	Fax #	804/698 4234

COMMONWEALTH of VIRGINIA**DEPARTMENT OF ENVIRONMENTAL QUALITY**

George Allen
Governor

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Thomas L. Hopkins
Director

(804) 698-4000
1-800-592-5482

Becky Norton Dunlop
Secretary of Natural Resources

July 11, 1996

Ms. C.A. Jake
Alliant Techsystems Inc.
Radford Army Ammunition Plant
P.O. Box 1
Radford, VA 24141-0100

**RE: Radford Army Ammunition Plant (RAAP), EPA ID# VA12100207306
Equalization Basin Closure Amendment
SW-846 Methods' PQL Revisions**

Dear Ms. Jake:

On March 27, 1996, RAAP submitted an amendment for the Equalization Basin's approved closure plan to the Department of Environmental Quality (DEQ). This amendment requested a revision of the practical quantitation limits (PQL) for the approved SW-846 test methods. DEQ responded to this amendment request on April 23, 1996, and DEQ staff met with RAAP, Alliant, and Radian personnel on May 21, 1996, to discuss the amendment issues. In accordance with the DEQ response and meeting discussions, RAAP submitted additional information in support of this amendment request on May 30, 1996.

Based on the information submitted, the following comments must be addressed: (Note, all Test Methods listed are SW-846, Third Addition, as updated)

1. The information submitted from Radian states that "commercial laboratories review the results of the MDL study and, to facilitate data reporting requirements and to account for inter-instrument variability, will make the reporting limit the same for all the analytes in that method." For instance, the reporting limit of 5 µg/kg is utilized for all constituents of Method 8021A. However, based on review of the Table 1 methods and reporting limits, this does not hold true for all methods. For Methods 8240B, 8080A, and 6020, the reporting limits vary for the specific constituents. Please explain the inconsistent use of a uniform reporting limits for the various methods. Note, it is preferable to have an individual reporting limit for each constituent. Under Method 8021A, many of the detection limits listed are low enough that a reporting limit of 5 µg/kg is excessive. Additionally, in

RAAP Closure Amendment
Page 2

the previous amendment request, many of the Method 8021A constituents were approvable at a 1 $\mu\text{g/kg}$ limit (i.e. benzene, chloroform, hexachlorobutadiene, methyl bromide, methyl chloride, methylene chloride, toluene, 1,2,4-trichlorobenzene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, trichlorofluoromethane, and vinyl chloride); however, this new submittal requests a further PQL increase to 5 $\mu\text{g/kg}$.


2. In accordance with Radian's response, the laboratories will include analytical results less than the reporting limit in their results. Please provide information regarding how/if this data will be qualified.

3. Please note that for Method 6020, selenium is not one of the constituents approved for the ICP-MS determination (see Table 1 of Method 6020). Therefore, in accordance with the scope and application of Method 6020, the analyst performing this method will need to demonstrate accuracy and precision of the Method (i.e. monitor interferences and take appropriate action to ensure data of known quality).

4. For Acrolein, Radian proposed the use of 8240B as its detection limit is "lower than the 8030A detection limit". However, the previous amendment requested a modification of the reporting limit to 15 $\mu\text{g/kg}$ for Method 8030A, which is less than both Method 8240B's reporting and detection limits. Please provide further data/explanation supporting the conclusion that Method 8240B provides a lower detection limit. Note, based on available information, this conclusion is not supported.

Based on review of the information submitted, this closure plan amendment will require the submittal of above noted information. RAAP is requested to submit this information in support of their closure plan amendment. If there are any questions regarding the information provided, please contact me at (804) 698-4206.

Sincerely,

 (618-4428)
for Debra A. Miller
Environmental Engineer Senior

cc: Lisa Ellis, DEQ
Glenn VonGonten, DEQ
Doug Brown, DEQ
Mike Scott, DEQ-RRO

Track ID#PM96-0086

Alliant Techsystems Inc.
Radford Army Ammunition Plant
Route 114
P.O. Box 1
Radford, VA 24141-0100

96-815-158

May 28, 1996

Debra A. Miller
Environmental Engineer Senior
Department of Environmental Quality
Office of Permitting Management, Hazardous Waste
629 East Main Street, Suite 406
Richmond, VA 23219

Subject: PQL Revisions, Table 3-1
Closure Plan for Equalization Basin HWMU 10 & SWMU 10
Radford Army Ammunition Plant, Radford Virginia, EPA ID# VA12100207306

Dear Ms. Miller:

I appreciate your meeting with Jerry Redder, Bob Richardson, and the Corps of Engineers, Tuesday May 21, 1996. According to Mr. Redder the meeting went very well. Based on the outcome of that meeting the Corps of Engineers' contractor, Radian, is proposing an alternate set of reporting limits and detection limits. These limits would be in lieu of the limits listed in Table 3-1 for soil.

Enclosed is the letter from Radian to the Corps of Engineers; an advance copy was faxed to you on May 23, 1996. Please review the information and let Mr. Redder know if the limits are acceptable. He will then proceed with requesting a closure plan amendment based on your review and comments. In order to avoid multiple amendments we propose to wait until this matter is resolved prior to amending the closure plan for the previously approved extension request.

If you have any questions or concerns please contact Jerry Redder (540) 639 7536.

Sincerely



C. A. Jake
Environmental Manager

Enclosures

PQL Revisions, Table 3-1

Page 2

Enclosures

May 28, 1996

c: Doug Brown, DEQ
Mike Scott, DEQ-RRO
R. L. Richardson, RAAP ACO
S. M. Lantz, Norfolk Corps of Engineers
W. R. Hearn, Radian Corporation

Coordination: R. L. Richardson
R. L. Richardson

bc: Administrative File
C. A. Jake
J. J. Redder
M. H. Bolt
Env. File

FAFAC_ENV\REDDER\WORD\CLOSURE\DAM0528.010



23 May 1996

2455 Horsepen Road, Suite 250
Herndon, VA 22071
(703) 713-1500

Steven M. Lantz, P.E.
Civil Engineer
GeoEnvironmental Branch
Norfolk District, Corps of Engineers
803 Front Street
Norfolk, Virginia 23510-1096

Subject: Response to VaDEQ Letter Concerning PQL Revisions
Delivery Order 10, Contract DACA65-95-D-0030

Dear Mr. Lantz:

This letter addresses the Virginia Department of Environmental Quality (VaDEQ) concerns about proposed PQL revisions for the RAAP Equalization Basin Closure project. Radian has responded to these concerns in this letter as well as in a meeting with VaDEQ on 21 May 1996.

Radian undertook a laboratory selection process of contacting seven Missouri River District (MRD) certified labs. We selected two labs based on their ability to provide the lowest PQLs. For several of the hazardous constituents of concern, the PQL required by the Closure Plan was not achieved. In general, the justification for a laboratory not achieving a PQL is related to variability between individual instruments in the laboratory, i.e., a commercial lab will utilize several instruments on a routine basis, and laboratory contamination. Also, we understand the SW-846 MDLs were determined in a research laboratory setting while the PQLs we are reporting are determined by commercial laboratories routinely processing large numbers of samples.

To ensure we are all using the same definition of some common terms, the following summary is presented. Chapter 1 of SW-846 defines the Method Detection Limit (MDL) as "the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from the analysis of a sample in a given matrix type containing the analyte." The MDL is commonly referred to as the "detection limit" and is so used by Radian. Chapter 1 of SW-846 also defines the Estimated Quantitation Limit (EQL) (known as the PQL in earlier editions of SW-846) as "the lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions." The EQL is commonly referred to as the "reporting limit", and is so used by Radian. SW-846 allows laboratories to choose their EQLs, within the guidelines in SW-846, to simplify data reporting requirements.

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Based on information from the selected laboratories, the detection limits and the reporting limits for the required analytical methods are presented in the attached table. Except for the metals by Method 6020 and cyanide, the detection limits in this table are actual concentrations from the laboratory method detection limit studies performed on a soil matrix, and represent those concentrations a commercial laboratory can typically achieve as the detection limit under routine operating conditions. When establishing reporting limits for a given analytical method, commercial laboratories review the results of the MDL study and, to facilitate data reporting requirements and to account for inter-instrument variability, will make the reporting limit the same for all the analytes in that method. For example, the detection limits from the soil MDL study for the three analytes are 16 $\mu\text{g/kg}$, 9.9 $\mu\text{g/kg}$, and 24 $\mu\text{g/kg}$, and the laboratory established the reporting limit for all three analytes at 30 $\mu\text{g/kg}$, again to facilitate data reporting, etc. We recognize in several cases, the detection limits (and reporting limits) are greater than the Closure Plan-specified PQL; consequently, this letter provides reasons why the commercial laboratories we have selected cannot achieve the PQLs required by the Closure Plan. The laboratories have agreed to include analytical results less than the reporting limit in their data packages.

Radian prepared responses to each of the comments made by DEQ in their letter of 23 April 1996. The DEQ's comments are repeated here for convenience:

1. *Method 6020 should be the test method used for determination of arsenic, barium, beryllium, chromium, lead, silver, and thallium concentrations. The approved closure plan requires the use of the SW-846 test method with the lowest PQL for background closure. For these constituents, other test methods with higher PQLs were chosen and a request for revising these PQLs was submitted. Please note, the chosen test methods are not acceptable for background closure. Method 6020 shall be utilized for these constituents as it has the lowest PQL.*

We will use Method 6020 for the analytical analysis of these elements. The following values are derived from a MDL study on an aqueous matrix conducted by the laboratory:

<u>Element</u>	<u>Detection Limit ($\mu\text{g/L}$)</u>	<u>Reporting Limit ($\mu\text{g/kg}$)</u>
Arsenic	0.85	200
Barium	0.16	100
Beryllium	0.15	100
Chromium	0.34	100
Lead	0.36	100
Silver	0.52	100
Thallium	0.08	100

Steven M. Lantz, P.E.
23 May 1996
Page 3

We also propose to analyze cadmium and selenium by Method 6020 as the detection limits by this method are lower than the corresponding graphite furnace atomic absorption methods. The detection limits and reporting limits follow:

<u>Element</u>	<u>Detection Limit ($\mu\text{g/L}$)</u>	<u>Reporting Limit ($\mu\text{g/kg}$)</u>
Cadmium	0.17	200
Selenium	0.51	200

2. *The revised PQLs for the following constituents cannot be approved at this time. In accordance with SW-846, Chapter One, laboratories shall have procedures for demonstrating proficiency with each analytical method routinely used in the laboratory. These procedures shall include demonstration of precision and bias of the method, as performed in the laboratory, and shall provide for determination of the method detection limit (MDL). Please provide the latest MDLs for each of the below mentioned Methods. Prior to any decision regarding the increase in PQLs, additional justifying information for each of the following SW-846 test methods will also need to be submitted (i.e. sample preparation, reagents, spike recovery, matrix interference, etc...).*

- a. *Method 6020 for Nickel - requested PQL revision from .2 $\mu\text{g/kg}$ to 2500 $\mu\text{g/kg}$. Please explain the need for an increase of 12500 times. Although acid digestion is needed prior to use of Method 6020 and may contribute to an increase in the achievable PQL, such a large increase, as the one requested, will necessitate the submittal of additional information for appropriate justification.*

The revised reporting limit for nickel by Method 6020 is 100 $\mu\text{g/kg}$. Acid digestion, inter-instrument variability and ease of data reporting are the justifications for not meeting the requested PQL of 0.2 $\mu\text{g/kg}$.

- b. *Method 8061 for Butyl benzyl phthalate and Di-n-octyl phthalate - requested PQL revision from 28 to 500 $\mu\text{g/kg}$ for Butyl Benzyl phthalate and from 33 to 500 $\mu\text{g/kg}$ for Di-n-octyl phthalate. Both of these revised PQLs are greater than 15 times the recommended SW-846 Method 8061 PQL. Please provide specific justification to explain the increase in PQL for this test method.*

The detection limits for Butyl benzyl phthalate and Di-n-octyl phthalate are 32 and 31 $\mu\text{g/kg}$, respectively. In our 16 May letter and during the

Steven M. Lantz, P.E.

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meeting, Radian proposed to use Method 8061 for these two compounds. Additionally, we proposed that dimethyl phthalate will also be analyzed by Method 8061 instead of Method 8060 as the reporting limits are the same (330 $\mu\text{g/kg}$). After reviewing additional information from the laboratory, we are proposing to use Method 8270B for the analysis of these phthalate compounds as the reporting limits by 8270B are the same as 8061 (330 $\mu\text{g/kg}$). A comparison of the detection limits determined from MDL studies on a soil matrix follows:

<u>Analyte</u>	<u>Detection Limit ($\mu\text{g/kg}$)</u>	
	<u>8061</u>	<u>8270B</u>
Bis(2-ethylhexyl) phthalate	29	27
Butyl benzyl phthalate	32	26
Di-n-butyl phthalate	28	27
Diethyl phthalate	31	21
Dimethyl phthalate	29	24
Di-n-octyl phthalate	31	16

- c. *Method 8010B for Carbon Tetrachloride, Chlorobenzene, Chloroform, Trans-1,2-Dichloroethylene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, Trichloroethylene, Tetrachloroethylene, and Vinyl chloride - requested PQL revision from .01-.06 $\mu\text{g/kg}$ (depending on constituent) to 1 $\mu\text{g/kg}$. This requested PQL modification is from 16 to 100 times greater than the Method 8010B specified PQL. Please explain with greater detail this increase. Note, if the laboratories cannot achieve the Method 8010B PQL, determine if a lower PQL can be achieved for Method 8021A. If a lower PQL for Method 8021A can be achieved, then that Method shall be utilized for those constituents.*

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The detection limits derived from a MDL study for Methods 8010B and 8021A on a soil matrix are as follows:

<u>Analyte</u>	<u>Detection Limit ($\mu\text{g/kg}$)</u>	
	<u>8010B</u>	<u>8021A</u>
Carbon Tetrachloride	1.1	0.94
Chlorobenzene	1.1	0.38
Chloroform	0.99	1.1
trans-1,2-Dichloroethylene	1.7	0.93
Methyl Bromide	1.4	1.7
Methyl Chloride	0.85	0.94
Tetrachloroethene	0.47	0.21
1,1,1-Trichloroethane	1.1	1.3
1,1,2-Trichloroethane	0.95	0.59
Trichloroethylene	1.3	0.52
Vinyl Chloride	1.2	0.94

We propose to perform all of the above analytes by 8021A, including methyl bromide and methyl chloride. The reporting limits for all of the analytes by Method 8021A are 5 $\mu\text{g/kg}$.

Inter-instrument variability and lab contamination are the justifications for not meeting the requested PQLs of 0.01-0.06 $\mu\text{g/kg}$.

- d. *Method 9010A for Cyanide - requested PQL revision from 20 $\mu\text{g/kg}$ to 500 $\mu\text{g/kg}$. Additional information pertinent to this method shall be provided for justification.*

The detection limit for cyanide by Method 9010A is 8 $\mu\text{g/L}$ as determined by an MDL study in an aqueous matrix. Sample preparation and inter-instrument variability are justifications for not meeting the required PQL of 20 $\mu\text{g/kg}$.

- e. *Method 8090 for 2,4-Dinitrotoluene and 2,6-Dinitrotoluene - requested PQL revision from 13 to 330 $\mu\text{g/kg}$ for 2,4-dinitrotoluene and from 7 to 330 $\mu\text{g/kg}$ for 2,6-dinitrotoluene. Additional information to support the PQL revision request for this specific method must be submitted.*

The detection limit for 2,4-Dinitrotoluene and 2,6-Dinitrotoluene is 82 $\mu\text{g/kg}$ for Method 8090 using a flame ionization detector. If an electron

Steven M. Lantz, P.E.

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capture detector is used, the detection limit for 2,4-Dinitrotoluene is 0.56 $\mu\text{g/kg}$ and for 2,6-Dinitrotoluene is 0.65 $\mu\text{g/kg}$. Radian proposes to use the electron capture detector.

- f. *Method 7470 is not one of the approved methods for Mercury, as it does not provide the lowest PQL and has been recently updated. Either Method 7470A or 7471A shall be used for the analysis of mercury.*

Method 7471A will be used for Mercury. The detection limit is 0.03 $\mu\text{g/L}$.

- g. *Method 8070 for N-nitrosodimethylamine - requested PQL revision from 1.5 to 330 $\mu\text{g/kg}$. As the requested PQL is 220 times the Method 8070 specified PQL, additional information for this specific test method and the cause for the increase in PQL must be submitted.*

The detection limit for N-Nitrosodimethylamine by Method 8070 is 12 $\mu\text{g/kg}$. The reporting limit has been revised from 330 $\mu\text{g/kg}$ to 67 $\mu\text{g/kg}$. Inter-instrument variability and lab contamination is the justification for not meeting the requested PQL of 1.5 $\mu\text{g/kg}$.

- h. *Method 7741A for Selenium - requested PQL revision from 20 to 250 $\mu\text{g/kg}$. Additional information shall be submitted to justify this PQL revision.*

As stated in our response to Comment 1, we are proposing to perform the analysis for selenium by Method 6020.

For the above requested PQL revisions, it should also be determined if any of the other methods listed for the specific constituent would provide a lower PQL than the proposed PQL revision. If a lower PQL can be achieved with a different test method, it may be necessary to utilize that method.

3. *A PQL revision for Method 8061 for Di-n-butyl phthalate and Diethyl phthalate was also requested. This revision proposed to increase the PQL from 220 to 500 $\mu\text{g/kg}$ for di-n-butyl phthalate and from 170 to 500 $\mu\text{g/kg}$ for Diethyl phthalate. Although these PQL increases can be approved, it should be determined if Method 8060 will provide a lower PQL for the constituents. If a lower PQL can be achieved with Method 8060, then that method shall be utilized.*

The detection limit for Di-n-butyl phthalate is 28 $\mu\text{g/kg}$, and the detection limit for Diethyl phthalate is 31 $\mu\text{g/kg}$; the reporting limits have been revised to 330 $\mu\text{g/kg}$ for both analytes. Method 8060 does not provide a lower PQL for these

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analytes. We propose to perform the analysis for Dimethyl phthalate by Method 8061 rather than Method 8060 as both methods provide the same detection limit and reporting limit for this analyte. As described in our response to Comment 1b, we are proposing to use Method 8270B for the analysis of these phthalate compounds.

4. *RAAP proposed to increase the Method 8010B PQL for Methyl Chloride. This increase in PQL from .1 to 1 µg/kg can be approved; however, it should be determined if Method 8021A will provide a lower PQL. If a lower PQL can be achieved with Method 8021A, then that method shall be used.*

The detection limit for methyl chloride Method 8010B is 0.85 µg/kg. The DL for methyl chloride by Method 8021A is 0.94 µg/kg. As stated in our response to Comment 2c, since both Methods 8010B and 8021A provide comparable MDLs and reporting limits, we propose to perform the analysis for Methyl Chloride by Method 8021A.

5. *For PCB analysis using Method 8250, RAAP proposed to increase the PQL increase from 2000 to 3500 µg/kg. This requested PQL revision can be approved; however, it should be determined if Method 8080A will provide a lower PQL. If a lower PQL can be achieved with Method 8080A, then that method shall be used.*

We will use Method 8080A for the PCBs analysis as this method provides a lower detection limit than does Method 8250. See Table 1.

Additional Responses:

There are two instances where we are proposing to consolidate analytes into one analytical method. These instances are discussed below. In both of these cases, the same reporting limit as the original method will be used. These proposed changes are reflected in Table 1.

- A. We are proposing to perform the analysis for acrolein by Method 8240 rather than 8030A. The reporting limit by 8240 is 100 µg/kg, with a detection limit of 21 µg/kg, which is lower than the 8030A detection limit.

Steven M. Lantz, P.E.

23 May 1996

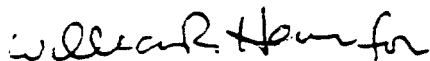
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- B. We are proposing to perform the analysis for 4-chloro-3-methyl phenol, 2-chlorophenol, 2,4-dimethyl phenol, and phenol by Method 8270B instead of by Method 8040A. The reporting limits (330 $\mu\text{g/kg}$) by 8270B for these compounds are identical to 8040A. A comparison of the detection limits, determined from MDL studies on a soil matrix follows:

<u>Analyte</u>	<u>Detection Limit ($\mu\text{g/kg}$)</u>	
	<u>8040B</u>	<u>8270B</u>
4-Chloro-3-methyl phenol	41	42
2-Chlorophenol	50	38
2,4-Dimethyl phenol	148	35
Phenol	68	38

If you have any questions or would like additional information, please call Steve Falatko at 703/713-6408, or Bob Hearn at 703/713-6410.

Sincerely,



Torsten Rothman, P.E., DEE
Project Manager

Fax Cover Sheet

Radford Army Ammunition Plant
P.O. Box 1
Radford, VA 24141-0100

Date: <i>MAY 17</i>	Time: 8:50	Pages to follow: 14	<input type="checkbox"/> Urgent <input type="checkbox"/> Confidential
To: DEBRA MILLER		Company: DEQ	
Address: 629 E. Main St Richmond, VA			
Telephone: 804-698-4206		Fax: 804-698-4234	
From: Jerry Redder		Telephone: (540) 639-7536	Fax: 540-639-7214
Note: If you did not receive a clear transmission, please call:			Telephone: 540-639-7536
Comments: Thanks for the help yesterday. The following transmission is the letter that the Corps of Engineers' contractor sent to them. It is not a final this is the position, it is an opening dialogue to resolve the PQL and detection limits for the EQ Basin closure. The last page is a proposed agenda. Basically we are proposing to start with what we think are the more easily resolved issues and work toward the more complicated. If you wish to have a different agenda that fine with us. If you have any question about the letter or think we can resolve some of the comments prior to the Tuesday meeting please feel free to contact me. At this time Bob Richardson, Radford Government staff Steve Lantz, Program Manger for the Norfolk Corps of Engineers Bob Hearn, Radian Corp. Steve Falatko, Radian Corp. And myself will be at the meeting. I look forward to meeting you Tuesday May 21, 1996.			

**FAX COVER SHEET****16 May 1996 / 1126**

TO: Jerry Redder
ORGANIZATION: Alliant Techsystems Inc
FAX NUMBER: 540-639-7214
FROM: Bob Hearn

Radian International LLC
2455 Horsepen Road, Suite 250
Herndon, Virginia 22071
(703) 713-6410
Fax No.: (703) 713-1512

12 Pages follow this cover sheet

FOR ASSISTANCE, PLEASE CALL (703) 713-1500

Comments:

Jerry, attached is the revised letter and a proposed agenda for the meeting on Tuesday. If you have a question, please call me today.

bob hearn

AGENDA

RADFORD ARMY AMMUNITION PLANT EQUILIZATION BASIN CLOSURE SW-846 METHODS' PQL REVISION

USE OF METHOD 8080A FOR PCB ANALYSIS

DETECTION LIMITS FOR METALS

USE OF METHODS 8060 AND 8061 FOR ANALYSIS OF PHTHALATES

DETECTION LIMIT FOR CYANIDE

USE OF METHOD 8090 FOR THE DINITROTOLUENES

USE OF METHOD 8070 FOR N-NITROSODIMETHYLAMINE

DETECTION LIMITS FOR VOLATILE ORGANICS



16 May 1996

2455 Horsepen Road, Suite 250
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(703) 713-1500

Steven M. Lantz, P.E.
Civil Engineer
GeoEnvironmental Branch
Norfolk District, Corps of Engineers
803 Front Street
Norfolk, Virginia 23510-1096

Subject: Response to VaDEQ Letter Concerning PQL Revisions
Delivery Order 10, Contract DACA65-95-D-0030

Dear Mr. Lantz:

This letter is in response to the Virginia Department of Environmental Quality (VaDEQ) letter, dated April 23, 1996, concerning the proposed PQL revisions for the RAAP Equalization Basin Closure project. Radian undertook a laboratory selection process of contacting seven Missouri River District (MRD) certified labs. We selected two labs based on their ability to provide the lowest PQLs. For several of the hazardous constituents of concern, the PQL required by the Closure Plan was not achieved. In general, the justification for a laboratory not achieving a PQL is related to variability between individual instruments in the laboratory, i.e., a commercial lab will utilize several instruments on a routine basis, and laboratory contamination. Also, we understand the SW-846 MDLs were determined in a research laboratory setting while the PQLs we are reporting are determined by commercial laboratories routinely processing large numbers of samples.

To ensure we are all using the same definition of some common terms, the following summary is presented. Chapter 1 of SW-846 defines the Method Detection Limit (MDL) as "the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from the analysis of a sample in a given matrix type containing the analyte." The MDL is commonly referred to as the "detection limit" and is so used by Radian. Chapter 1 of SW-846 also defines the Estimated Quantitation Limit (EQL) (known as the PQL in earlier editions of SW-846) as "the lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions." The EQL is commonly referred to as the "reporting limit", and is so used by Radian. SW-846 allows laboratories to choose their EQLs, within the guidelines in SW-846, to simplify data reporting requirements.

Based on information from the selected laboratories, the detection limits and the reporting limits for the required analytical methods are presented in the attached table. Except for the metals by Method 6020 and cyanide, the detection limits in this table are

RADIAN
CORPORATION

Steven M. Lantz, P.E.

16 May 1996

Page 2

actual concentrations from the laboratory method detection limit studies performed on a soil matrix, and represent those concentrations a commercial laboratory can typically achieve as the detection limit under routine operating conditions. When establishing reporting limits for a given analytical method, commercial laboratories review the results of the MDL study and, to facilitate data reporting requirements and to account for inter-instrument variability, will make the reporting limit the same for all the analytes in that method. For example, the detection limits from the soil MDL study for the three analytes are 16 $\mu\text{g/kg}$, 9.9 $\mu\text{g/kg}$, and 24 $\mu\text{g/kg}$, and the laboratory established the reporting limit for all three analytes at 30 $\mu\text{g/kg}$, again to facilitate data reporting, etc. We recognize in several cases, the detection limits (and reporting limits) are greater than the Closure Plan-specified PQL; consequently, this letter provides reasons why the commercial laboratories we have selected cannot achieve the PQLs required by the Closure Plan. The laboratories have agreed to include analytical results less than the reporting limit in their data packages.

Radian prepared responses to each of the comments made by DEQ in their letter of 23 April 1996. The DEQ's comments are repeated here for convenience:

1. *Method 6020 should be the test method used for determination of arsenic, barium, beryllium, chromium, lead, silver, and thallium concentrations. The approved closure plan requires the use of the SW-846 test method with the lowest PQL for background closure. For these constituents, other test methods with higher PQLs were chosen and a request for revising these PQLs was submitted. Please note, the chosen test methods are not acceptable for background closure. Method 6020 shall be utilized for these constituents as it has the lowest PQL.*

We will use Method 6020 for the analytical analysis of these elements. The following values are derived from a MDL study on an aqueous matrix conducted by the laboratory:

<u>Element</u>	<u>Detection Limit ($\mu\text{g/L}$)</u>	<u>Reporting Limit ($\mu\text{g/kg}$)</u>
Arsenic	0.85	200
Barium	0.16	100
Beryllium	0.15	100
Chromium	0.34	100
Lead	0.36	100
Silver	0.52	100
Thallium	0.08	100



Steven M. Lantz, P.E.
16 May 1996
Page 3

We also propose to analyze cadmium and selenium by Method 6020 as the detection limits by this method are lower than the corresponding graphite furnace atomic absorption methods. The detection limits and reporting limits follow:

<u>Element</u>	<u>Detection Limit ($\mu\text{g/L}$)</u>	<u>Reporting Limit ($\mu\text{g/kg}$)</u>
Cadmium	0.17	200
Selenium	0.51	200

2. *The revised PQLs for the following constituents cannot be approved at this time. In accordance with SW-846, Chapter One, laboratories shall have procedures for demonstrating proficiency with each analytical method routinely used in the laboratory. These procedures shall include demonstration of precision and bias of the method, as performed in the laboratory, and shall provide for determination of the method detection limit (MDL). Please provide the latest MDLs for each of the below mentioned Methods. Prior to any decision regarding the increase in PQLs, additional justifying information for each of the following SW-846 test methods will also need to be submitted (i.e. sample preparation, reagents, spike recovery, matrix interference, etc...).*

- a. *Method 6020 for Nickel - requested PQL revision from .2 $\mu\text{g/kg}$ to 2500 $\mu\text{g/kg}$. Please explain the need for an increase of 12500 times. Although acid digestion is needed prior to use of Method 6020 and may contribute to an increase in the achievable PQL, such a large increase, as the one requested, will necessitate the submittal of additional information for appropriate justification.*

The revised reporting limit for nickel by Method 6020 is 100 $\mu\text{g/kg}$. Acid digestion, inter-instrument variability and ease of data reporting are the justifications for not meeting the requested PQL of 0.2 $\mu\text{g/kg}$.

- b. *Method 8061 for Butyl benzyl phthalate and Di-n-octyl phthalate - requested PQL revision from 28 to 500 $\mu\text{g/kg}$ for Butyl Benzyl phthalate and from 33 to 500 $\mu\text{g/kg}$ for Di-n-octyl phthalate. Both of these revised PQLs are greater than 15 times the recommended SW-846 Method 8061 PQL. Please provide specific justification to explain the increase in PQL for this test method.*

The detection limits for Butyl benzyl phthalate and Di-n-octyl phthalate are 32 and 31 $\mu\text{g/kg}$, respectively.



Steven M. Lantz, P.E.

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- c. *Method 8010B for Carbon Tetrachloride, Chlorobenzene, Chloroform, Trans-1,2-Dichloroethylene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, Trichloroethylene, Tetrachloroethylene, and Vinyl chloride - requested PQL revision from .01-.06 $\mu\text{g}/\text{kg}$ (depending on constituent) to 1 $\mu\text{g}/\text{kg}$. This requested PQL modification is from 16 to 100 times greater than the Method 8010B specified PQL. Please explain with greater detail this increase. Note, if the laboratories cannot achieve the Method 8010B PQL, determine if a lower PQL can be achieved for Method 8021A. If a lower PQL for Method 8021A can be achieved, then that Method shall be utilized for those constituents.*

The detection limits derived from a MDL study for Method 8010B on a soil matrix are as follows:

<u>Analyte</u>	<u>Detection Limit ($\mu\text{g}/\text{kg}$)</u>	
	<u>8010B</u>	<u>8021A</u>
Carbon Tetrachloride	1.1	0.94
Chlorobenzene	1.1	0.38
Chloroform	0.99	1.1
trans-1,2-Dichloroethylene	1.7	0.93
Methyl Bromide	1.4	1.7
Methyl Chloride	0.85	0.94
Tetrachloroethene	0.47	0.21
1,1,1-Trichloroethane	1.1	1.3
1,1,2-Trichloroethane	0.95	0.59
Trichloroethylene	1.3	0.52
Vinyl Chloride	1.2	0.94

We propose to perform all of the above analytes by 8021A, including methyl bromide and methyl chloride. The reporting limits for all of the analytes by Method 8021A are 5 $\mu\text{g}/\text{kg}$.

Inter-instrument variability and lab contamination are the justifications for not meeting the requested PQLs of 0.01-0.06 $\mu\text{g}/\text{kg}$.



Steven M. Lantz, P.E.

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- d. *Method 9010A for Cyanide - requested PQL revision from 20 µg/kg to 500 µg/kg. Additional information pertinent to this method shall be provided for justification.*

The detection limit for cyanide by Method 9010A is 8 µg/L as determined by an MDL study in an aqueous matrix. Sample preparation and inter-instrument variability are justifications for not meeting the required PQL of 20 µg/kg.

- e. *Method 8090 for 2,4-Dinitrotoluene and 2,6-Dinitrotoluene - requested PQL revision from 13 to 330 µg/kg for 2,4-dinitrotoluene and from 7 to 330 µg/kg for 2,6-dinitrotoluene. Additional information to support the PQL revision request for this specific method must be submitted.*

The detection limit for 2,4-Dinitrotoluene and 2,6-Dinitrotoluene is 82 µg/kg for Method 8090 using a flame ionization detector. If an electron capture detector is used, the detection limit for 2,4-Dinitrotoluene is 0.56 µg/kg and for 2,6-Dinitrotoluene is 0.65 µg/kg.

- f. *Method 7470 is not one of the approved methods for Mercury, as it does not provide the lowest PQL and has been recently updated. Either Method 7470A or 7471A shall be used for the analysis of mercury.*

Method 7471A will be used for Mercury. The detection limit is 0.03 µg/L.

- g. *Method 8070 for N-nitrosodimethylamine - requested PQL revision from 1.5 to 330 µg/kg. As the requested PQL is 220 times the Method 8070 specified PQL, additional information for this specific test method and the cause for the increase in PQL must be submitted.*

The detection limit for N-Nitrosodimethylamine by Method 8070 is 12 µg/kg. The reporting limit has been revised from 330 µg/kg to 67 µg/kg. Inter-instrument variability and lab contamination is the justification for not meeting the requested PQL of 1.5 µg/kg.

- h. *Method 7741A for Selenium - requested PQL revision from 20 to 250 µg/kg. Additional information shall be submitted to justify this PQL revision.*

As stated in our response to Comment 1, we are proposing to perform the analysis for selenium by Method 6020.

RADIAN
CORPORATION

Steven M. Lantz, P.E.

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For the above requested PQL revisions, it should also be determined if any of the other methods listed for the specific constituent would provide a lower PQL than the proposed PQL revision. If a lower PQL can be achieved with a different test method, it may be necessary to utilize that method.

3. *A PQL revision for Method 8061 for Di-n-butyl phthalate and Diethyl phthalate was also requested. This revision proposed to increase the PQL from 220 to 500 µg/kg for di-n-butyl phthalate and from 170 to 500 µg/kg for Diethyl phthalate. Although these PQL increases can be approved, it should be determined if Method 8060 will provide a lower PQL for the constituents. If a lower PQL can be achieved with Method 8060, then that method shall be utilized.*

The detection limit for Di-n-butyl phthalate is 28 µg/kg, and the detection limit for Diethyl phthalate is 31 µg/kg; the reporting limits have been revised to 330 µg/kg for both analytes. Method 8060 does not provide a lower PQL for these analytes. We propose to perform the analysis for Dimethyl phthalate by Method 8061 rather than Method 8060 as both methods provide the same detection limit and reporting limit for this analyte.

4. *RAAP proposed to increase the Method 8010B PQL for Methyl Chloride. This increase in PQL from .1 to 1 µg/kg can be approved; however, it should be determined if Method 8021A will provide a lower PQL. If a lower PQL can be achieved with Method 8021A, then that method shall be used.*

The detection limit for methyl chloride Method 8010B is 0.85 µg/kg. The DL for methyl chloride by Method 8021A is 0.94 µg/kg. As stated in our response to Comment 2c, since both Methods 8010B and 8021A provide comparable MDLs and reporting limits, we propose to perform the analysis for Methyl Chloride by Method 8021A.

5. *For PCB analysis using Method 8250, RAAP proposed to increase the PQL increase from 2000 to 3500 µg/kg. This requested PQL revision can be approved; however, it should be determined if Method 8080A will provide a lower PQL. If a lower PQL can be achieved with Method 8080A, then that method shall be used.*

We will use Method 8080A for the PCBs analysis as this method provides a lower detection limit than does Method 8250. See Table 1.

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Steven M. Lantz, P.E.

16 May 1996

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If you have any questions or would like additional information, please call Steve Falatko at 703/713-6408, or Bob Hearn at 703/713-6410.

Sincerely,

Will R. Hearn for

Torsten Rothman, P.E., DEE
Project Manager



Steven M. Lantz, P.E.

16 May 1996

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Table 1

Analytical Limits for the RAAP Biopant Equalization Basin Closure

Analyte	Required PQL ($\mu\text{g/kg}$)	Detection Limit ($\mu\text{g/kg}$)	Reporting Limit ($\mu\text{g/kg}$)
VOLATILES			
METHOD 8021A			
Benzene	0.09	0.37	5
Carbon Tetrachloride	0.03	0.94	5
Chlorobenzene	0.01	0.38	5
Chloroform	0.02	1.1	5
trans-1,2-Dichloroethene	0.02	0.93	5
Hexachlorobutadiene	0.20	1.8	5
Methyl Bromide	0.30	1.7	5
Methyl Chloride	0.10	0.94	5
Methylene Chloride	0.20	1.4	5
Naphthalene	0.60	3.4	5
Tetrachloroethene	0.01	0.21	5
Toluene	0.10	0.34	5
1,2,4-Trichlorobenzene	0.20	1.5	5
1,1,1-Trichloroethane	0.01	1.3	5
1,1,2-Trichloroethane	0.07	0.59	5
Trichloroethene	0.01	0.52	5
Trichlorofluoromethane	0.30	0.50	5
Vinyl Chloride	0.06	0.94	5
METHOD 8030A			
Acrolein	7	25	100
METHOD 8240B			
Carbon Disulfide	100	0.98	20
Methyl Ethyl Ketone	100	6.1	100



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Table 1 (Continued)

Analytical Limits for the RAAP Biopant Equalization Basin Closure

Analyte	Required PQL ($\mu\text{g/kg}$)	Detection Limit ($\mu\text{g/kg}$)	Reporting Limit ($\mu\text{g/kg}$)
SEMIVOLATILES			
METHOD 8040A			
4-Chloro-3-methyl phenol	240	41	330
2-Chlorophenol	210	50	330
2,4-Dimethylphenol	210	140	330
Phenol	94	68	330
METHOD 8060			
Dimethyl phthalate	190	29	330
METHOD 8061			
Bis(2-ethylhexyl) phthalate	180	29	330
Butyl benzyl phthalate	28	32	330
Di-n-butyl phthalate	220	28	330
Diethyl phthalate	170	31	330
Di-n-octyl phthalate	33	31	330
METHOD 8070			
N-Nitrosodimethylamine	1.5	12	67
METHOD 8090			
2,4-Dinitrotoluene (FID/ECD)	13	82/0.56	330/10
2,6-Dinitrotoluene (FID/ECD)	7	82/0.65	330/10
METHOD 8110			
Bis(2-chloroethoxy) methane	5	16	30
Bis(2-chloroethyl) ether	3	9.9	30
Bis(2-chloroisopropyl) ether	8	24	30
METHOD 8121			
Hexachlorobenzene	3.8	0.12	3.3
Hexachlorocyclopentadiene	160	0.82	3.3
Hexachloroethane	1.1	0.11	3.3
METHOD 8151			
Pentachlorophenol	1.6	4.3	17



Steven M. Lantz, P.E.

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Table 1 (Continued)

Analytical Limits for the RAAP Bioplant Equalization Basin Closure

Analyte	Required PQL (µg/kg)	Detection Limit (µg/kg)	Reporting Limit (µg/kg)
METHOD 8270B			
4,6-Dinitro-2-methylphenol	3,300	27	350
2,4,5-Trichlorophenol	600	34	350
2,4,6-Trichlorophenol	390	33	330
METHOD 8310			
Fluoranthene	140	0.27	10
Fluorene	140	1.0	10
METHOD 8330			
Nitrobenzene	260	12	250
PESTICIDES/PCBs			
METHOD 8080A			
Aldrin	3	0.58	1.7
Chlordane	9.4	3.5	17
Dieldrin	1.3	0.35	3.3
Endosulfan I	9.4	0.43	1.7
Endosulfan II	3	2.8	3.3
Endrin	4	0.30	3.3
Heptachlor	2	0.80	1.7
Heptachlor Epoxide	21	0.47	1.7
Methoxychlor	120	3.6	17
PCB 1016	2,500	4.6	33
PCB 1221	2,500	8.8	67
PCB 1232	2,500	13	33
PCB 1242	2,500	15	33
PCB 1248	2,500	5.0	33
PCB 1254	2,500	5.2	33
PCB 1260	2,500	13	33
METHOD 8081			
Toxaphene	57	34	170



Steven M. Lantz, P.E.

16 May 1996

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Table 1 (Continued)

Analytical Limits for the RAAP Bioplant Equalization Basin Closure

Analyte	Required PQL ($\mu\text{g/kg}$)	Detection Limit ($\mu\text{g/kg}$)	Reporting Limit ($\mu\text{g/kg}$)
METALS			
METHOD 6020			
Arsenic	10	0.85 $\mu\text{g/L}^a$	200
Barium	20	0.16 $\mu\text{g/L}^a$	100
Beryllium	3	0.15 $\mu\text{g/L}^a$	100
Cadmium	1	0.17 $\mu\text{g/L}^a$	200
Chromium	10	0.34 $\mu\text{g/L}^a$	100
Lead	10	0.36 $\mu\text{g/L}^a$	100
Nickel	0.2	0.67 $\mu\text{g/L}^a$	100
Silver	2	0.52 $\mu\text{g/L}^a$	100
Thallium	10	0.08 $\mu\text{g/L}^a$	100
METHOD 7471A			
Mercury	2	0.03 $\mu\text{g/L}^a$	100
METHOD 7740			
Selenium	20	0.51 $\mu\text{g/L}^a$	200
METHOD 9010A			
Cyanide	20	8 $\mu\text{g/L}^a$	100

^aThese detection limits are based on a MDL study of an aqueous matrix.

Commonwealth of Virginia
Department of Environmental Quality
PS&E, DIVISION OF WASTE OPERATIONS
Office of Permitting Management
Facsimile Transmittal

Date:	April 29, 1996	Page 1 of 2
TO:	Jerry Redder	
TITLE:		
ORGANIZATION:	Alliant Techsystems	
FAX NUMBER:	(540) 639-7214	
FROM:	Debra A. Miller	
TITLE:	Environmental Engineer Senior	
PHONE:	(804) 698-4206 FAX: (804) 698-4234	
SUBJECT:	Info Request on SW-846, Method 6020	

Please deliver!



Jerry,

As promised, I talked to our Chemists and they provided me with the attached list of labs doing 6020. Please note, this is not all the labs that can perform this analysis, it is just a short list of ones that we had contacted. No recommendation intended. Hope it helps!!

-Debbie

Department of Environmental Quality, P.O. Box 10009, Richmond, Virginia 23240-0009

**LABS OFFERING METALS ANALYSIS
BY SW-846 METHOD 6020**

<u>NAME</u>	<u>PHONE</u>	<u>CONTACT</u>
Gascoyne	800-GAS-COYN	lab manager
Quanterra	Denver, W. Sacramento	
EMI	540-396-3661	Mark Brooks
Environmental Health Labs.	219-233-4777	Paul Bowers
Synergic Atlantics, Inc	616-538-8700	Sam Yazadani
Aquatech	800-783-5991	
Montgomery Watson Labs	818-568-6486	Rick Zimmer
American Water Works Belleville, Il	XXX- 35-3600	Rick Bessee

NOTE: This list should not be construed as a recommendation, endorsement, or solicitation for, or on behalf of, any companies listed. It is merely intended to demonstrate that this method is available for use. These are not all the labs using the method, only those we contacted.



*Date 5-2-96
Mild 2 3/4*

*Redder
Jake
Richards
96-061
SUSPENSE
5-24-96*

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

Peter W. Schmidt
Director

APR 23 1996

P. O. Box 10009
Richmond, Virginia 23240-0009
(804) 762-4000

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

C.A. Jake
Alliant Techsystems Inc.
Environmental Manager
Radford Army Ammunition Plant
Route 114
P.O. Box 1
Radford, VA 24141-0100

**RE: Radford Army Ammunition Plant (RAAP), EPA ID# VA12100207306
Equalization Basin Closure Amendment
SW-846 Methods' PQL Revisions**

Dear Mr. Jake:

Your letter requesting an amendment to the Equalization Basin's approved closure plan was received by the Department of Environmental Quality (DEQ) on March 27, 1996. This amendment requested a revision of the practical quantitation limits (PQL) for the approved SW-846 test methods and an extension to the closure schedule. The extension request was approved by a letter sent to you on April 17, 1996.

Based on the information submitted regarding revision of the SW-846 Test Methods' PQLs, the following comments must be addressed: (Note, all Test Methods listed are SW-846, Third Addition, as updated)

1. Method 6020 should be the test method used for determination of arsenic, barium, beryllium, chromium, lead, silver, and thallium concentrations. The approved

closure plan requires the use of the SW-846 test method with the lowest PQL for background closure. For these constituents, other test methods with higher PQLs were chosen and a request for revising these PQLs was submitted. Please note, the chosen test methods are not acceptable for background closure. Method 6020 shall be utilized for these constituents as it has the lowest PQL.

2. The revised PQLs for the following constituents cannot be approved at this time. In accordance with SW-846, Chapter One, laboratories shall have procedures for demonstrating proficiency with each analytical method routinely used in the laboratory. These procedures shall include demonstration of precision and bias of the method, as performed in the laboratory, and shall provide for determination of the method detection limit (MDL). Please provide the latest MDLs for each of the below mentioned Methods. Prior to any decision regarding the increase in PQLs, additional justifying information for each of the following SW-846 test methods will also need to be submitted (i.e. sample preparation, reagents, spike recovery, matrix interference, etc...).

- a. Method 6020 for Nickel - requested PQL revision from .2 $\mu\text{g}/\text{kg}$ to 2500 $\mu\text{g}/\text{kg}$. Please explain the need for an increase of 12500 times. Although acid digestion is needed prior to use of Method 6020 and may contribute to an increase in the achievable PQL, such a large increase, as the one requested, will necessitate the submittal of additional information for appropriate justification.
- b. Method 8061 for Butyl benzyl phthalate and Di-n-octyl phthalate - requested PQL revision from 28 to 500 $\mu\text{g}/\text{kg}$ for Butyl benzyl phthalate and from 33 to 500 $\mu\text{g}/\text{kg}$ for Di-n-octyl phthalate. Both of these revised PQLs are greater than 15 times the recommended SW-846 Method 8061 PQL. Please provide specific justification to explain the increase in PQL for this test method.
- c. Method 8010B for Carbon Tetrachloride, Chlorobenzene, Chloroform, Trans-1,2-Dichloroethylene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, Trichloroethylene, Tetrachloroethylene, and Vinyl chloride - requested PQL revision from .01-.06 $\mu\text{g}/\text{kg}$ (depending on constituent) to 1 $\mu\text{g}/\text{kg}$. This requested PQL modification is from 16 to 100 times greater than the Method 8010B specified PQL. Please explain with greater detail this increase. Note, if the laboratories cannot achieve the Method 8010B PQL, determine if a lower PQL can be achieved for Method 8021A. If a lower PQL for Method 8021A can be achieved, then that method shall be utilized for those constituents.

- d. Method 9010A for Cyanide - requested PQL revision from 20 $\mu\text{g}/\text{kg}$ to 500 $\mu\text{g}/\text{kg}$. Additional information pertinent to this method shall be provided for justification.
- e. Method 8090 for 2,4-Dinitrotoluene and 2,6-Dinitrotoluene - requested PQL revision from 13 to 330 $\mu\text{g}/\text{kg}$ for 2,4-dinitrotoluene and from 7 to 330 $\mu\text{g}/\text{kg}$ for 2,6-dinitrotoluene. Additional information to support the PQL revision request for this specific method must be submitted.
- f. Method 7470 is not one of the approved methods for Mercury, as it does not provide the lowest PQL and has been recently updated. Either Method 7470A or 7471A shall be used for the analysis of mercury.
- g. Method 8070 for N-nitrosodimethylamine - requested PQL revision from 1.5 to 330 $\mu\text{g}/\text{kg}$. As the requested PQL is 220 times the Method 8070 specified PQL, additional information for this specific test method and the cause for the increase in PQL must be submitted.
- h. Method 7741A for Selenium - requested PQL revision from 20 to 250 $\mu\text{g}/\text{kg}$. Additional information shall be submitted to justify this PQL increase.

For the above requested PQL revisions, it should also be determined if any of the other methods listed for the specific constituent would provide a lower PQL than the proposed PQL revision. If a lower PQL can be achieved with a different test method, it may be necessary to utilize that method.

3. A PQL revision for Method 8061 for Di-n-butyl phthalate and Diethyl phthalate was also requested. This revision proposed to increase the PQL from 220 to 500 $\mu\text{g}/\text{kg}$ for di-n-butyl phthalate and from 170 to 500 $\mu\text{g}/\text{kg}$ for Diethyl phthalate. Although these PQL increases can be approved, it should be determined if Method 8060 will provide a lower PQL for the constituents. If a lower PQL can be achieved with Method 8060, then that method shall be utilized.


4. RAAP proposed to increase the Method 8010B PQL for Methyl Chloride. This increase in PQL from .1 to 1 $\mu\text{g}/\text{kg}$ can be approved; however, it should be determined if Method 8021A will provide a lower PQL. If a lower PQL can be achieved with Method 8021A, then that method shall be used.

5. For PCB analysis using Method 8250, RAAP proposed to increase the PQL

increase from 2000 to 3500 $\mu\text{g}/\text{kg}$. This requested PQL revision can be approved; however, it should be determined if Method 8080A will provide a lower PQL. If a lower PQL can be achieved with Method 8080A, then that method shall be used.

Based on review of the information submitted, this closure plan amendment will require the submittal of additional information. RAAP is requested to submit an updated closure plan amendment addressing these comments within 30 days of receipt of this letter. If there are any questions regarding the information provided, please contact me at (804) 698-4206.

Sincerely,



Debra A. Miller
Environmental Engineer Senior

Enclosures

cc: Lisa Ellis, DEQ
Aziz Farahmand, DEQ-RRO
Mike Scott, DEQ-RRO



COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

APR 17 1996

Peter W. Schmidt
Director

P. O. Box 10009
Richmond, Virginia 23240-0009
(804) 762-4000

96-056
Reeder
Barker/Rich
Jake
ACU file

**CERTIFIED MAIL
RETURN RECEIPT REQUESTED**

C.A. Jake
Environmental Manager
Alliant Techsystems Inc.
Radford Army Ammunition Plant
Route 114
P.O. Box 1
Radford, VA 24141-0100

**RE: RAAP Equalization Basin Closure Amendment
Extension to Closure Schedule
EPA ID# VA12100207306**

Dear Mr. Jake:

Your letter requesting an amendment to the Equalization Basin's approved closure plan was received by the Department of Environmental Quality (DEQ) on March 27, 1996. This amendment requested a revision of the PQLs for the approved SW-846 test methods, and an extension to the closure schedule. The modification of the PQLs are under review and will be addressed in a separate correspondence.

The closure activities will, of necessity, take longer to complete than the approved closure schedule in order to accommodate the Corp of Engineer's requirements for the project. Based on the information submitted, DEQ will approve this modified schedule for completion of closure activities at the RAAP's Equalization Basin. Closure activities shall be completed and reports submitted in accordance with the revised closure schedule. This revised closure schedule is attached, please update your closure plan as necessary. During this extension period, RAAP shall continue to take all steps to prevent threats to human health and the environment from the Equalization Basin that is no longer operating but has not undergone formal closure.

RAAP Closure Amendment
Page 2

If there are any additional questions, please contact Debra Miller,
Environmental Engineer Senior, of my staff at (804) 698-4206.

Sincerely,

Leslie A. Romanchik

for Peter W. Schmidt
Director

Attachment

cc: Leslie Romanchik, DEQ
Lisa Ellis, DEQ
Debra Miller, DEQ
Claire Slaughter, DEQ

TABLE 3-4 CLOSURE SCHEDULE DURING CLEAN CLOSURE ATTEMPT	
Activity	Date
Closure Plan Approved	1/2/96
Sample Background/ Calculate Background Critical Value/ Take Soil Samples in Subsoil Assessment	March & April 1996
Submit Analytical Results to VDEQ for approval of background (DEQ response 7 days) and Subsoil Assessment	5/14/96
Finalize Plans and Specifications	5/28/96
Advertise for Bids	May & June 1996
Open Bids	7/8/96
Begin Construction	9/9/96
Remove contaminated soil/ resample/ or contingent close Receive Additional Lab Analyses/ Statistical Analysis and Submit to VDEQ Submit Monthly QA/QC Reports as Work Continues Remove contaminated soil/ resample/ or contingent close Repeat Sampling and Excavation as Necessary to "Clean" Close or submit a letter to VDEQ and go to Contingent Closure Plan	September 1997 through February 1997
Equipment Decontamination	March 1997
Receive Lab Analyses of Pre- and Post- Rinses	3/15/97
Submit Final Report of QA/QC on Work Performed	5/12/97

Alliant Techsystems Inc.
Radford Army Ammunition Plant
Route 114
P.O. Box 1
Radford, VA 24141-0100

March 22, 1996

96-815-097

Clifton L. Parker^{IV}
Department of Environmental Quality
Office of Permitting Management, Hazardous Waste
629 East Main Street, Suite 406
Richmond, VA 23219

Subject: Closure Plan for Equalization Basin HWMU 10 & SWMU 10
Radford Army Ammunition Plant, Radford Virginia, EPA ID# VA12100207306

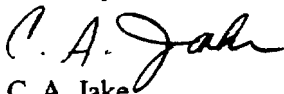
Dear Mr. Parker:

The Corps of Engineer's laboratory contractor surveyed at least 5 laboratories to attempt to meet the PQL's required in Paragraph 3.5 of the closure plan. Mr. Redder sent the information to two other laboratories. Enclosure A is a chart showing the best PQL's that are achievable using the methods in the plan. The method listed in the plan will be used, but due to intra- laboratory instrument variability, laboratory contamination (e.g., acetone in the atmosphere), the soil matrix, and the fact that the PQL listed in SW-846 methods are presented for guidance only, we request that the PQL's shaded in the last column be acceptable for background and for the intent of this closure plan.

In addition we are requesting a modification to paragraph 3.15 Closure Schedule Table 3.4 as shown in Enclosure B. The modification extends the schedule of completion to approximately 15 months from date of approval to accommodate the Corps of Engineer's requirements to complete the project. Your understanding in this matter is appreciated.

If you have any questions or concerns please contact Jerry Redder (540) 639 7536

Sincerely



C. A. Jake
Environmental Manager

Enclosures


w/ enclosures

c: West Central Regional Office- Roanoke
R. L. Richardson, RAAP ACO
S. M. Lantz, Norfolk Corps of Engineers

Clifton L. Parker^{IV}
March 22, 1996
Page 2

Coordination:


J. E. Woolwing


R. L. Richardson

w/o Enclosures

bc: Adm. File
D. W. Ratcliff
C. A. Jake
J. J. Redder
Env. File

ENCLOSURE A

No.	TABLE 3-1 HAZARDOUS CONSTITUENTS OF CONCERN	SW-846 METHOD	PQL $\mu\text{G/L}$ (WATER)	PQL $\mu\text{G/Kg}$ (SOIL)	Proposed PQL $\mu\text{G/Kg}$ (SOIL)
1	Acrolein; 2-Propenal	8030A 8240A 8316	7 (5) 300	7 - -	15 - -
2	Aldrin	8080A 8081 8250A 8270B	0.04 0.34 19 (10)	3 22 1,300 -	3 22 1,300 -
3	Arsenic	6010A 6020 7060A 7061A 7062	530 0.2 10 20 10	530 0.2 10 20 10	530 0.2 250 20 10
4	Barium	6010A 6020 7080A 7081	20 0.2 1,000 -	20 0.2 1,000 -	2,500 0.2 1,000 -
5	Benzene	8020A 8021A 8240B 8260	2 0.09 5 1	2 0.09 5 5	2 1 5 5
6	Beryllium	6010A 6020 7090 7091	3 0.2 50 2	3 0.2 50 2	100 0.2 50 2
7	Bis(2-chloroethoxy)methane; Bis(2-chloromethoxy)ethane; Ethane, 1,1'-[methylenebis(oxy)]bis[2chloro	8010B 8110 8250A 8270B 8410	- 5 53 10 -	- 5 3,600 660 -	- 30 3,600 660 -
8	Bis(2-chloroethyl)ether	8110 8250A 8270B 8410	3 57 10 -	3 3,800 660 -	30 3,800 660 -
9	Bis(2-chloro-1-methylethyl)ether; 2,2'-dichlorodiisopropyl ether; Bis(2-chloroisopropyl) ether	8010B 8110 8250A 8270B 8410	- 8 57 10 -	- 8 3,800 660 -	- 30 3,800 660 -

No.	TABLE 3-1 HAZARDOUS CONSTITUENTS OF CONCERN	SW-846 METHOD	PQL μG/L (WATER)	PQL μG/Kg (SOIL)	Proposed PQL μG/Kg (SOIL)
10	Bis(2-ethylhexyl)phthalate	8060 8061 8250A 8270B	20 2.7 25 -	1,000 180 1,700 -	1,000 500 1,700 -
11	Butyl benzyl phthalate; Benzyl butyl phthalate	8060 8061 8250A 8270B 8410	3.4 0.42 25 10 -	230 28 1,700 660 -	230 500 1,700 660 -
12	Cadmium	6010A 6020 7130 7131A	40 0.2 50 1	40 0.2 50 1	40 0.2 50 25
13	Carbon disulfide	8240B	100	100	100
14	Carbon tetrachloride	8010B 8021A 8240B 8260	0.03 0.1 5 1	0.03 0.1 5 5	1 0.1 5 5
15	Chlordane	8080A 8081 8250A 8270B	0.14 0.37 (10) -	9.4 15 (200) -	9.4 15 (200) -
16	Chlorobenzene	8010B 8020A 8021A 8240B 8260	0.01 2 0.03 5 1	0.01 2 0.03 5 5	1 2 0.03 5 5
17	p-Chloro-m-cresol; 4-Chloro-3-methylphenol	8040A 8270B 8410	3.6 20 -	240 1,300 -	240 1,300 -
18	Chloroform; Trichloromethane	8010B 8021A 8240B 8260	0.02 0.2 5 1	0.02 0.2 5 5	1 0.2 5 5
19	2-Chlorophenol	8040A 8250A 8270B 8410	3.1 33 10 -	210 1,300 660 -	210 1,300 660 -

No.	TABLE 3-1 HAZARDOUS CONSTITUENTS OF CONCERN	SW-846 METHOD	PQL μG/L (WATER)	PQL μG/Kg (SOIL)	Proposed PQL μG/Kg (SOIL)
20	Chromium	6010A	70	70	70
		6020	0.2	0.2	0.2
		7090	500	500	500
		7191	10	10	250
21	Cyanide	9010A	20	20	500
		9012	-	-	-
22	trans-1,2-Dichloroethylene	8010B	0.02	0.02	1
		8021A	0.5	0.5	0.5
		8240B	5	5	5
		8260	1	5	5
23	Di-n-butyl phthalate	8060	3.6	240	240
		8061	3.3	220	500
		8250A	25	1,800	1,800
		8270B	10	-	-
		8410	-	-	-
24	Dieldrin	8080A	0.02	1.3	1.3
		8081	0.44	-	-
		8250A	25	1,700	1,700
		8270B	(10)	-	-
25	Diethyl phthalate	8060	4.9	330	330
		8061	2.5	170	500
		8250A	19	1,300	1,300
		8270B	10	660	660
26	2,4-Dimethylphenol	8040A	3.2	210	210
		8250A	27	1,800	1,800
		8270B	10	660	660
27	Dimethyl phthalate	8060	2.9	190	500
		8061	6.4	430	430
		8250A	16	1,100	1,100
		8270B	10	660	660
		8410	-	-	-
28	4,6-Dinitro-o-cresol; 4,6-Dinitro-2-methylphenol	8040A	160	11,000	11,000
		8270B	50	3,300	3,300
		8410	-	-	-
29	2,4-Dinitrotoluene	8090	0.2	13	330
		8250A	57	3,800	3,800
		8270B	10	660	660
		8330	0.02	250	250
		8410	-	-	-

No.	TABLE 3-1 HAZARDOUS CONSTITUENTS OF CONCERN	SW-846 METHOD	PQL $\mu\text{G/L}$ (WATER)	PQL $\mu\text{G/Kg}$ (SOIL)	Proposed PQL $\mu\text{G/Kg}$ (SOIL)
30	2,6-Dinitrotoluene	8090	0.1	7	330
		8250A	19	1,300	1,300
		8270B	10	660	660
		8330	0.31	260	260
		8410	-	-	-
31	Di-n-octyl phthalate	8060	30	2000	2000
		8061	0.49	33	500
		8250A	25	1,700	1,700
		8270B	10	660	660
		8410	-	-	-
32	Endosulfan I	8080A	0.14	9.4	9.4
		8081	0.3	21	21
		8250A	(10)	(200)	(200)
		8270B	-	-	-
33	Endosulfan II	8080A	0.04	3	3.3
		8081	0.4	24	24
		8250A	-	-	-
		8270B	-	-	-
34	Endrin	8080A	0.06	4	4
		8081	0.39	36	36
		8250A	(10)	(200)	(200)
35	Fluoranthene	8100	(200)	(200)	(200)
		8250A	22	1,500	1,500
		8270B	10	660	660
		8310	2.1	140	140
		8410	-	-	-
36	Fluorene	8100	(200)	(200)	(200)
		8250A	19	1,300	1,300
		8270B	10	660	660
		8310	2.1	140	140
		8410	-	-	-
37	Heptachlor	8080A	0.03	2	2
		8081	0.4	20	20
		8250A	19	1,300	1,300
		8270B	(10)	-	-
38	Heptachlor epoxide	8080A	0.83	56	56
		8081	0.32	21	21
		8250A	22	1,500	1,500
		8270B	(10)	-	-

No.	TABLE 3-1 HAZARDOUS CONSTITUENTS OF CONCERN	SW-846 METHOD	PQL μG/L (WATER)	PQL μG/Kg (SOIL)	Proposed PQL μG/Kg (SOIL)
39	Hexachlorobenzene	8081 8120A 8121 8250A 8270B 8410	- 0.5 5.6×10^{-2} 19 10 -	- 30 3.8 1,300 660 -	- 30 3.8 1,300 660 -
40	Hexachlorobutadiene	8021A 8120A 8121 8250A 8260 8270A 8410	0.2 3.4 1.4×10^{-2} 9 1 10 -	0.2 230 0.94 600 5 660 -	1 230 0.94 600 5 660 -
41	Hexachlorocyclopentadiene	8081 8120A 8121 8250A 8270B 8410	- 4 2.4 - 10 -	- 300 160 - 660 -	- 300 160 - 660 -
42	Hexachloroethane	8120A 8121 8250A 8270B 8410	0.3 1.6×10^{-2} 16 10 -	20 1.1 1,100 660 -	20 3.3 1,100 660 -
43	Lead	6010A 6020 7420 7421	420 0.2 1,000 10	420 0.2 1,000 10	420 0.2 1,000 250
44	Mercury	7470 7470A 7471A	- 2 2	- 2 2	100 2 2
45	Methoxychlor	8080A 8081 8250A 8270B	1.8 - - 10	120 - - -	120 - - -
46	Methyl bromide; Bromomethane	8010B 8021A 8240B 8260	0.3 11 10 1	0.3 11 10 5	1 11 10 5

No.	TABLE 3-1 HAZARDOUS CONSTITUENTS OF CONCERN	SW-846 METHOD	PQL μG/L (WATER)	PQL μG/Kg (SOIL)	Proposed PQL μG/Kg (SOIL)
47	Methyl chloride; Chloromethane	8010B	0.1	0.1	1
		8021A	0.3	0.3	0.3
		8240B	10	10	10
		8260	1	5	5
48	Methylene chloride; Dichloromethane	8010B	-0.1	0.1-	1-
		8021A	0.2	0.2	1
		8240B	5	5	5
		8260	1	5	5
49	Methyl Ethyl Ketone; 2-Butanone; MEK	8015A 8240B	- 100	- 100	- 100
50	Naphthalene	8021A	0.6	0.6	1
		8100	(200)	(200)	(200)
		8250A	16	1,100	1,100
		8260	1	5	5
		8270B	10	660	660
		8410	-	-	-
51	Nickel	6010A	150	150	150
		6020	0.2	0.2	2,500
		7520	400	400	400
52	Nitrobenzene	8090	36	2400	2400
		8250A	19	2,400	2,400
		8270B	10	660	660
		8330	6.4	260	260
		8410	-	-	-
53	N-Nitrosodimethylamine	8070	1.5	1.5	330
		8250A	-	-	-
		8270B	(10)	-	-
		8410	-	-	-
54	Pentachlorophenol	8040A	5.9	400	400
		8151	0.76	1.6	17
		8250A	36	2,400	2,400
		8270B	50	3,300	3,300
		8410	-	-	-
55	Phenol	8040A	1.4	94	100
		8250A	15	1,000	1,000
		8270B	10	660	660
		8410	-	-	-

No.	TABLE 3-1 HAZARDOUS CONSTITUENTS OF CONCERN	SW-846 METHOD	PQL $\mu\text{G/L}$ (WATER)	PQL $\mu\text{G/Kg}$ (SOIL)	Proposed PQL $\mu\text{G/Kg}$ (SOIL)
64	1,1,1-Trichloroethane; Methyl chloroform	8010B	0.01	0.01	1
		8021A	0.3	0.3	0.3
		8240B	5	5	5
		8260	1	5	5
65	1,1,2-Trichloroethane	8010B	0.07	0.07	1
		8021A	-	-	-
		8240B	5	5	5
		8260	1	5	5
66	Trichloroethylene; Trichloroethene	8010B	0.01	0.01	1
		8021A	0.1	0.1	0.1
		8240B	5	5	5
		8260	1	5	5
67	Trichlorofluoromethane	8010B	(10)	(10)	(10)
		8021A	0.3	0.3	1
		8240B	(5)	-	-
		8260	1	5	5
68	2,4,5-Trichlorophenol	8250A	-	-	-
		8270B	10	660	660
		8410	-	-	-
69	2,4,6-Trichlorophenol	8040A	5.8	390	390
		8250A	27	1,800	1,800
		8270B	10	660	660
		8410	-	-	-
70	Vinyl chloride	8010B	0.06	0.06	1
		8021A	0.2	0.2	0.2
		8240B	10	10	10
		8260	1	5	5

March 22, 1996

ENCLOSURE B

TABLE 3-4 CLOSURE SCHEDULE DURING CLEAN CLOSURE ATTEMPT	
Activity	Date
Closure Plan Approved	1/2/96
Sample Background/ Calculate Background Critical Value/ Take Soil Samples in Subsoil Assessment	March & April 1996
Submit Analytical Results to VDEQ for approval of background (DEQ response 7 days) and Subsoil Assessment	5/14/96
Finalize Plans and Specifications	5/28/96
Advertise for Bids	May & June 1996
Open Bids	7/8/96
Begin Construction	9/9/96
Remove contaminated soil/ resample/ or contingent close Receive Additional Lab Analyses/ Statistical Analysis and Submit to VDEQ Submit Monthly QA/QC Reports as Work Continues Remove contaminated soil/ resample/ or contingent close Repeat Sampling and Excavation as Necessary to "Clean" Close or submit a letter to VDEQ and go to Contingent Closure Plan	September 1997 through February 1997
Equipment Decontamination	March 1997
Receive Lab Analyses of Pre- and Post- Rinses	3/15/97
Submit Final Report of QA/QC on Work Performed	5/12/97

Fax Cover Sheet

Radford Army Ammunition Plant
P.O. Box 1
Radford, VA 24141-0100

Date: Dec. 4, 1995	Time: 12:45	Pages to follow: 7	<input type="checkbox"/> Urgent <input checked="" type="checkbox"/> Confidential
To: Clifton Parker		Company: DEQ Office of permitting Management	
Address: DEQ Richmond, VA			
Telephone: 804-698-4142		Fax: 804-698-4234	
From: J. J. Redder		Telephone: (540) 639-7536	Fax: (540) 639-4361
Note: If you did not receive a clear transmission, please call: Jerry Redder			Telephone: 540-639-7536
Comments: Enclosed is the charts on the HCOC. I tried moving them as you requested and made a mess. The legend dealshow I marked up the list.			

	CONSTITUENT	1	2	3	4	VI Aug, 90 mg/l (Total)	89 Samples mg/l	PART B, June 90 mg/l	Sep 95 Ug/l
13	Bis(2-chloroethox)methane; Bis(2-chloromethoxyl)ethane				X				<786
14	Bis(2-chloroethyl)ether				X				<1,230
15	Bis(2-chloroisopropyl)ether				X				<1,170
16	Bis(2-ethylhexyl)phthalate				X				46,000
17	Bromoform			X					<1.83
18	Butyl benzyl phthalate			X					<679
19	Cadmium		X			TCLP <4UGL	5.1	<0.005mg/l	
20	Carbon disulfide		X						
21	Carbon tetrachloride**			X				<.003	<2.49
22	Chlordane**			X				<.005	<1,480
23	Chlorobenzene**			X				<.003	<2.27
24	4-Chloro-3-methylphenol				X				<1,930
25	Chloroform Trichloromethane**				X			<.007	<3.07
26	2-Chlorophenol				X				<908
27	Chromium		X			85.7, TCLP 6.02UGL	160	<.05	

	CONSTITUENT	1	2	3	4	VI Aug, 90 mg/l (Total)	89 Samples mg/l	PART B, June 90 mg/l	Sep 95 Ug/l
28	Chrysene				X				1.52
29	Dibenzo(a,h)anthracene				X				0.523
30	Di-n-butyl phthalate	X				491			
31	1,2-dicholorobenzene				X				<1.33
32	1,3-Dicholorobenzene				X				<1.72
33	1,4-Dicholorobenzene**			X				<.003	<2.28
34	3,3-Dichlorobenzidine				X				<1,950
35	2,4-Dichlorophenol				X				<1,080
36	1,2-Dichloropropane			X					<1.78
37	Dieldrin			X					1,420
38	Diethyl phthalate	X							
39	2,4-Dimethylphenol			X					2,390
40	Dimethyl phthalate	X							
41	4,6-Dinitro-2-methylphenol				X				
42	2,4-Dinitrophenol				X				
43	2,4-Dinitrotoluene	X				<327>		<.010	
44	2,6-Dinitrotoluene		X			<94>			
45	Di-n-octyl phthalate	X							
46	Endosulfan I				X				

	CONSTITUENT	1	2	3	4	VI Aug, 90 mg/l (Total)	89 Samples mg/l	PART B, June 90 mg/l	Sep 95 Ug/l
47	Endosulfan II				X				
48	Endrin**			X				<.002	<1,970
49	Fluoranthene		X			4			
50	Fluorene			X					7.22
51	Heptachlor			X				<.0005	<456
52	Heptachlor epoxide			X					291,000
53	Hexachlorobenzene**			X				<.010	<2,310
54	Hexachlorobutadiene			X					<1,770
55	Hexachlorocyclopentadiene*				X			0.7	<9,470
56	Hexachloroethane			X				<.002	<2,480
57	Indeno(1,2,3-cd)pyrene			X				<.001	0.633
58	Lead	X				>50,000, TCLP 8400UGL	8100		
59	Mercury		X			0.69	0.75		
60	Methoxychlor			X					<6,880
61	Bromomethane			X					
62	Chloromethane			X					
63	Methylene Chloride			X					3.03

Legend

RAAP suggested HCOC

' Below detection in operational sample but used on plant

" Below detection in operational sample and not used on plant

Items not marked were analyzed for the first time in Sept. 1995 and are either below the current PQL or were essentially not detected.

mg/l milligrams per liter

Ug/l micrograms per liter

	CONSTITUENT	1	2	3	4	VI Aug, 90 mg/l (Total)	89 Samples mg/l	PART B, June 90 mg/l	Sep 95 Ug/l
1	Acrolein	X							
2	Acrylonitrile				X				<6.38
3	Aldrin	X							
4	Antimony			X					4.120
5	Arsenic		X			<3.48>, TCLP 4UGL		0.002 mg/l	
6	Barium	X				175, TCLP 494UGL		0.9 mg/l	
7	Benzene	X					<.003		
8	Benzo[a]anthracene			X					2.47
9	Benzo[b]fluoranthene				X				1.81
10	Benzo[k]fluoranthene				X				0.971
11	Benzo[a]pyrene				X				1.76
12	Beryllium			X					359

	CONSTITUENT	1	2	3	4	VI Aug, 90 mg/l (Total)	89 Samples mg/l	PART B, June 90 mg/l	Sep 95 Ug/l
64	Methyl Ethyl Ketone; 2- Butanone; MEK*	X						<.1	
65	Naphthalene				x				<1,580
66	Nickel		X			<12.6, TCLP 160UGL	61		
67	Nitrobenzene*	X						<0.1	
68	N-Nitrosodimethylamine				x	<602>			<2,820
69	Pentachlorophenol	X						<.050	
70	Phenol	X							
71	Polychlorinated biphenyls; PCBs	X							
72	Selenium		X					<.001	
73	Silver	X				44, TCLP <4.6UGL		<.025	
74	Tetrachloroethylene; Tetrachloroethene*; Perchloroethylene; PCE	X						<.003	
75	Thallium			X					467
76	Toluene	X				25			
77	Toxaphene**			X				<.005	<2,840
78	1,2,4-Trichlorobenzene				x				<1,360

	CONSTITUENT	1	2	3	4	VI Aug, 90 mg/l (Total)	89 Samples mg/l	PART B, June 90 mg/l	Sep 95 Ug/l
79	1,1,2-Trichloroethane			X					<240
80	Trichloroethylene*; Trichloroethene	X				<.003			
81	Trichlorofluoromethane			X					<10
82	2,4,5-Trichlorophenol			X		<.010			<1,360
83	2,4,6-Trichlorophenol			X		<.010			<962
84	Vinyl Chloride*	X				<.003			

**Risk Assessment and Closure
Certification for the Former
Bioplant Equalization Basin
*Radford Army Ammunition
Plant***

*U.S. Army Corps of Engineers
Norfolk District
Norfolk, Virginia*

22 July, 1998

Environmental Resources Management
9701 Metropolitan Court, Suite A
Richmond, Virginia 23236

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ATTACHMENT

1	CLOSURE PLANS AND AMENDMENT
2	LANDFILL DISPOSAL REPORT
3	CLOSURE CONSTRUCTION SOLICITATION AND SPECIFICATIONS
4	DAILY REPORTS
5	FINAL SITE INVESTIGATION TABLES
6	DEQ LETTER - 22 OCTOBER 1997
7	DEQ LETTER - 10 MARCH 1998
8	RISK TABLES

On behalf of the United States Army and Alliant Techsystems, Inc. the United States Army Corp of Engineers (USACOE) and Environmental Resources Management (ERM) have prepared this risk assessment and closure report for the former Bioplant Equalization Basin (United States Environmental Protection Agency (USEPA) ID No. VA1210020730).

The purpose of this report is to document that the closure activities were conducted in accordance with the Closure, Contingent Closure and Contingent Post-Closure Plans for Radford Army Ammunition Plant's Equalization Basin HWMU-10 & SWMU-10, dated 12 December 1995 and amended 9 March 1998 (Closure Plan) and that clean closure has been achieved for all Hazardous Constituents of Concern (HCOCs) except for fluoranthene. A risk assessment for risk-based closure has been performed for fluoranthene in accordance with the approved Closure Plan and is included in this report. This report includes the following items:

- Facility description/history;
- Former Bioplant Equalization Basin description/history;
- Summary of closure activities, including depth of excavation;
- Summary of results for background and basin subsoil sampling;
- Data usability and QA/QC summary;
- Results of statistical calculations;
- Risk assessment for fluoranthene;
- Disposal of waste generated during closure activities;
- Closure activities compliance certification;
- Risk-based closure assessment compliance certification, and;
- Attachments providing figures, tables, and other relevant information for this project.

Each of the items listed above will be discussed in the remaining sections of the report.

2.0 DESCRIPTION/SITE HISTORY

2.1 DESCRIPTION

2.1.1 Facility Description

The Bioplant Equalization Basin is situated on the Radford Army Ammunition Plant (RFAAP), which is operated by Alliant Techsystems, Inc. RFAAP is a government owned industrial complex located in southwestern Virginia. It encompasses approximately 4,104 acres and is located in Pulaski and Montgomery Counties. The facility is located approximately five miles northeast of the city of Radford, 10 miles west of Blacksburg, and 47 miles southwest of Roanoke (see Figure 1). The New River divides the RFAAP into two portions commonly known as the "Horseshoe Area" and the "Main Manufacturing Area." The "Horseshoe Area" lies mainly to the north and west in Pulaski County. The "Main Manufacturing Area" lies in Montgomery County to the south and east.

The former Bioplant Equalization Basin was located in the north central portion of the "Main Manufacturing Area" (see Figure 2).

2.1.2 Former Bioplant Equalization Basin Description

The Bioplant Equalization Basin was a soil/cement-lined, rectangular impoundment with dimensions of 255 x 160 x 10.5 feet deep. The basin met design capacity of 1,350,000 gallons with 7.5 feet of water. The basin received wastewater of widely varying characteristics, including non-acidic wastewater from propellant manufacturing (on both a batch and continuous basis); pre-treated wastewater from nitroglycerine manufacturing and alcohol rectification; and wastes from recovery of ethyl ether.

2.2 SITE HISTORY

2.2.1 Facility Background

RFAAP was operated under contract by Hercules Aerospace Corporation from 1941 to 1995. Alliant purchased the operations of Hercules RFAAP in 1995 and is the current facility contractor. This facility, which contains over 1,696 buildings and occupies close to 3.65 million square feet, is the top manufacturer of solid propellants in the United States. The major

products manufactured at this facility are solvent and solventless propellants that include single base (nitrocellulose), double base (nitrocellulose and nitroglycerin), and triple base (nitrocellulose, nitroglycerin, and nitroguanidine) propellants; cast propellants; and high energy propellants. These propellants are ultimately used in small arms, anti-tank weapons, anti-aircraft weapons, rockets, torpedoes, missile systems, igniters, and other numerous ordnance-related items.

2.2.2 *Bioplant Equalization Basin Background*

In 1979, two incinerators were constructed and the incineration of waste and off-specification explosives and propellants began. These incineration operations became regulated subsequent to the promulgation of the federal hazardous waste regulations under the Resource Conservation and Recovery Act (RCRA) in 1980.

Beginning in 1980, the Bioplant Equalization Basin operated as the first of nine components that make up a biological wastewater treatment system at RFAAP. The biological treatment system was built in 1978/1979 and became operational in 1980. Prior to 1980, these wastewaters were discharged directly to the New River. Operating procedures were such that influent flows were cut off if the Bioplant Equalization Basin capacity was reached.

The facility did not submit its Part B permit application prior to 8 November 1985 and was, therefore, notified that a closure plan was required under RCRA and the Virginia Hazardous Waste Management Regulations (VHWMR). On 16 March, 1990, RFAAP was notified that a closure plan for the Bioplant Equalization Basin was required; however, the Virginia Department of Environmental Quality (VADEQ) notified RFAAP that it would allow the Bioplant Equalization Basin to remain in operation as a "newly regulated unit" until 15 March, 1994. A closure plan was submitted as part of the Part B Permit Application. VADEQ commented on the Part B application on February 2, 1991, and requested additional information.

On 28 June 1991, RFAAP submitted the requested information. On 2 December 1991, RFAAP re-submitted a RCRA Part B application for the biological waste water treatment plant. On 1 June 1992, RFAAP submitted a plan for sampling the equalization sludges in accordance with RFAAP's agreement with EPA. On 21 July 1992, VADEQ approved the groundwater monitoring plan for the Bioplant Equalization Basin via Section E of the Part B application. On 3 November 1992, a Final Draft Verification Investigation report was received by VADEQ which contained detailed studies of all SWMUs, including the sampled sludges

from the Bioplant Equalization Basin. On 19 October 1993, EPA's Delisting Section recommended denial of petition number 0834 for the sludges from the Bioplant Equalization Basin, and thus they remain a listed hazardous waste. RFAAP contacted VADEQ's Roanoke Regional Office by phone on 11 March 1994, and notified VADEQ that RFAAP was not prepared to cease operation of the Bioplant Equalization Basin on 15 March 1994, as stipulated in the VADEQ's 16 March 1990 letter. On 21 March 1994, VADEQ notified RFAAP that the requirements for immediate closure had arisen from Section 3005(j)(6) of RCRA, that the unit was required to close, and should have ceased operations on 15 March 1994.

The provision requires that "newly regulated surface impoundment units" meet the requirements of Section 3004(o)(1)(a) of RCRA (minimum technology requirements) or cease receipt of hazardous wastes four years from the date the unit becomes subject to the regulations. The VADEQ notified RFAAP that continued operation constituted noncompliance. RFAAP was also notified that the Bioplant Equalization Basin was subject to the Toxicity Characteristics Final Rule (Federal register Vol.55, No.61, 29 March 1990), by VADEQ on 21 March 1994. Since the Bioplant Equalization Basin received toxicity characteristic waste (D030, 2,4-Dinitrotoluene), RFAAP was notified that the unit must be retro-fitted or have the unit operation cease by 29 March 1994.

The VADEQ notified EPA of the pending date for the Toxicity Characteristics Final Rule for appropriate action. RFAAP responded to the VADEQ notification correspondence the day before the final closure deadline and informed VADEQ that RFAAP would continue equalization operation while working toward a consent order with VADEQ's Office of Enforcement. On the same day, 29 March 1994, EPA notified RFAAP to immediately cease operation of the Bioplant Equalization Basin.

Emergency measures were taken by utilizing several abandoned steel tanks to serve as temporary Bioplant Equalization Basins to store wastewater prior to the transmission of the wastewater to the holding chamber of the Bioplant Equalization Basin pump station (located at the southwest corner of the Basin). The pump station delivers the wastewater to the biological treatment plant. The pump station was sealed off from the Bioplant Equalization Basin by the installation of a steel plate and gasket at the bar screen at the inlet to the pump station.

The Bioplant Equalization Basin was "closed " after the unit's pump station was taken off line, and RFAAP could route all wastewater directly to the newly constructed (2) concrete equalization tanks each holding 3.82 million gallons. All hazardous waste sludges and liquids that were

remaining in the Biopant Equalization Basin have been removed. Copies of the Hazardous Waste Manifests are on file with the VADEQ.

Closure of the Bioplant Equalization Basin included earthwork, demolition, removal and decontamination/disposal of piping, pumps, soil/cement liner and concrete, subsoil testing to verify soil requiring removal, removal and disposal of contaminated soil and backfill and grading. The closure activities were completed prior to the conduct of the risk assessment for risk-based closure (described in Section 5.0 of this closure report). The closure activities were conducted in accordance with the Closure Plan and are certified in Section 6.0 of this report. The disposal of waste generated during closure activities are discussed later in this section.

3.1

CLOSURE PERFORMANCE STANDARDS AND APPROACH

The closure performance standards and the general closure approach is detailed in Section 3.0 of the Closure Plan. The Closure Plan and the Closure Plan Amendment are included as an attachment to this report (see Attachment 1). The following is a brief summary of the closure performance standards and the general closure approach.

The closure plan was prepared and followed to meet the requirements of VHWMR Sections 9.6.L, 10.6 and 10.10.I. The basin was closed in a manner that

- Minimized the need for further maintenance, and;
- Controls, minimizes or eliminates, to the extent necessary to prevent threats to human health and the environment, post-closure escape of hazardous waste, hazardous waste constituents, leachate, contaminated rainfall, or waste decomposition products to the ground or surface waters or the atmosphere.

The general closure approach included the removal of water and sludges from the Bioplant Equalization Basin prior to closure. Pumps and ancillary piping were also removed for off-site disposal or decontaminated in accordance with Section 3.7 of the approved Closure Plan. The perimeter flood control wall was removed and disposed. Soil sampling and testing was conducted to determine that no additional soils were required to be removed. The excavation was then back-filled with clean soils, graded to promote positive drainage, and re-vegetated. Equipment was decontaminated in an approved manner. The contaminated materials, excluding the water and sludges previously

removed, did not test positive as a characteristic hazardous waste and was therefore disposed of in accordance with the VSWMR (see Attachment 2, Permitted Landfill Receipt).

3.2 **CLOSURE SPECIFICATIONS**

The specifications for the closure activities are included in the Specifications for Bio Plant Equalization Basin Closure Section of the Bioplant Equalization Basin Closure Construction Solicitation and Specifications (USACOE Specifications) prepared by USACOE dated 8 September 1997. This document and the as-built diagrams are included as an attachment to this report (see Attachment 3).

Division 01 of the referenced USACOE Specifications include the general requirements of the closure activities. The specifications for demolition, demolition debris disposal, grading, chain link fence, and turf are included in Division 02 of the USACOE Specifications (see Attachment 3). Daily Reports recorded during the site work are included as Attachment 4.

3.3 **DISPOSAL OF WASTE GENERATED DURING CLOSURE ACTIVITIES**

3.3.1 **Waste Characterization Sampling**

Radian collected samples of the basin liner and of the concrete wall which surrounds the basin to identify if the material would need to be managed as hazardous waste when removed. For the basin liner, one composite sample was collected from seven sampling grid nodes. Radian placed approximately one-half liter of liner material in a stainless steel bowl from each of the seven sampling locations. The material was pulverized and completely mixed with a stainless steel spoon and split into the appropriate sample containers. The sample containers were packed with ice and shipped overnight with the proper chain-of-custody to the laboratory. The material appeared to be a mixture of brownish-colored soil and bentonite.

Radian collected four discrete samples of concrete from the basin wall. The field personnel used a hammer and chisel to remove concrete chip from the base of the 2-foot high wall. The chips were pulverized with the hammer on a piece of plastic sheeting and placed into the sampling containers. This procedure was repeated at each wall sampling location so that one concrete wall sample was collected from each quadrant of the perimeter wall.

4.0

SUMMARY OF RESULTS FOR BACKGROUND AND BASIN SUBSOIL SAMPLING

4.1

DEVELOPMENT OF BACKGROUND LEVELS

The hazardous constituents of concern (HCOCs) for this unit were identified in Table 3-1 of Section 3.5 of the Bioplant Equalization Basin closure, contingent closure and contingent post-closure plans (see Attachment 1). Radian developed background soil concentrations. The following is a summary from the *Final Site Investigation/Evaluation Bioplant Equalization Basin Closure Site Investigation/Evaluation Radford Army Ammunition Plant, Radford, Virginia* prepared by Radian dated February 1997.

Eight samples were collected from areas thought to be free from contamination from past or present industrial activities (see Figure 4). Prior to collection, the sample locations were approved by VADEQ. The samples were collected from soils that were geologically similar to the basin subsoil. A critical value (CV) for each constituent was calculated as an upper tolerance limit for the 99th percentile (i.e., a coverage of 99%) with 95% confidence, as specified in the closure plan. This CV became the reasonable background value for each constituent. These background levels were approved by VADEQ on 10 March 1998 and became appropriate for comparison to basin subsoil data. The background levels are included as Attachment 5 (Table 3-1). VADEQ approved the background data in writing on 22 October 1997. A copy of this letter is included as Attachment 6.

4.2

BASIN SUBSOIL SAMPLING

On 16 September, 1996, Radian initiated the basin sampling by measuring 50 foot increments around the basin wall, starting from the southeast corner of the basin. The locations of the subsoil samples are illustrated in Figure 5. A sampling point was selected in each grid node and marked with a wooden stake. At the time the sampling points were selected, water covered the center of the basin including all of grid node No. 9. The sampling point for No. 9 was marked by placing a large piece of concrete in the water in the area of the proposed sampling location. The sampling locations and elevations were surveyed following completion of the sampling.

Radian collected samples of basin subsoil from all seven sampling locations. A hole was made in the 12-inch thick basin liner with an air hammer. Radian field personnel used a stainless steel hand auger to collect soil from the top 6 inches of the soil directly underneath the liner (subsoil). The clayey sand material was split into the sampling containers following the protocol in the Chemical Data Acquisition Plan (CDAP) (Radian, 1996). Seven discrete samples were collected. The samples were identified with the following field ID's: RAAP-#10-01, 05, 06, 09, 10, 14, 15. Radian backfilled each of the boreholes in the liner with bentonite following the completion of the sampling.

The samples were packed with ice and shipped overnight with the proper chain-of-custody to the appropriate laboratory. Additional soil was collected for the QA/QC samples. Equipment rinsate blank, a field blank, and trip blanks also were collected. The results of the basin subsoil samples are included as Attachment 5 (Table 3-2). Due to high practical quantitation limits achieved during the first round of sampling, locations RAAP-#1 and RAAP-#10 were resampled. The results of the resampling were submitted to the VADEQ. VADEQ approved the use of the resampled locations for use in background comparison. This letter approving the equalization basin revised sampling dated 10 March 1998 is included as Attachment 7.

4.3

DATA USABILITY AND QA/QC SUMMARY

Data evaluation and usability was assessed by Radian and the results were included in the *Final Site Investigation/Evaluation Bioplant Equalization Basin Closure Site Investigation/Evaluation Radford Army Ammunition Plant, Radford, Virginia* prepared by Radian dated February 1997. The following section summarizes the findings of the assessment.

The background and basin subsoil sample data were evaluated according to the data quality objectives (DQOs) presented in the CDAP. These DQOs are statements of the acceptable level of measurement uncertainty in chemical data. The measurement objectives were established in terms of accuracy, precision, representativeness, sensitivity, comparability, and completeness. Overall, the data generated for the background soil samples and the basin subsoil samples were approved by the VADEQ for use for their intended purpose.

RESULTS OF STATISTICAL CALCULATIONS

Radian conducted a statistical treatment of the background data in order to calculate a critical value (CV) for comparison against the basin subsoil data. The following section summarizes their statistical calculations as detailed in the *Final Site Investigation/Evaluation Bioplant Equalization Basin Closure Site Investigation/Evaluation Radford Army Ammunition Plant, Radford, Virginia* prepared by Radian dated February 1997.

Based on the Closure Plan and discussions with the VADEQ, Radian calculated CVs only for the seven metals detected in the background samples. These CVs are included in Attachment 5 (Tables 3-1 and 3-2). Critical values were calculated for those HCOCs that were detected in both the background and basin samples (e.g., metals) or detected in the basin samples but not in the background (e.g., fluoranthene). The CVs were calculated as an upper tolerance limit (UTL) for the 99th percentile (i.e., a coverage of 99%) with 95% confidence, as specified in the Closure Plan.

Prior to calculating the UTLs, the data were evaluated to determine if the concentrations follow a normal distribution for each analyte according to the Shapiro-Wilk w test (Shapiro and Wilk, 1965). Each of the HCOCs were determined to have a normal distribution according to the W test, so only normal UTLs were calculated using the following equation:

$$UTL = \bar{x} + (K)(s)$$

where \bar{x} is the estimated sample mean; K is the tolerance factor; and s is the estimated standard deviation. The tolerance factor, K, is from Hahn Meeker, 1991. A summary table illustrating the appropriate statistics used in the UTL calculations is included in Attachment 5 (Table 3-4).

Each basin sample was compared to the critical values. All results for the inorganic HCOCs were below the CVs. Fluoranthene was detected in one basin sample (Grid #9 at .330 mg/Kg); however, fluoranthene was not detected in any of the background samples. A CV for fluoranthene was calculated using the equation above. Using one-half the sample result (per telephone conversation with VADEQ) yields a CV for fluoranthene of .006 mg/Kg. Therefore, the concentration of fluoranthene for one sample exceeds the CV.

5.0 RISK ASSESSMENT FOR RISK-BASED CLOSURE

5.1 GENERAL

Based on the data collected as part of the basin subsoil sampling program, clean closure could be established for all of the HCOCs, except for fluoranthene. Based on the detection of 0.333 mg/Kg fluoranthene in one of the soil samples collected below the Bioplant Equalization Basin, USACOE elected to perform a risk assessment (RA) for risk-based closure. The risk assessment detailed herein was conducted in accordance with the VADEQ document titled "Guidance for Development of Health Based Cleanup Goals Using Decision Tree/REAMS Program" (hereinafter "Virginia Risk Guidance"), and Section 3.8.5 of the Closure Plan. Successful risk-based closure would demonstrate that the concentration of fluoranthene does not pose an unacceptable level of risk to human health and the environment.

5.2 SITE EVALUATION

At the time this RA was completed, closure activities of the Bioplant Equalization Basin had been completed. The area encompassed by the former Bioplant Equalization Basin was approximately ten feet deep. This depth accounted for removal of the concrete / soil liner. The entire area was approximately 265 feet by 170 feet which accounts for some side slope and flood wall removal.

5.3 EXPOSURE ASSESSMENT

5.3.1 Media and Exposure Pathways

Fluoranthene was detected in one sub-basin sample collected beneath the Bioplant Equalization Basin at a concentration that statistically exceeded the background level. Exposure to fluoranthene potentially involves multiple receptors and various media pathways.

5.3.2 Site Conceptual Exposure Model (SCEM)

The SCEM is based on existing and future site conditions and depicts the potential exposure routes and media for the site (Figure 6). The SCEM presents the primary applicable migration pathways and identifies the

exposure routes and potentially affected populations which warrant either further consideration and/or quantitative risk characterization. Table 2 provides a summary of the exposure pathways to human populations. While there are multiple potential exposure pathways to humans, only the future on-site resident was quantitatively evaluated for this assessment. The remaining receptor pathways were qualitatively evaluated and determined to be insignificant when compared to the risk associated with a future on-site resident.

RFAAP continues to operate as an industrial complex; as such, access is limited by the use of gated entrances and security personnel. On-site workers in the vicinity of the Bioplant Equalization Basin area are one potentially significant human receptor. Because of the security associated with RFAAP, we assume only escorted guests are subject to the risk associated with this area. In the unlikely event a trespasser crosses the area of concern, the trespasser would most likely be subject to the same risk associated with a site visitor. In either situation, visitors which frequent the area of concern are unlikely to experience the same risk associated with an on-site worker. Therefore, under the current scenario, a RFAAP worker is the primary human receptor.

An RFAAP worker can be subject to multiple exposure pathways: inhalation of particulate matter, ingestion, and dermal contact. Soil particles can become windborne and inhaled by the on-site worker. Additionally, a worker can physically handle the contaminated soil, which can lead to absorption by the skin or incidental ingestion. Risks associated with soil contamination can be assumed to be minimal in this instance, however. The soil sample which produced the contaminated soil result is located approximately nine (9) feet below grade, at six (6) inches beneath the former Bioplant Equalization Basin concrete/soil liner. The excavation has been backfilled with clean material and approximately nine (9) feet of clean compacted subgrade material was placed on top of the excavated liner. The nine (9) foot layer of clean soil is a sufficient barrier to soil particle inhalation, ingestion, and dermal contact. Because no complete pathways exist for ground water (no drinking water wells exist), the risks corresponding to potential human receptors for the current working conditions is insignificant.

The closure plan for the Bioplant Equalization Basin states that a future residential use of the property must be considered in the RA. Assuming residential homes are built on the property, on-site residents will experience a much greater potential risk than visitors or trespassers, simply by their proximity to the contamination source.

As with a RFAAP worker, on-site residents will be subject daily to the contaminant concentrations of the soil and ground water. In addition to inhalation of soil particulates, ingestion, and dermal contact with the contaminated soil, no restrictions have been placed by RFAAP on the use of ground water in the area. Therefore, residents can also be exposed through ingestion and dermal contact with ground water. Again, as with the RFAAP worker, we can assume an incomplete pathway for risks associated with soil contamination; however, we have elected not to make this assumption for the assessment of risk. We conservatively assumed that soils excavated during housing construction or well construction have been evenly spread across the remainder of the parcel. This could bring contaminated material to the surface, creating a complete exposure pathway via soil inhalation, ingestion, and/or dermal contact.

The potential pathways quantitatively modeled for this RA pertain to an on-site resident. The potential exposure routes include soil inhalation, ingestion, and dermal contact, and ground water ingestion and dermal contact. Each potential exposure pathway was quantitatively evaluated using the REAMS model default exposure assumptions (where applicable), the April 1998 USEPA Region III Risk Based Concentration Table of toxicity values presented in Table 1, and default values provided in the existing closure plan.

5.4

HAZARDOUS CONTAMINANTS OF CONCERN (HCOC)

Radian Corporation of Herndon, Virginia (Radian) collected and analyzed soil samples from eight background locations and seven subsoil samples at RFAAP. The results of this investigation are detailed in the *Final Site Investigation/Evaluation*, February 1997 prepared by Radian. The background samples were used to determine a statistical background value (Critical Value) for all HCOCs. The statistical background values became the threshold values against which the subsoil samples collected from beneath the Bioplant Equalization Basin were compared to determine if a particular sample was "contaminated," i.e., above the statistically generated background threshold value.

The following results indicate the contaminant which exceeds the background threshold concentrations as described above. It is this contaminant for which this RA is being performed. The location of the sample with respect to the former Bioplant Equalization Basin and the threshold values for the listed contaminants are included. Only those tests which exceed the background (threshold) values are included in this table.

Contaminant	Location	Result (ppm)	Critical Value (ppm)
Fluoranthene	Grid #9	0.333	0.006

5.5

TOXICITY ASSESSMENT

The toxicological assessment involved the identification of adverse health effects associated with exposure to fluoranthene and the relationship between the extent of exposure and the likelihood of adverse health effects. Fluoranthene is a non-carcinogenic chemical and the toxicity values for non-carcinogenic chemicals are represented by reference doses (RfDs). The toxicity values used in this risk assessment for fluoranthene were derived from the USEPA Region III Risk-Based Concentration Table-April 1998, and are presented in Table 3.

The USEPA Region III Risk-Based Concentration Table provides an oral reference dose but not an inhalation reference dose for non-carcinogenic effects of fluoranthene. Therefore, the RfD for oral inhalation for the non-carcinogenic effects of fluoranthene is assumed to be equal to the RfD for the ingestion of fluoranthene. Although it is recognized that substitution of the exposure route-specific toxicity value may not be applicable for all compounds, it was determined that a more conservative risk estimate is derived by retaining the exposure route without a published toxicity value for consideration in the overall RA.

5.6

CONTAMINANT CONCENTRATION AT THE POINT OF EXPOSURE

The table in Section 5.4 provides the sample result which exceeds the critical value determined for the RFAAP Biopant Equalization Basin site. The development of the concentrations at the points of exposure required using the only sample with a concentration exceeding the critical value. The value of 0.333 parts per million (ppm) fluoranthene was used in the calculations of risk and exposure point concentrations.

For migration of the contaminant from soil to ground water, the maximum contaminant level (MCL) is typically used to mark the starting point for determination of the contaminant concentration of a HCOC. The MCL is the maximum contamination allowed in drinking water. An MCL for fluoranthene was not available at the time of this assessment. Therefore, the tap water concentration taken from the USEPA Region III Risk-Based Concentration Table-April 1998 was used and is presented in

Table 4. Demonstrating a concentration at this level or below gives an acceptable risk for the contaminant in question.

5.7

RISK EVALUATION AND SUMMARY

This section combines the information developed in the exposure and toxicity assessment sections to estimate the potential risks to human health posed by the contaminants detected. Since fluoranthene is listed as a non-carcinogenic chemical only non-carcinogenic risk will be discussed herein. A hazard quotient (HQ - non-carcinogens) for exposure to fluoranthene by each route of exposure, exposure pathway, category of receptor, and exposure case are initially estimated separately. The hazard index (HI) is then summed across chemical, exposure routes, and pathways applicable to the same population.

Fluoranthene has quantified non-carcinogenic effects as indicated by the RfDs given in Table 1. The cumulative non-carcinogenic risk must have a hazard index (HI) of less than one, where the HI is the sum of the HQs calculated for each relevant route of exposure. Another aspect of non-carcinogenic risk calculations is that effects are not cumulative for a lifetime, and the susceptibility of effects differs between adults and children. Therefore, different equations and default parameters are necessary to calculate the risks attributed to adults and the risks attributed to children. Likewise, separate HIs must be calculated for both adults and children.

The risk tables for the exposure pathways can be found in Attachment 8; the results of the HI calculations are shown in Table 3 and summarized here. For adults, the HI is approximately $9.18\text{E-}05$; for children, approximately $2.51\text{E-}04$. Both values fall well below the HI threshold of one.

Another potential area of contamination is the migration of contaminants to ground water. Percolation through the contaminated zone may generate leachate which can reach the ground water. As shown in Table 4, ERM used the Soil Screening Level Partitioning Equation to estimate the screening level in soil which will generate a concentration no greater than the EPA Region III Risk-Based Tap Water Concentration in the ground water. Using conservative default parameters as necessary, the calculated screening level in soil was determined to be well above the maximum concentration detected. In addition, a dilution attenuation factor (DAF) of one (1) was used instead of twenty (20). The table below illustrates the results.

Contaminant	Site-Specific Screening Level (mg/Kg) (1 DAF)	Maximum Level Detected (mg/Kg)	Below Screening Level?
Fluoranthene	2.0E+02	0.333	Yes

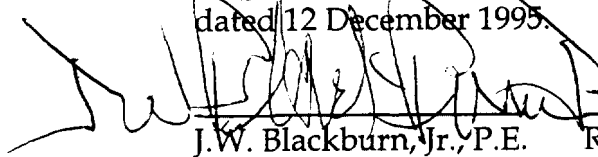
Therefore, based on the level of fluoranthene detected in the subsoils, potential impacts to ground water will not exceed the acceptable criteria (RBC Tap Water).

In summary, the maximum and only detected concentration of fluoranthene poses an acceptable risk under the current use and to a potential future residential population. The non-carcinogenic risk associated with inhalation, ingestion, and dermal absorption of fluoranthene in soil for adults is approximately $9.18\text{E-}05$; for children, approximately $2.51\text{E-}04$. These risks are well below the target HI of one.

In addition, when the calculated soil screening values are compared to the detected level, the fluoranthene concentration does not pose a threat to migrate from the soil to the ground water at levels equal to or above the RBC Tap Water Concentration. Therefore, the soil concentration of fluoranthene remaining in the Bioplant Equalization Basin area meets the acceptable risk levels as outlined in the Bioplant Equalization Basin Closure Plan and the Virginia Risk Guidance for risk-based closure.

CLOSURE ACTIVITIES COMPLIANCE CERTIFICATION

Norfolk District, Corps of Engineers certifies that the closure of the Bioplant Equalization Basin at the Radford Army Ammunition Plant in Radford, Virginia, was performed and completed in accordance with the Virginia Department of Environmental Quality approved Closure Plan dated 12 December 1995.



J.W. Blackburn, Jr., P.E.

7355

Registration No.

VA

State

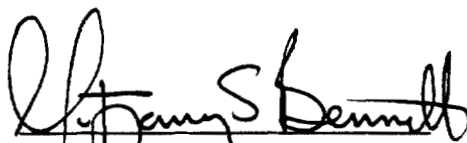
JUL 23 1998

Date



**RISK BASED CLOSURE ASSESSMENT COMPLIANCE
CERTIFICATION**

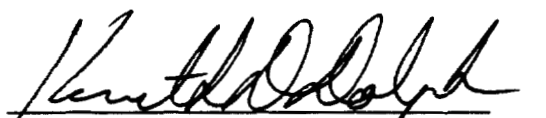
Environmental Resources Management certifies that the closure of the Bioplant Equalization Basin at the Radford Army Ammunition Plant in Radford, Virginia, was performed and completed in accordance with the Virginia Department of Environmental Quality approved Closure Plan dated 12 December 1995, and amended 9 March 1998 and the VADEQ document titled "Guidance for Development of Health Based Cleanup Goals Using Decision Tree/REAMS Program".


Montgomery S. Bennett, P.G.

2801 001095
Registration No.

VA 7/22/98
State Date



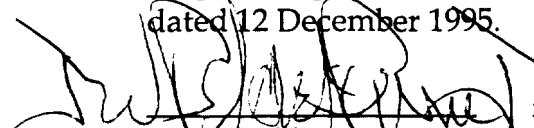

for Radford Army Ammunition Plant

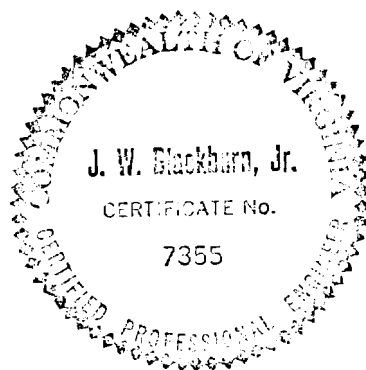
RESIDENT MANAGER
Title

7/30/98
Date

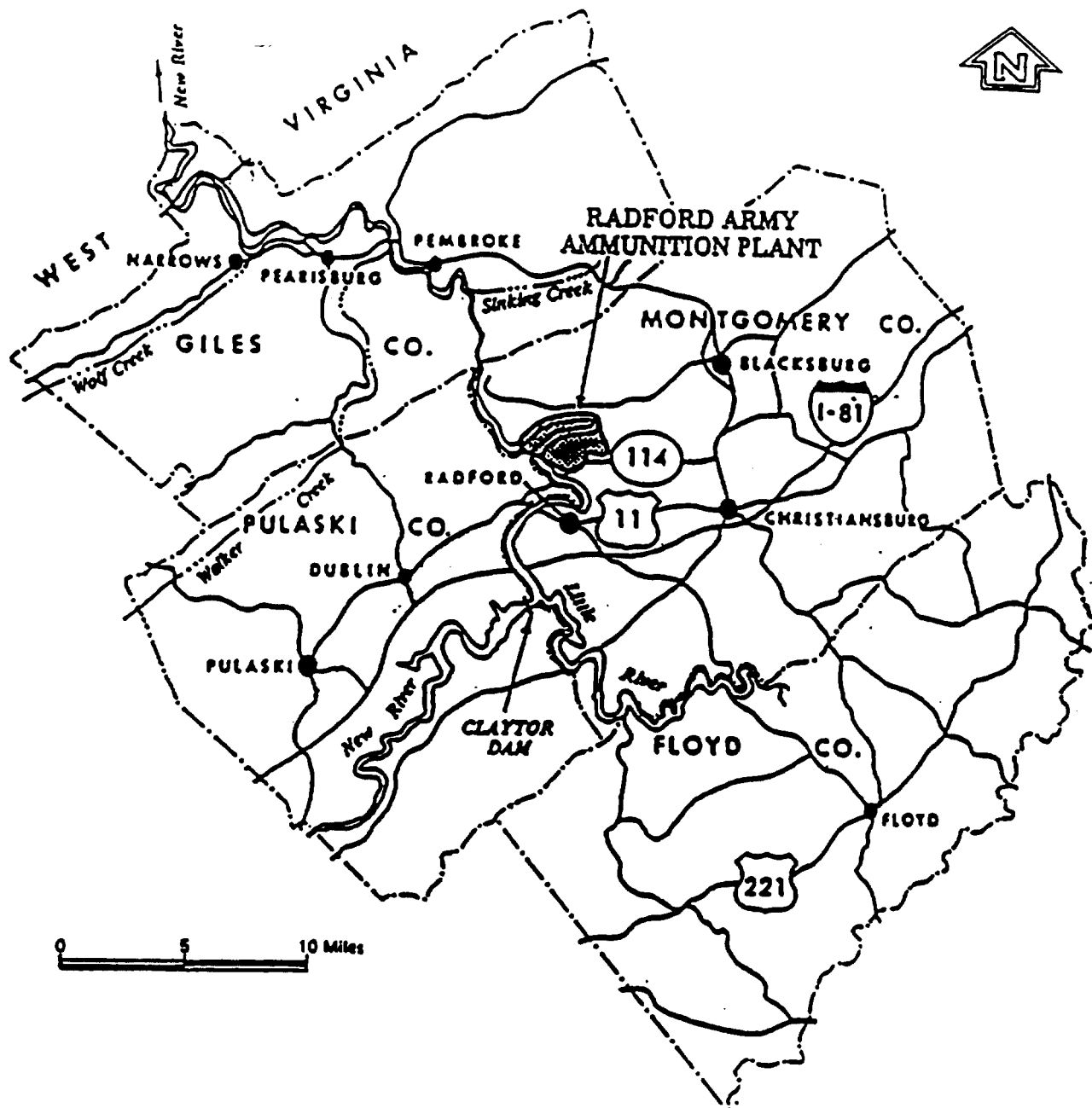
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J.W. Blackburn, Jr., P.E. 7355 VA JUL 23 1998
Registration No. State Date



Figures



W.O. #: 28705.00.01

Drawn By/Date: LJC/7-6-98

Checked By/Date:

Revised By/Date:

Checked By/Date:

Figure 1
Facility Location Map



ERM

9701 Metropolitan Court Suite A
Richmond, VA 23236
(804)330-8990

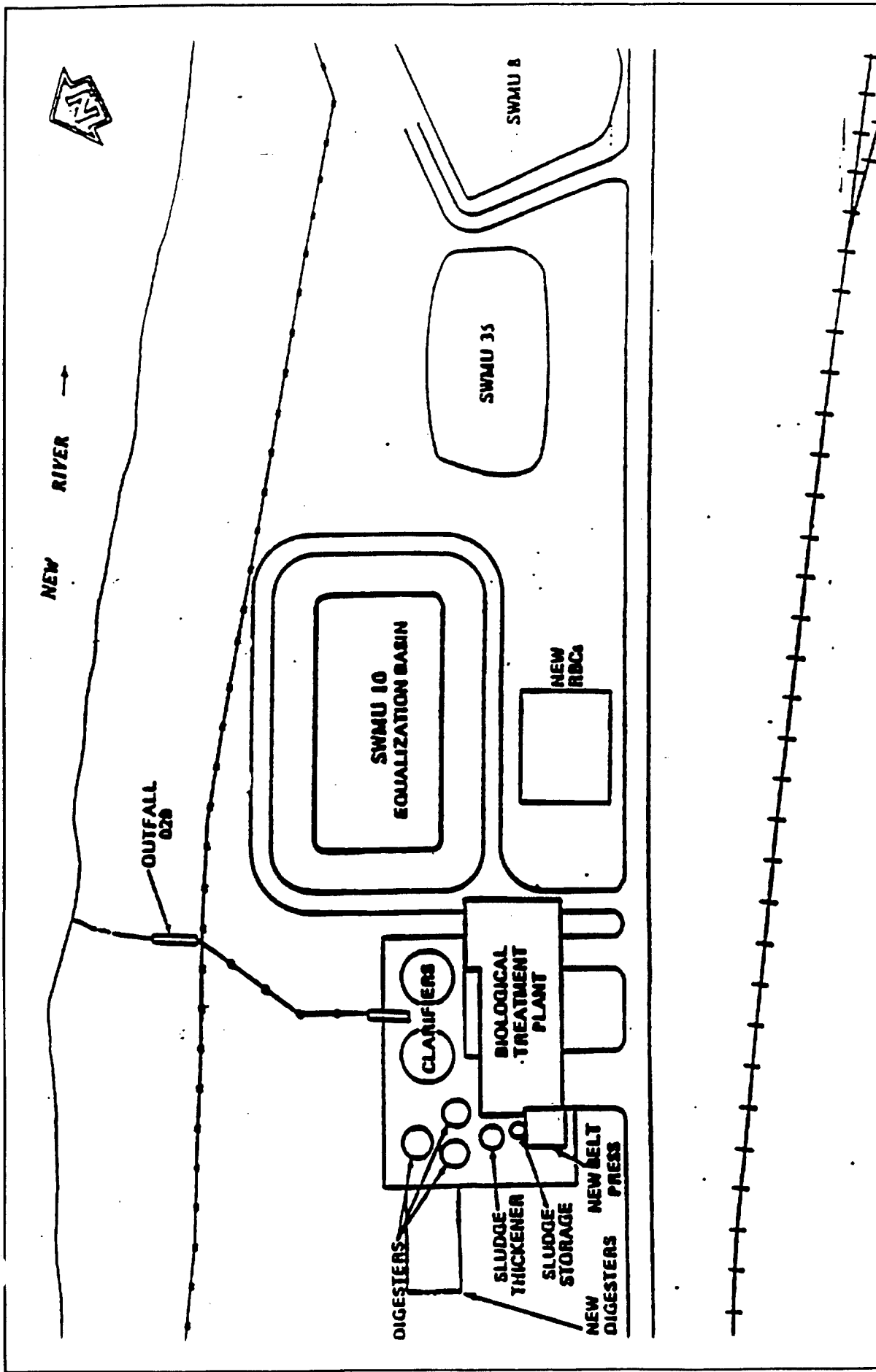
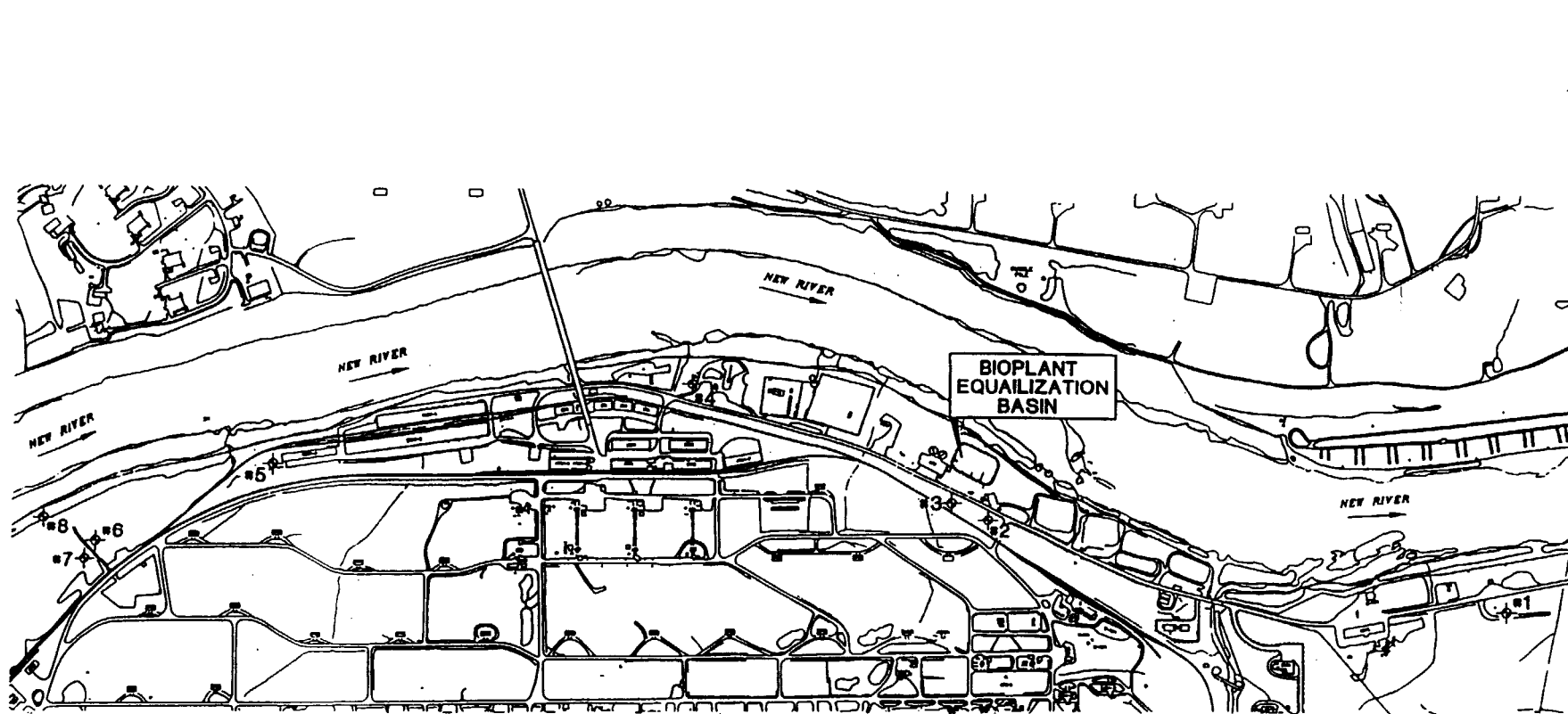


Figure 2
Former Bioplant Equalization
Basin Location Map



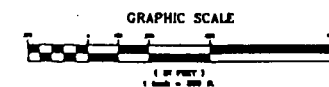
9701 Metropolitan Court Suite A
 Richmond, VA 23236
 (804)330-8990

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LEGEND

 LOCATIONS OF BACKGROUND SAMPLES



W.O. #: 28705.00.01

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Revised By/Date:

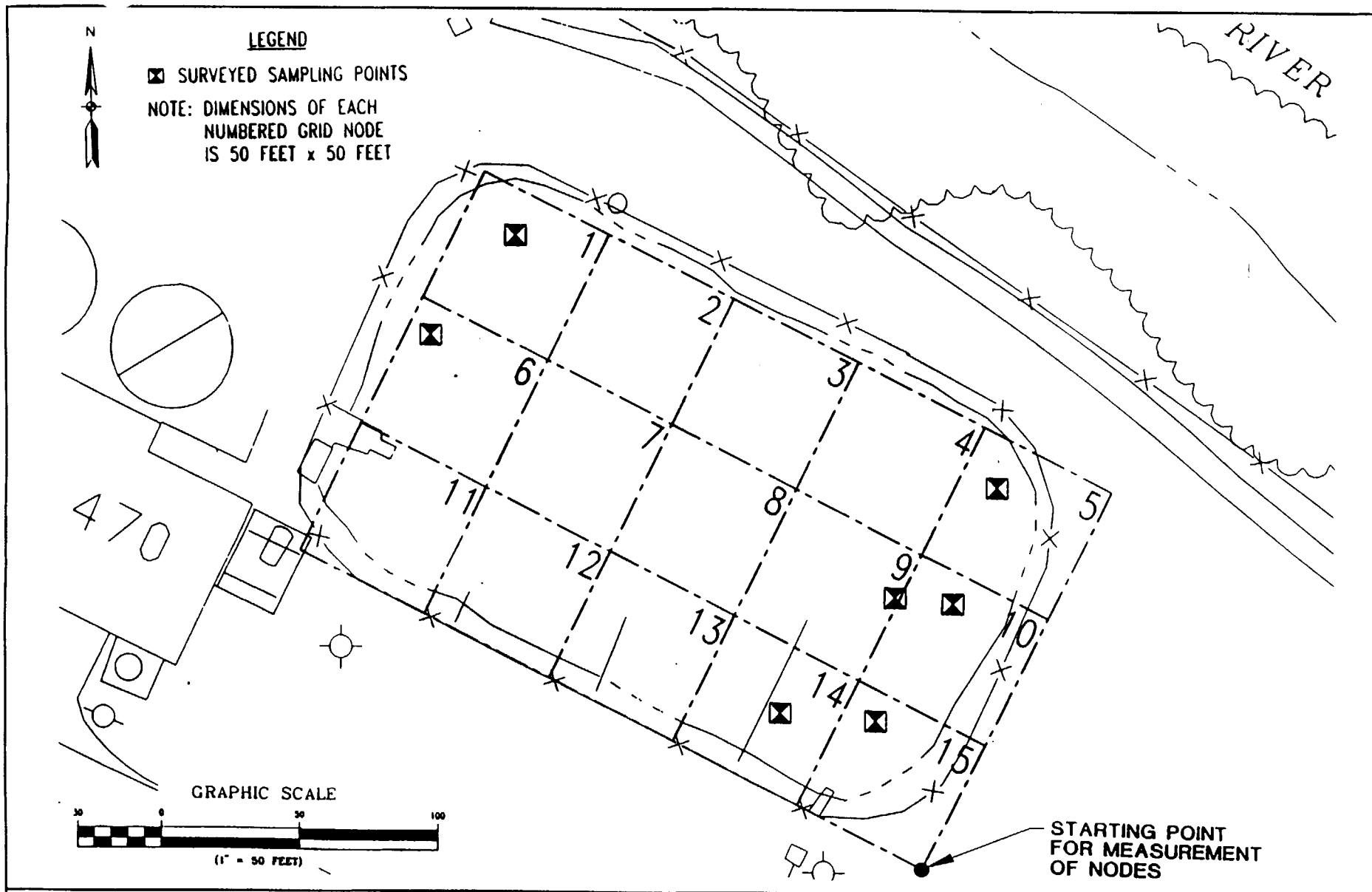
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Figure 3
Background Sample
Location Map



ERM

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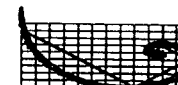
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Figure 4
Basin Subsoil Sample
Location Map



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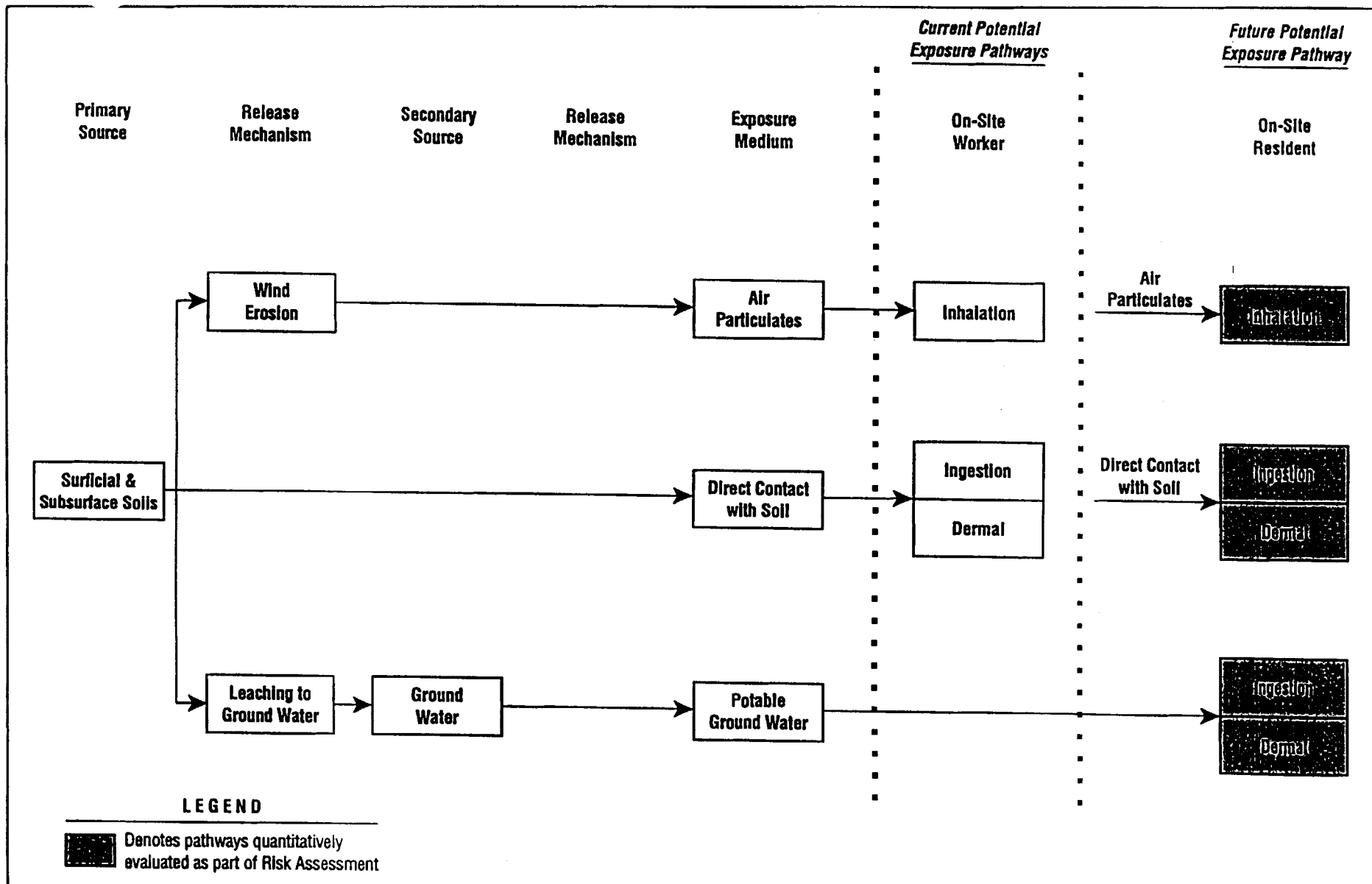


Figure 5
Site Conceptual Exposure
Model (SCEM)

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Tables

Table 1
Toxicity Values
Radford Army Ammunition Plant
Radford, Virginia

Contaminant	CAS No.	Carcinogen?	Carcinogenic Effects		Non-Carcinogenic Effects	
			Oral Slope Factor (CPSo) (Kg•day/mg)	Inhalation Slope Factor (CPSi) (Kg•day/mg)	Chronic Oral Reference Dose (RfDo) (mg/kg/day)	Chronic Inhalation Reference Dose (RfDi) (mg/kg/day)
<i>PHA</i>						
Fluoranthene	206440	No	~	~	4.00E-02	4.00E-02

Note: Toxicity value taken from USEPA Region III list (Roy Smith Tables-15 April 1998)

~: Not applicable

The RfDi was assumed to be equal to the RfDo

Table 2
Summary of Potential Exposure Pathways
Considered in the Risk Assessment
Radford Army Ammunition Plant
Radford, Virginia

Exposure Medium/ Exposure Route	Current Site Access		Future Site Access		
	RAAP Worker	Visitor	Resident	Construction Worker	Trespasser/Visitor
Soils					
Inhalation	~	~	X	~	~
Ingestion	~	~	X	~	~
Dermal Contact	~	~	X	~	~
Migration to Groundwater					
Ingestion	~	~	X	~	~
Dermal Contact	~	~	X	~	~

"X" Indicates that the pathway was modeled quantitatively in the Risk Assessment.

"~" Indicates that the pathway was qualitatively evaluated, but was determined to be an insignificant exposure route compared to that of a future long-term resident

Table 3
On-site Resident
Human Exposure to Soils (Non-carcinogen)
Radford Army Ammunition Plant
Radford, Virginia

Contaminant	CAS No.	Carcinogen?	Maximum All Soils Conc. (mg/Kg)	Calculated Air (Dust) Conc. (kg/m3)	Non-Carcinogenic (Adult) Hazard Quotient (HQ)			Non-Carcinogenic (Child) Hazard Quotient (HQ)		
					Ingestion	Dermal	Dust Inhalation	Ingestion	Dermal	Dust Inhalation
<i>PAH</i>										
Fluoranthene	206440	No	0.333	4.90E-10	1.14E-05	8.04E-05	3.36E-09	1.06E-04	1.45E-04	9.41E-09

Totals	1.14E-05	8.04E-05	3.36E-09	1.06E-04	1.45E-04	9.41E-09
---------------	-----------------	-----------------	-----------------	-----------------	-----------------	-----------------

Hazard Index (Adult):	9.18E-05
Hazard Index (Child):	2.51E-04

NOTES:

Dust concentration in air calculated by multiplying maximum soil concentration by the particulate emission factor (as defined in the closure plan).

Concentration is the only detected concentration.

Values in italics are calculated using oral factors (RfDo)

Table 4
Soil Screening Level Partitioning Equation for Migration to Ground Water
Radford Army Ammunition Plant
Radford, Virginia

$$\text{Screening Level in Soil (mg/kg)} = C_w [K_d + (\theta_w + \theta_a H') / \rho_b]$$

where:

C_w = target soil leachate concentration (mg/L)

K_d = soil-water partition coefficient (L/kg)

θ_w = water filled soil porosity ($L_{\text{water}}/L_{\text{soil}}$)

θ_a = air filled soil porosity ($L_{\text{air}}/L_{\text{soil}}$)

where: $n = 1 - \rho_p/\rho_s$, soil porosity ($L_{\text{pore}}/L_{\text{soil}}$)

where: ρ_s = soil particle density (kg/L)

H' = Henry's law constant (dimensionless)

ρ_b = dry soil bulk density (kg/L)

FLUORANTHENE

$$\text{Screening Level in Soil (mg/kg)} = C_w [K_d + (\theta_w + \theta_a H') / \rho_b]$$

where:

C_w = 1.5 1.5 x 1 (RBC Tap Water Concentration x default attenuation factor (DAF)*)

K_d = 1.07E+02 [107,000 Koc (Soil Screening Guidance: User's Guide, Attachment C, page C-3) * foc 0.1% (default value)]

θ_w = 0.3 (default value)

θ_a = 0.1339623 1 - (1.5 / 2.65) - 0.3 ((1 - ρ_p/ρ_s) - θ_w , default values)

H' = 0.00066 (Soil Screening Guidance: User's Guide, Attachment C, page C-3)

ρ_b = 1.5 (default value)

$$\text{Screening Level in Soil (mg/kg)} = 2.E+02 \quad \text{Highest Detected Value (mg/kg)} = 0.333$$

* The default DAF equals 20 for sources up to 0.5 acres in size, however for conservatism, DAF equals 1 was used in this case. Therefore, the concentration of fluoranthene in the soil which will leach to the ground water and produce ground water concentrations approximately equal to the RBC tap water concentration is 20,000 mg/kg, assuming the default parameters provided in the EPA document Soil Screening Guidance: User's Guide (April 1996) are used.

** An MCL for fluoranthene is not available; therefore, the EPA Region III Risk-Based Concentration for tap water was used.

Attachment 1
Closure Plans and Amendment

APPROVED BY
DEQ

CLOSURE, CONTINGENT CLOSURE AND CONTINGENT POST-CLOSURE PLANS
FOR RADFORD ARMY AMMUNITION PLANT'S

**EQUALIZATION BASIN
HWMU-10 & SWMU-10**

RADFORD, VIRGINIA
EPA ID VA1210020730

RADFORD ARMY AMMUNITION PLANT
RADFORD, VIRGINIA
EPA ID VA1210020730
December 12, 1995

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LIST OF ACRONYMS

CDD Construction, Demolition, and Debris Landfill
 CEI Comprehensive Evaluation Inspection
 CFR Code of Federal Regulations
 CQA Construction Quality Assurance
 EEA Explosive Experimental Area
 EPA Environmental Protection Agency
 FFCA Federal Facility Compliance Agreement
 GWMP Groundwater Monitoring Plans
 HCOC Hazardous Constituents of Concern
 LDR Land Disposal Restrictions
 MDL Method Detection Limit
 ND Not Detectable
 NPL National Priority List
 PQL Practical Quantitation Limit
 PVC Polyvinyl Chloride
 QA/QC Quality Assurance/Quality Control
 RAAP Radford Army Ammunition Plant
 RBC Risk Based Criteria
 RCRA Resource Conservation and Recovery Act
 RDT&E Research, Development, Test and Evaluation
 RFA RCRA Facility Assessment
 RFDs Reference Doses
 RFI RCRA Facility Investigation
 RSDs Risk Specific Doses
 SCS Soil Conservation Service
 SPLT Synthetic Precipitation Leach Test
 UTS Universal Treatment Standard
 VDEQ Virginia Department of Environmental Quality
 VI Verification Investigation
 VPDES Virginia Pollutant Discharge Elimination System Permit
 VSWMR Virginia Solid Waste Management Regulations
 VHWMR Virginia Hazardous Waste Management Regulations
 WWTP Wastewater Treatment Plant

1.0 INTRODUCTION

1.1 Purpose

The following closure plan is submitted in accordance with the requirements of the Commonwealth of Virginia's Hazardous Waste Management Regulations (VHWMR), § 9.6. The plan identifies the necessary steps to close the Equalization Basin, (EQ Basin), which is a RCRA surface impoundment located at the Radford Army Ammunition Plant in Radford, Virginia; EPA ID No. VA1210020730.

1.2 Facility Identification and Contact Person

EPA ID No. VA1210020730

Owner/Operator - U.S. Army, Radford Army Ammunition Plant / Alliant Tech Systems, Inc.

Address - Radford Army Ammunition Plant, P.O. Box 1, Radford, Virginia 24141-7536.

Contacts Telephone No. - Jerome Redder at (540) 639-7536 or Robert Richardson at (540) 639-8641.

1.3 Background

The facility has operated a hazardous waste management facility subject to regulations promulgated under the Resource Conservation and Recovery Act. The Army is the owner of the Radford Army Ammunition Plant (Radford), located in Radford, Virginia and operated by Alliant Tech Systems (Alliant) which was previously Hercules Incorporated (Hercules). A Notification of Hazardous Waste Activity was filed for Radford with the EPA on August 14, 1980, declaring Radford to be engaged in the generation, treatment, storage, and disposal of hazardous waste under Title 40, Code of Federal Regulations, Part 261.

The EQ Basin is located along the New River in the north-central part of the Main Manufacturing Area. The surface impoundment is the first of nine components that make up a biological wastewater treatment system at Radford. This system treats wastewaters of widely varying characteristics, including non-acidic wastewaters from propellant manufacturing (on both a batch and continuous basis), pre-treated wastewaters from nitroglycerine (NG) manufacturing and alcohol rectification and wastes from recovery of ethyl ether (USEPA, 1987). The wastes treated and sludges generated in the Basin are listed hazardous wastes, hazardous waste code K044 and characteristic waste codes D030. The biological treatment system was built in 1978/1979 and became operational in 1980. Prior to 1980, these wastewaters were discharged directly to the New River.

The EQ Basin is approximately 160 feet wide by 255 feet long. The total depth of the Basin is approximately 10.5 feet. With 7.5 feet of water in the Basin it realizes design capacity of 1,350,000 gallons. The containment walls are constructed of concrete, and the Basin is lined with a soil/cement/clay liner. The unit was expanded to its current dimensions since original construction. The Basin's northern and eastern outside embankments are reinforced with rip-rap. Suspended polymeric dividers accommodate aeration/Equalization and divide the Basin into three compartments. According to the plant operator interviewed during EPA's March 1990, facility visit, the Basin has never overflowed. Operating procedures are such that influent flows are cut off if the Basin capacity is reached.

As a regulated interim status surface impoundment, the EQ Basin, under RCRA and the VHWMR, was required to submit a Part B permit application by 11/8/85 or interim status would terminate in accordance with VHWMR § 11.3.E.1. The facility did not submit its Part B permit application until November 26, 1988; therefore, closure of the unit was required. On March 16, 1990, Radford was notified that a closure plan for the EQ Basin was required; however, the Department notified Radford that it would allow the EQ Basin to remain in operation as a "newly regulated unit" until March 15, 1994. A closure plan was submitted as part of the Part B Permit Application. The Department commented on the Part B application on February 2, 1991, and requested additional information. On June 28, 1991, Radford submitted the requested information. On December 2, 1991, Radford re-submitted a RCRA Part B application for the biological waste water treatment plant. On June 1, 1992, Radford submitted a plan for sampling the equalization sludges in accordance with Radford's agreement with EPA. On July 21, 1992, the Department approved the groundwater monitoring plan for the EQ Basin via Section E of the Part B application. On November 3, 1992, a Final Draft Verification Investigation report was received by the Department which contained detailed studies of all SWMUs, including the sampled sludges from the EQ Basin. On October 19, 1993, EPA's Delisting Section recommended denial of petition number 0834 for the sludges from the EQ Basin, and thus they remain a listed hazardous waste. Radford contacted VDEQ's Roanoke Regional Office by phone on March 11, 1994, and notified VDEQ that Radford was not prepared to cease operation of the EQ Basin on March 15, 1994, as stipulated in the Department's March 16, 1990 letter. On March 21, 1994, VDEQ notified Radford that the requirements for immediate closure had arisen from § 3005(j)(6) of RCRA, that the unit was required to close, and should have ceased operations on March 15, 1994. The provision requires that "newly regulated surface impoundment units"

meet the requirements of § 3004(o)(1)(A) of RCRA (minimum technology requirements) or cease receipt of hazardous wastes four years from the date the unit becomes subject to the regulations. The VDEQ notified Radford that continued operation constituted noncompliance. Radford was also notified that the EQ Basin was subject to the Toxicity Characteristics Final Rule (Federal register Vol.55, No.61, March 29, 1990), by VDEQ on March 21, 1994. Since the EQ Basin received toxicity characteristic waste (D030, 2,4-Dinitrotoluene), Radford was notified that the unit must be retro-fitted or have the unit operations cease by March 29, 1994. The VDEQ notified EPA of the pending date for the Toxicity Characteristics Final Rule for appropriate action. Radford responded to the VDEQ notification correspondence the day before the final closure deadline and informed VDEQ that Radford would continue equalization operation while working toward a consent order with VDEQ's Office of Enforcement. On the same day, March 29, 1994, EPA notified Radford to immediately cease operation of the EQ Basin.

Emergency measures were taken by utilizing several abandoned steel tanks as a temporary EQ Basin. Wastewater is held in these tanks and then sent to the holding chamber of the EQ Basin pump station (located at the southwest corner of the Basin). The holding chamber of the EQ Basin is still utilized to deliver wastewater to the biological wastewater treatment plant from the steel tanks. The pump station delivers the wastewater to the biological treatment plant. The pump station was sealed off from the EQ Basin by the installation of a steel plate and gasket at the bar screen at the inlet to the pump station. The EQ basin cannot be "closed" until the unit's pump station is taken off line, and Radford can route all wastewater directly to the newly constructed two concrete equalization tanks each holding 3.82 million gallons. The new tanks are expected to be on line in the spring of 1996. However, all hazardous waste sludges and liquids remaining in the EQ Basin have been removed. Copies of the Hazardous Waste Manifests are on file with the VDEQ.

The Radford Army Ammunition Plant, The Advisory Council on Historic Preservation, and the Virginia Historic Preservation Office are in the process of executing a Memorandum of Agreement (MOA) regarding the subject closure. The reason for the MOA is to protect prehistoric archaeological site 44MY7, which is eligible for the National Register of Historic Places and likely extends under the berm and basin, from damage associated with the closure.

The MOA requires that the Corps of Engineers Construction Contractor provide a properly trained archaeologist (C-SAM) to monitor earth disturbing activity in association with the closure, and direct that all earth disturbing activities cease if significant archaeological remains associated with this site are encountered during the work. In that case, plans will have to be formulated to retrieve significant data if this is feasible and to ensure the protection of archaeological remains. The exact procedures to be followed will depend on the nature of the remains encountered, but will include, at a minimum, the following items which have the potential to effect the closure methods and schedule:

1. The Corps of Engineers contractor will supply additional trained personnel to assist the C-SAM in recovering significant archaeological data.
2. All visible prehistoric features, such as post holes, pit features, burials and midden will be mapped under the supervision of the C-SAM.
3. Archaeological remains will be excavated only as necessary to comply with contaminated soil removal provisions of the closure plan. Protective measures to safeguard discovered archaeological remains shall be as mutually agreed by the C-SAM and the Contracting Officer, and at a minimum, archaeological remains will be protected by a layer of sterile fill (i.e., clean sand) and any other measures necessary to provide for the stabilization.
4. Perimeter fencing will be installed around site 44My7 after closure.
5. If Native American cultural items (possibly including human burials) are encountered, the requirements of the Native American Graves Protection and Repatriation Act will be observed, work which may effect the area must cease, and an emergency permit must be obtained from the Virginia Department of Historic Resources by RAAP. It should be noted that this will trigger an automatic waiting period of at least 30 days, during which time no work may be done on portions of the site which may affect the discovered Native American cultural items.

6. If the soil in which archaeological remains are encountered is so badly contaminated that traditional archaeological data recovery cannot be safely completed, then the maximum practical data recovery will be carried out in the form of photography and other remote recording.

2.0 FACILITY DESCRIPTION

2.1 Site Location

The Radford Army Ammunition Plant (Radford) is a government owned industrial complex located in southwestern Virginia. The Radford Army Ammunition Plant encompasses approximately 4,104 acres and is located in Pulaski and Montgomery Counties. The facility is located approximately 5 miles northeast of the city of Radford, 10 miles west of Blacksburg, and 47 miles southwest of Roanoke, (see figures 2-1, 2-2, 2-3, 2-4, 2-5, 2-6). The New River separates Pulaski and Montgomery Counties and also divides the RAAP into two portions commonly known as the "horseshoe area" and the "main manufacturing area." The main manufacturing area of Radford is located south of the New River meander in Montgomery County, and the horseshoe area of Radford is located within the New River meander in Pulaski County. The EQ Basin unit is located in the main manufacturing area, the north area on the river's edge, Montgomery County. Table 2-1 summarizes the propellants which are manufactured at the facility.

2.2 EQ Basin Description

The EQ Basin was operated from 1980 until March 28, 1994, and was the first of nine components that make up the biological wastewater treatment system at Radford. The EQ basin received wastewater of widely varying characteristics, including non-acidic wastewaters from propellant manufacturing (on both a batch and continuous basis); pre-treated wastewater from nitroglycerine (NG) manufacturing and alcohol rectification; and wastes from recovery of ethyl ether. The basin was originally constructed in the location of a nitrocellulose (NC) fines settling lagoon (USACE, 1981) that was approximately 200' x 100' in size and surrounded by a 7' dike.

The 1980 construction plans show that prior to expanding the nitrocellulose fines lagoon approximately 4' of very soft, wet sludge had to be removed. The new lagoon was expanded to its present dimension of 255' x 160' with a 10.5' dike and a 12" soil cement bottom. No records are available on the soil cement material specification. However, discussions with personnel familiar with the 1980 construction recall that the soil cement bottom was developed using cement mixed into the soil and then compacted. In 1986/87, flood control protection was added via a 5.5' x 0.67' concrete perimeter wall embedded 2.5' into the 10.5' dike. This also provided an additional 2' of freeboard.

2.3 Facility Background

Although Radford is owned by the US Government, it has been operated under contract by Alliant Tech Systems, (previously known as Hercules Aerospace Corporation), since 1941. This facility, which contains over 1,696 buildings and occupies close to 3,649,965 square feet, is the top manufacturer of solid propellants in the United States. The major products manufactured at this facility are solvent and solventless propellants that include single phase (nitrocellulose), double-phase (nitrocellulose and nitroglycerin), and triple phase (nitrocellulose, nitroglycerin, and nitroguanidine) propellants; cast propellants; and high energy propellants. These propellants are ultimately used in small arms, anti-tank weapons, anti-aircraft weapons, rockets, torpedoes, missile systems, igniters, and other numerous ordnance-related items.

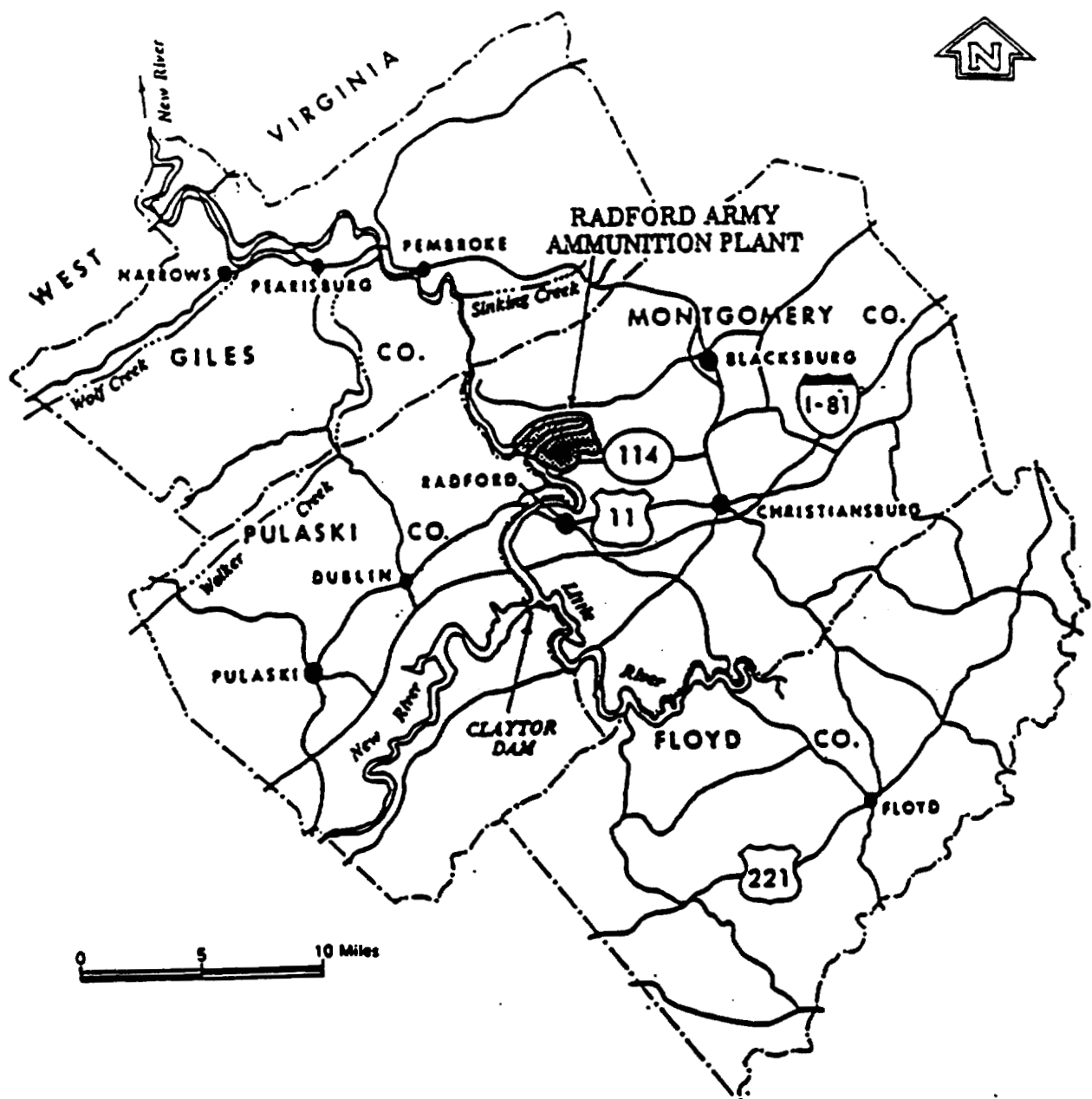


FIGURE 2-1 VICINITY MAP

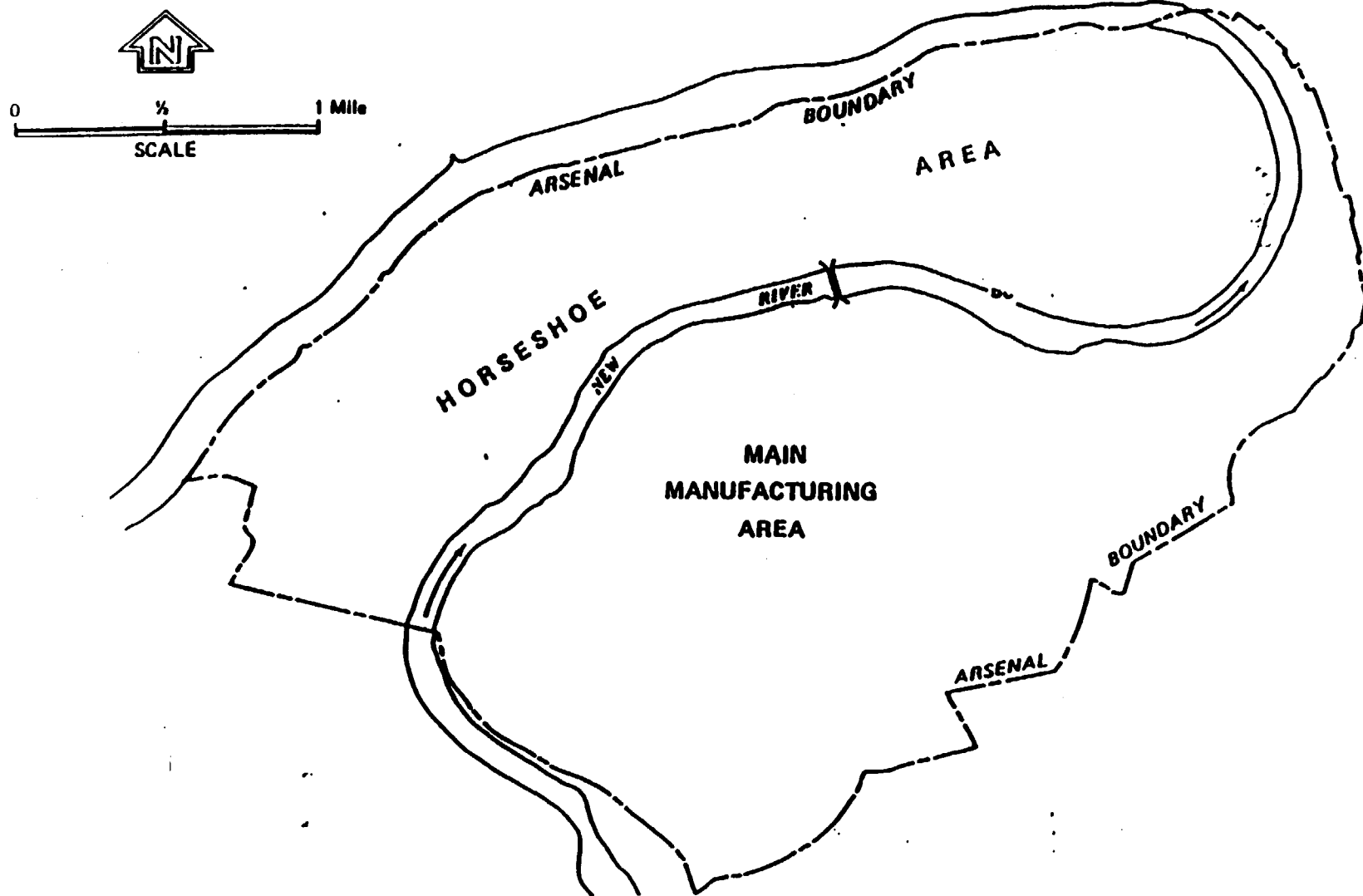


FIGURE 2-2 SITE BOUNDARY

Approximate Boundary of the Radford Army Ammunition Plant Hazardous Waste Management Facility



FIGURE 2-3 TOPOGRAPHIC MAP

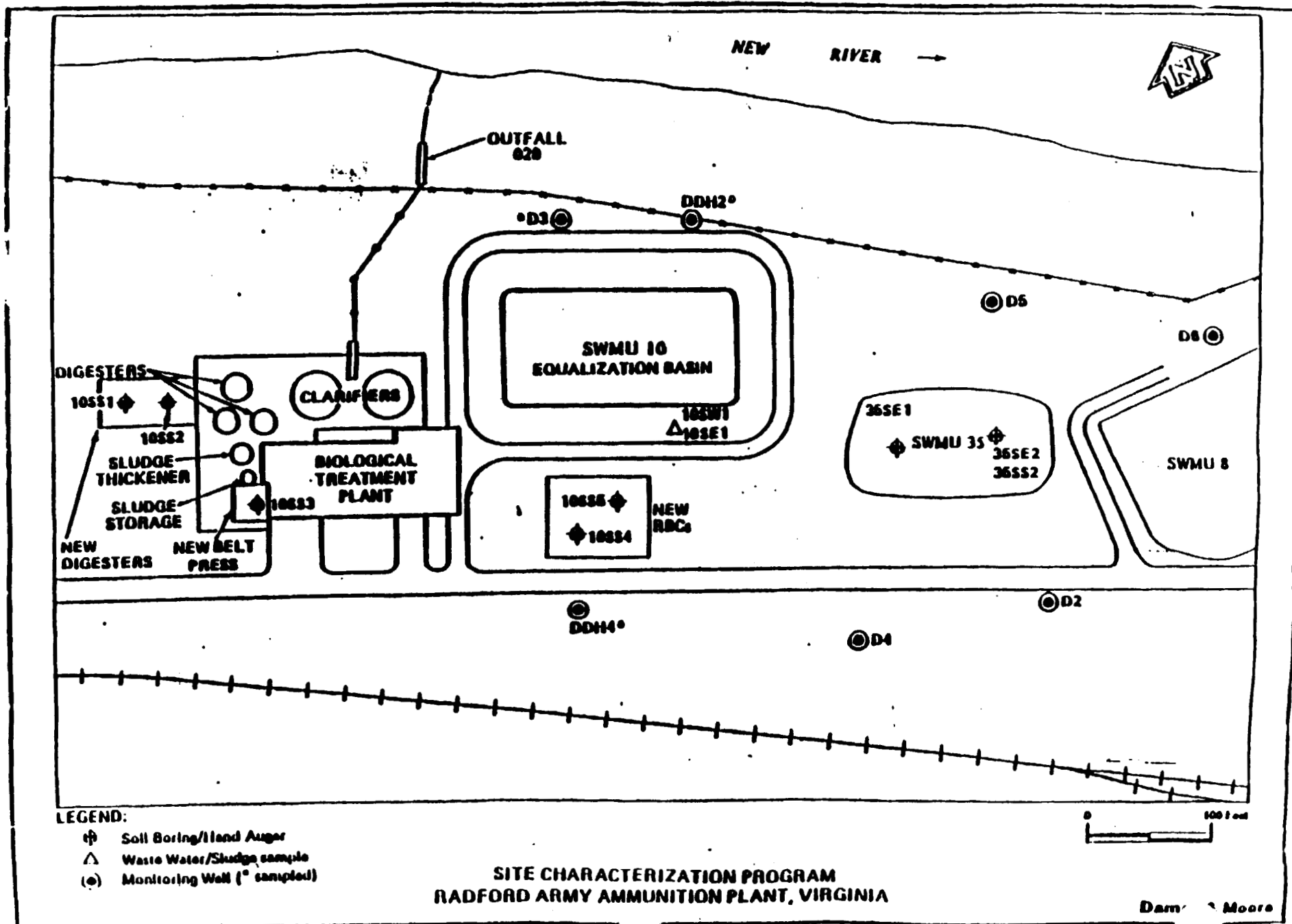
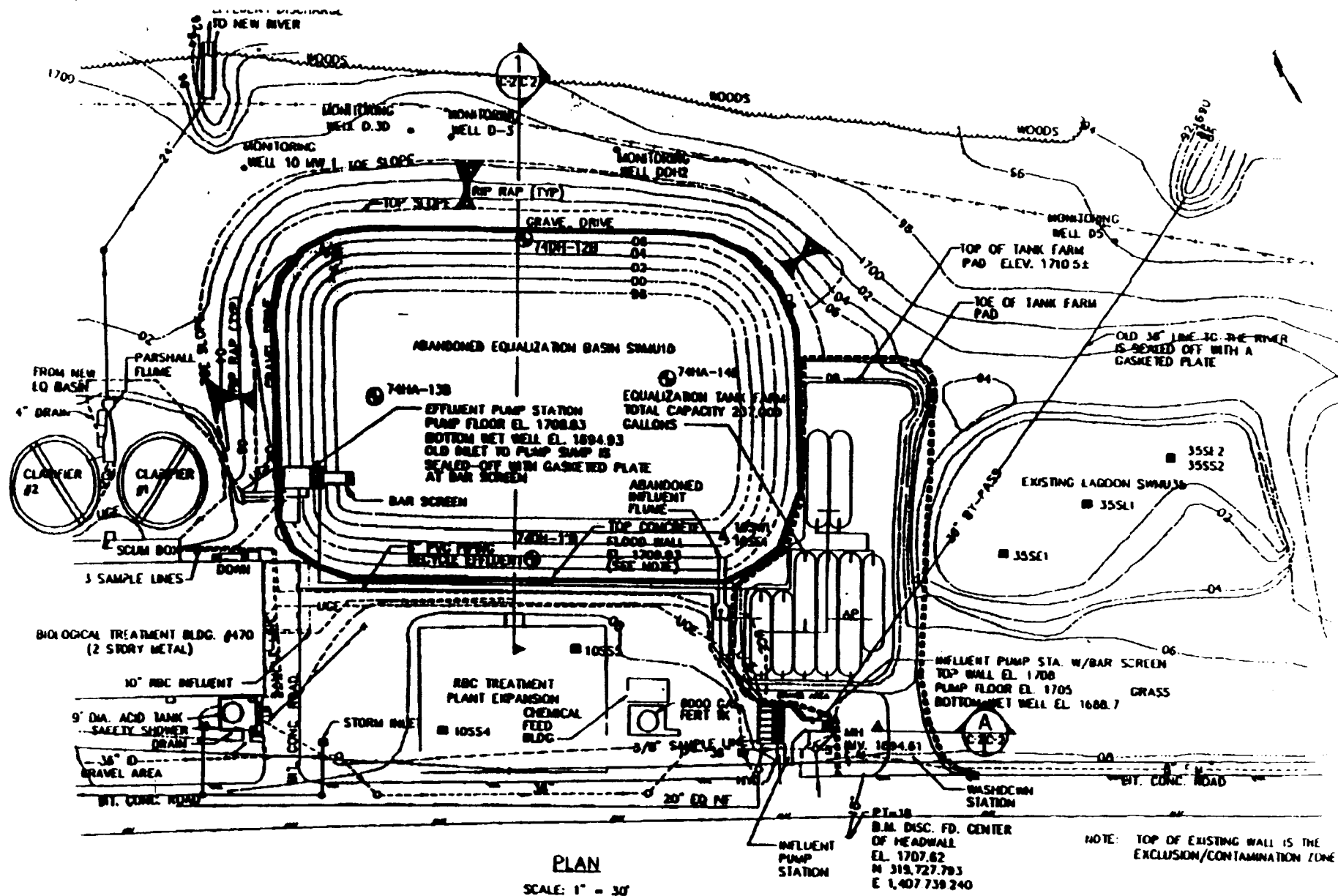


FIG. 2-4

FIGURE 1
3



PROPELLANTS MANUFACTURED BY RAAP

<u>Categories of Propellant</u>	<u>Number of Propellants Manufactured</u>	<u>Major Chemical Constituent(s)</u>	<u>Weight Percent</u>	<u>Organic Solvents used in the Production of Solvent-Propellants</u>
o Single-base propellants	15	nitrocellulose	40-100	diethyl ether ethyl alcohol
o Double-base propellants	31	nitrocellulose nitroglycerin	25-84 10-45	ethyl alcohol acetone
o Triple-base propellants	4	nitrocellulose nitroglycerin nitroguanidine	19-29 18-24 45-55	ethyl alcohol acetone
o Cast and extruded propellants	3	nitrocellulose nitroglycerin	49-54 31-37	nitroglycerin triacetone
o Miscellaneous	4	nitrocellulose nitroglycerin acetone propylene glycol dinitrate	0-65 0-16 0-59 0-77	acetone

Source: RCRA Part B Permit Application

TABLE 2-1 PROPELLANTS MANUFACTURED BY RADFORD

2.4 Wastewater Treatment Plant Background

The EQ Basin was equipped with four surface aerators and four subsurface jet injection type aerators. From the EQ Basin, the wastewater was pumped at a constant rate to the biological treatment system. As originally designed, the biological treatment system consisted of two parallel trains of six rotating biological contactors (RBCs). The first two RBCs in each train were designed to operate anaerobically; the remaining four units were to operate aerobically. Following start-up, it was discovered that the anaerobic RBCs were hindering plant performance, and they were subsequently converted to aerobic RBCs. At present, the plant is operating with 12 aerobic RBCs on line. These units have a total surface area of 611,200 square feet. The RBCs are run as three-stage systems, with the first two RBCs in each train operated as a single stage (USEPA, 1987).

From the RBC trains the wastewater flows to two circular, center-feed, peripheral weir clarifiers. Clarified effluent is discharged to the New River at NPDES Outfall No. 029.

Sludge handling consists of aerobic digestion, chemical conditioning, and belt press dewatering. The three digesters are maintained at about 75 percent of capacity to prevent overflows. The sludge from the digesters is a listed hazardous waste (KO44, sludge from the treatment of wastewater from explosives manufacturing (USAEHA 1980a)). Prior to February 1990, the sludge was landfilled in Fly Ash Landfill No.2 (SWMU 29); at present, it is containerized and shipped to an off-post hazardous waste landfill.

2.5 Type of Wastes Managed at the Facility

The major products of manufacture at Radford are explosives and rocket propellants. There are five major categories of propellants produced at the facility. These categories are:

- Single base propellants (primary constituent nitrocellulose);
- Double base propellants (primary constituents nitrocellulose and nitroglycerine);
- Triple base propellants (primary constituents nitrocellulose, nitroglycerine, and nitroguanidine);
- Cast and extruded propellants; and
- Miscellaneous items

"Off-specification" propellants which do not meet Army production standards and "NG slums" are the waste materials which are treated and incinerated at the facility. NG slums are generated from cleanup of nitroglycerine (NG) in the production process and contain nitroglycerine, sawdust (to absorb the liquid), and triacetin (to desensitize the NG). All of the waste materials described above are regulated as hazardous waste by virtue of the fact that they exhibit the hazardous characteristic of reactivity pursuant to VHWMR § 3.8.

3.0 CLOSURE PLAN

3.1 Introduction

The following closure plan for the EQ Basin has been prepared to meet the requirements of VHWMR Sections 9.6.L, 10.6 and 10.10.I.

3.2 Closure Performance Standards

Upon approval and implementation, and in accordance with VHWMR § 9.6., this plan will close the facilities and site in a manner that:

- Minimizes the need for further maintenance, and
- Controls, minimizes or eliminates, to the extent necessary to prevent threats to human health and the environment, post-closure escape of hazardous waste, hazardous waste constituents, leachate, contaminated rainfall, or waste decomposition products to the ground or surface waters or to the atmosphere.
- Complies with the closure and post closure care requirements of § 9.6. and 9.10.F.

Groundwater will be monitored in accordance with the Groundwater Quality Assessment Plan (as updated) until:

- "Clean" closure for both saturated soils (groundwater) and unsaturated subsoils have been demonstrated; or,
- A post-closure care permit for the cap maintenance and/or groundwater monitoring requirements is obtained.

The specific procedures and criteria for determining "clean" closure with respect to groundwater will be specified in the Groundwater Quality Assessment Plan (as updated).

The closure performance standards will be accomplished by; (1) demolition, removal and decontamination of piping, pumps and concrete; (2) subsoil sampling to identify any contaminated soil requiring removal; (3) either contamination removal or closure in-place by executing the contingent closure plan; and (4) completion of the requirements contained in the groundwater quality assessment plan (as updated).

If clean closure is not economically feasible, Radford may abandon attempts to clean close the soils (if found to be contaminated) and close any remaining contamination in place by closing with a landfill cap. The procedures to meet these performance standards are detailed herein.

Sampling of the subsoils to show that constituent levels are not statistically higher than background concentrations will be the demonstration for clean closure for soils. If subsoils cannot feasibly be shown to have statistically less than or equal to background levels of constituents, then the facility can attempt a clean closure by use of health based standards. Changing the performance standards from background to health based standards or Risk Based Criteria requires a closure plan modification. A closure modification could be discussed and agreed upon by Radford and VDEQ prior to a closure plan modification submission by Radford. The facility retains the option at any time to abandon a clean closure attempt, and to close as a landfill as delineated in § 9.13 and the contingent closure plan in section four of this plan.

3.3 General Closure Approach

The water and sludges were removed from the EQ Basin prior to closure. The water and sludges were properly disposed of according to the VHWMR by transporting all hazardous waste to a permitted RCRA hazardous waste disposal facility by a Virginia permitted hazardous waste transporter. Pumps and ancillary piping will be removed and decontaminated. The perimeter flood control concrete wall will be removed and disposed of as appropriate. Soil sampling and testing will identify sub-soils to be removed for disposal. Testing of the subsoils will be performed to confirm that the closure performance standards have been met. Once any contamination has been removed, the excavation will be back-filled with clean soils, graded to promote positive drainage, and re-vegetated. Equipment will be decontaminated in an approved manner. The contaminated materials (i.e. possibly soils, sludges, concrete, pipes, pumps and equipment rinsate) will be tested for Hazardous Waste characteristics. If the contaminated material tests positive as a characteristic hazardous waste the contaminated material shall be transported to a permitted RCRA hazardous waste disposal facility by a permitted hazardous waste transporter. If the contaminated material does not exhibit any Hazardous Waste characteristic the contaminated material shall be disposed of in accordance with the VSWMR. In the event Radford abandons the clean closure attempt, the basin

will be backfilled with clean soils to promote positive drainage, and covered with a RCRA 2-1-2 composite clay cap. If the soils close "dirty", the post closure permit will include soil and groundwater post closure requirements.

3.4 Maximum Waste Inventory

The maximum inventory of waste that could be placed in the unit at any one time over its active life was 1.35 million gallons, which is the reported maximum capacity of the impoundment.

3.5 Analyte List

The analyte list, or the hazardous constituents of concern, are defined as those materials which may have come into contact with the unit during its lifetime. Hazardous constituents of concern for this closure are based on knowledge of the plant's operational history. The following table 3-1 lists the hazardous constituents of concern for closure. The associated analysis methods and detection limits are also provided.

No.	TABLE 3-1 HAZARDOUS CONSTITUENTS OF CONCERN	SW-846 METHOD	PQL μG/L (WATER)	PQL μG/Kg (SOIL)
1	Acrolein; 2-Propenal	8030A 8240A 8316	7 (5) 300	7 - -
2	Aldrin	8080A 8081 8250A 8270B	0.04 0.34 19 (10)	3 22 1,300 -
3	Arsenic	6010A 6020 7060A 7061A 7062	530 0.2 10 20 10	530 0.2 10 20 10
4	Barium	6010A 6020 7080A 7081	20 0.2 1,000 -	20 0.2 1,000 -

No.	TABLE 3-1 HAZARDOUS CONSTITUENTS OF CONCERN	SW-846 METHOD	PQL μG/L (WATER)	PQL μG/Kg (SOIL)
5	Benzene	8020A 8021A 8240B 8260	2 0.09 5 1	2 0.09 5 5
6	Beryllium	6010A 6020 7090 7091	3 0.2 50 2	3 0.2 50 2
7	Bis(2-chloroethoxy)methane; Bis(2-chloromethoxy)ethane; Ethane, 1,1'-[methylenebis(oxy)]bis[2chloro	8010B 8110 8250A 8270B 8410	- 5 53 10 -	- 5 3,600 660 -
8	Bis(2-chloroethyl)ether	8110 8250A 8270B 8410	3 57 10 -	3 3,800 660 -
9	Bis(2-chloro-1-methylethyl)ether; 2,2'dichlorodiisopropyl ether; Bis(2-chloroisopropyl) ether	8010B 8110 8250A 8270B 8410	- 8 57 10 -	- 8 3,800 660 -
10	Bis(2-ethylhexyl)phthalate	8060 8061 8250A 8270B	20 2.7 25 -	1,000 180 1,700 -
11	Butyl benzyl phthalate; Benzyl butyl phthalate	8060 8061 8250A 8270B 8410	3.4 0.42 25 10 -	230 28 1,700 660 -
12	Cadmium	6010A 6020 7130 7131A	40 0.2 50 1	40 0.2 50 1
13	Carbon disulfide	8240B	100	100

No.	TABLE 3-1 HAZARDOUS CONSTITUENTS OF CONCERN	SW-846 METHOD	PQL μG/L (WATER)	PQL μG/Kg (SOIL)
14	Carbon tetrachloride	8010B 8021A 8240B 8260	0.03 0.1 5 1	0.03 0.1 5 5
15	Chlordane	8080A 8081 8250A 8270B	0.14 0.37 (10) -	9.4 15 (200) -
16	Chlorobenzene	8010B 8020A 8021A 8240B 8260	0.01 2 0.03 5 1	0.01 2 0.03 5 5
17	p-Chloro-m-cresol; 4-Chloro-3-methylphenol	8040A 8270B 8410	3.6 20 -	240 1,300 -
18	Chloroform; Trichloromethane	8010B 8021A 8240B 8260	0.02 0.2 5 1	0.02 0.2 5 5
19	2-Chlorophenol	8040A 8250A 8270B 8410	3.1 33 10 -	210 1,300 660 -
20	Chromium	6010A 6020 7090 7191	70 0.2 500 10	70 0.2 500 10
21	Cyanide	9010A 9012	20 -	20 -
22	trans-1,2-Dichloroethylene	8010B 8021A 8240B 8260	0.02 0.5 5 1	0.02 0.5 5 5

No.	TABLE 3-1 HAZARDOUS CONSTITUENTS OF CONCERN	SW-846 METHOD	PQL μG/L (WATER)	PQL μG/Kg (SOIL)
23	Di-n-butyl phthalate	8060 8061 8250A 8270B 8410	3.6 3.3 25 10 -	240 220 1,800 - -
24	Dieldrin	8080A 8081 8250A 8270B	0.02 0.44 25 (10)	1.3 - 1,700 -
25	Diethyl phthalate	8060 8061 8250A 8270B	4.9 2.5 19 10	330 170 1,300 660
26	2,4-Dimethylphenol	8040A 8250A 8270B	3.2 27 10	210 1,800 660
27	Dimethyl phthalate	8060 8061 8250A 8270B 8410	2.9 6.4 16 10 -	190 430 1,100 660 -
28	4,6-Dinitro-o-cresol; 4,6-Dinitro-2-methylphenol	8040A 8270B 8410	160 50 -	11,000 3,300 -
29	2,4-Dinitrotoluene	8090 8250A 8270B 8330 8410	0.2 57 10 0.02 -	13 3,800 660 250 -
30	2,6-Dinitrotoluene	8090 8250A 8270B 8330 8410	0.1 19 10 0.31 -	7 1,300 660 260 -
31	Di-n-octyl phthalate	8060 8061 8250A 8270B 8410	30 0.49 25 10 -	2000 33 1,700 660 -

No.	TABLE 3-1 HAZARDOUS CONSTITUENTS OF CONCERN	SW-846 METHOD	PQL μG/L (WATER)	PQL μG/Kg (SOIL)
32	Endosulfan I	8080A 8081 8250A 8270B	0.14 0.3 (10) -	9.4 21 (200) -
33	Endosulfan II	8080A 8081 8250A 8270B	0.04 0.4 - -	3 24 - -
34	Endrin	8080A 8081 8250A	0.06 0.39 (10)	4 36 (200)
35	Fluoranthene	8100 8250A 8270B 8310 8410	(200) 22 10 2.1 -	(200) 1,500 660 140 -
36	Fluorene	8100 8250A 8270B 8310 8410	(200) 19 10 2.1 -	(200) 1,300 660 140 -
37	Heptachlor	8080A 8081 8250A 8270B	0.03 0.4 19 (10)	2 20 1,300 -
38	Heptachlor epoxide	8080A 8081 8250A 8270B	0.83 0.32 22 (10)	56 21 1,500 -
39	Hexachlorobenzene	8081 8120A 8121 8250A 8270B 8410	- 0.5 5.6x10 ⁻² 19 10 -	- 30 3.8 1,300 660 -

No.	TABLE 3-1 HAZARDOUS CONSTITUENTS OF CONCERN	SW-846 METHOD	PQL μG/L (WATER)	PQL μG/Kg (SOIL)
40	Hexachlorobutadiene	8021A 8120A 8121 8250A 8260 8270A 8410	0.2 3.4 1.4X10 ⁻² 9 1 10 -	0.2 230 0.94 600 5 660 -
41	Hexachlorocyclopentadiene	8081 8120A 8121 8250A 8270B 8410	- 4 2.4 - 10 -	- 300 160 - 660 -
42	Hexachloroethane	8120A 8121 8250A 8270B 8410	0.3 1.6x10 ⁻² 16 10 -	20 1.1 1,100 660 -
43	Lead	6010A 6020 7420 7421	420 0.2 1,000 10	420 0.2 1,000 10
44	Mercury	7470A 7471A	2 2	2 2
45	Methoxychlor	8080A 8081 8250A 8270B	1.8 - - 10	120 - - -
46	Methyl bromide; Bromomethane	8010B 8021A 8240B 8260	0.3 11 10 1	0.3 11 10 5
47	Methyl chloride; Chloromethane	8010B 8021A 8240B 8260	0.1 0.3 10 1	0.1 0.3 10 5

No.	TABLE 3-1 HAZARDOUS CONSTITUENTS OF CONCERN	SW-846 METHOD	PQL μG/L (WATER)	PQL μG/Kg (SOIL)
48	Methylene chloride; Dichloromethane	8010B 8021A 8240B 8260	- 0.2 5 1	- 0.2 5 5
49	Methyl Ethyl Ketone; 2-Butanone; MEK	8015A 8240B	- 100	- 100
50	Naphthalene	8021A 8100 8250A 8260 8270B 8410	0.6 (200) 16 1 10 -	0.6 (200) 1,100 5 660 -
51	Nickel	6010A 6020 7520	150 0.2 400	150 0.2 400
52	Nitrobenzene	8090 8250A 8270B 8330 8410	36 19 10 6.4 -	2400 2,400 660 260 -
53	N-Nitrosodimethylamine	8070 8250A 8270B 8410	1.5 - (10) -	1.5 - - -
54	Pentachlorophenol	8040A 8151 8250A 8270B 8410	5.9 0.76 36 50 -	400 1.6 2,400 3,300 -
55	Phenol	8040A 8250A 8270B 8410	1.4 15 10 -	94 1,000 660 -
56	Polychlorinated biphenyls; PCBs	8080A (8250)	(50) (100)	3,000 (2,000)

No.	TABLE 3-1 HAZARDOUS CONSTITUENTS OF CONCERN	SW-846 METHOD	PQL µG/L (WATER)	PQL µG/Kg (SOIL)
57	Selenium	6010A 7740 7741A 7742	750 20 20 30	750 20 20 30
58	Silver	6010A 6020 7760A 7761	70 0.2 100 2	70 0.2 100 2
59	Tetrachloroethylene; Tetrachloroethene; Perchloroethylene; PCE	8010B 8021A 8240B 8260	0.01 0.4 5 1	0.01 0.4 5 5
60	Thallium	6010A 6020 7840 7841	400 0.2 1,000 10	400 0.2 1,000 10
61	Toluene	8020A 8021A 8240B 8260	2 0.1 5 1	2 0.1 5 5
62	Toxaphene	8080A 8081 8250A	2.4 0.86 -	160 57 -
63	1,2,4-Trichlorobenzene	8021A 8120A 8121 8250A 8270B 8260 8410	0.2 0.5 1.3 19 10 1 -	0.2 30 87 1,300 660 5 -
64	1,1,1-Trichloroethane; Methyl chloroform	8010B 8021A 8240B 8260	0.01 0.3 5 1	0.01 0.3 5 5
65	1,1,2-Trichloroethane	8010B 8021A 8240B 8260	0.07 - 5 1	0.07 - 5 5

No.	TABLE 3-1 HAZARDOUS CONSTITUENTS OF CONCERN	SW-846 METHOD	PQL μG/L (WATER)	PQL μG/Kg (SOIL)
66	Trichloroethylene; Trichloroethene	8010B 8021A 8240B 8260	0.01 0.1 5 1	0.01 0.1 5 5
67	Trichlorofluoromethane	8010B 8021A 8240B 8260	(10) 0.3 (5) 1	(10) 0.3 - 5
68	2,4,5-Trichlorophenol	8250A 8270B 8410	- 10 -	- 660 -
69	2,4,6-Trichlorophenol	8040A 8250A 8270B 8410	5.8 27 10 -	390 1,800 660 -
70	Vinyl chloride	8010B 8021A 8240B 8260	0.06 0.2 10 1	0.06 0.2 10 5

3.6 Cleanup Targets

Closure to background levels will constitute soil's clean closure. Background levels will be determined from soil samples collected in areas that have not been affected by the operation of the EQ Basin. Background soil samples will be collected in an area with a depositional environment similar to the sediments underlying the EQ Basin, i.e., same approximate depth, color, odor, etc. The sampling analysis section of the closure plan includes detailed information on background sampling. The groundwater monitoring plan (as updated) outlines the procedures and protocols necessary to demonstrate that the groundwater is either "clean" or that a release from the unit has occurred.

3.7 Procedures for Removing, Transporting, Treating, and Disposing of Wastes

VHWMR Section 10.10.1.1.a requires that all sludge and other contaminated components of the Basin (i.e. piping, pumps, concrete, liner materials, subsurface soils, etc.) be decontaminated or removed for surface impoundment soils to be "clean closed". To meet these requirements, Radford will remove all contaminated materials.

3.7.1 Removal of Wastewater and Sludge

The wastewater shall be removed to a "FRAC" tank and then disposed of as an K044 waste and appropriate characteristic wastes at an approved RCRA hazardous waste treatment, storage, or disposal facility by a permitted hazardous waste transporter. The remaining sludge in the Basin shall be solidified using coal combustion by-products "flyash", as approved by VDEQ. The solidified sludge shall then be disposed of as K044 waste and appropriate characteristic wastes at an approved RCRA hazardous waste treatment, storage, or disposal facility by a permitted hazardous waste transporter. All hazardous waste generator requirements of VHWMR Parts V and VI shall be followed. No wastes will be stored for greater than 90 days.

3.7.2 Concrete Flood Control Protection Perimeter Wall Removal

In 1986/87, flood control protection was added via a 5.5' x 0.67' concrete perimeter wall embedded 2.5' into the 10.5' dike. This provided an additional 2' of freeboard. The liquid in the impoundment never reached a level that touched the concrete perimeter wall, based on daily visual inspections of the unit. The concrete flood control protection perimeter wall must be removed for clean closure. All hazardous waste generator requirements of VHWMR Parts V and VI will be followed. Four randomly located

concrete chip samples will be taken from the wall and analyzed for Hazardous waste characteristics. If the chip samples do not exhibit any hazardous waste characteristics the concrete may be disposed of in accordance with VSWMR, at a permitted CDD landfill.

3.7.3 Ancillary Equipment Decontamination and Removal

All ancillary equipment which is not decontaminated will be disposed of based on analytic test results or assumed to be a hazardous waste. The piping, drains, concrete, and pumps will be removed and decontaminated or disposed of according to the VHWMR and VSWMR. Piping, valves, and pumps will be dismantled and placed in a washdown station. Decontaminated piping can be disposed of as scrap metal. The concrete sump and flow gate areas will be excavated, demolished, and disposed of in accordance with the disposal options set forth in section 3.7.2. (the flood wall). If in good condition and successfully decontaminated, pumps, valves, and piping can be placed in storage for possible future use. Pipes, pumps, concrete, and valves which cannot be decontaminated will be transported to a permitted RCRA hazardous waste disposal facility by a permitted hazardous waste transporter. The materials will be transported by a permitted hazardous waste transporter to a RCRA approved hazardous waste treatment, storage, or disposal facility. All hazardous waste generator requirements of VHWMR Parts V and VI will be followed.

3.7.4 Removal of Sludges

Sludges were removed, treated and disposed of in accordance with VHWMR. Rainwater accumulated in the basin after the sludges have been removed will be pumped into the headworks of the Biological treatment Plant.

3.7.5 Soil Liner Removal

The investigation/assessment described herein will be implemented to determine hazardous waste characteristics associated with the one foot thick soil liner and to determine if clean closure of the soil cement is achievable.

Data will be collected by performing the following tasks:

- Collect sufficient data to determine the horizontal and vertical extent of contamination in the soil cement liner. (This will entail sampling laterally, and possibly expanding the testing grid)
- Collect sufficient data to calculate the quantities of the affected soil cement liner.
- Statistically compare samples to representative background samples for designated closure parameters to evaluate achievement of clean closure.

The soil cement liner will be tested for the established HCOCs according to the methods outlined herein. If found to exhibit a characteristic of hazardous waste, then the soil cement liner will be placed in plastic-lined trucks or containers and transported to an approved RCRA hazardous waste, treatment, storage or disposal facility by a permitted hazardous waste transporter. If the soil cement liner does not exhibit characteristic but is statistically above the calculated background level the soil cement liner will be handled in accordance with VSWMR.

The contingent closure plan may be implemented at any time Radford decides to abandon the clean closure attempt. A determination of the appropriate point to discontinue excavation and begin implementation of the contingent closure plan will be based on actual field conditions encountered.

The Basin will be excavated as rapidly as possible to lessen the possibility of a precipitation event that may transport contaminants through the unsaturated zone to the New River. Radford will schedule and plan the excavation work appropriately after analytical testing of the soil cement liner to limit the occurrence of contaminant transport due to exposure by excavation. Visually contaminated soil cement liner may be excavated and removed as removal excavation progresses.

3.7.6 Subsoil Investigation

The investigation/assessment described herein will be implemented to determine whether residual hazardous waste constituents associated with the wastewater leached into the underlying subsoils, and to determine if clean closure of the soils is achievable. All hazardous waste materials excavated will be transported by a permitted hazardous waste transporter to a RCRA approved hazardous waste treatment, storage, or disposal facility. All hazardous waste generator requirements of VHWMR Parts V and VI will be followed. Data will be collected by performing the same tasks outlined in the previous section.

The subsoils will be tested for the constituents in Table 3-1 according to the methods outlined. If subsoils are found to exhibit a characteristic of hazardous waste, then the subsoils will be placed in plastic-lined trucks or containers and transported to an approved RCRA hazardous waste, treatment, storage or disposal facility by a permitted hazardous waste transporter. If the subsoils do not exhibit characteristic but is statistically above the calculated background level the subsoils will be handled in accordance with VSWMR.

The contingent closure plan or a request to modify the closure plan to incorporate Risk Based Closure may be implemented at any time Radford decides to abandon the clean closure attempt. A determination of the appropriate point to discontinue excavation and begin implementation of the contingent closure plan or request to modify the closure plan to incorporate Risk Based Closure will be based on actual field conditions encountered.

The Basin will be excavated as rapidly as possible to lessen the possibility of a precipitation event that may transport contaminants through the unsaturated zone to the New River. Radford will schedule and plan the excavation work appropriately after analytical testing of the subsoil to limit the occurrence of contaminant transport due to exposure by excavation.

3.8 Overview of Subsoil Testing Program

To show that a hazardous waste unit is statistically clean, a testing program is required which carefully and adequately assures quality while minimizing field and lab errors. Inadequate sampling and analysis can lead to incorrect conclusions about a unit, and Radford will perform sampling and analyses in a methodical and efficient manner to draw appropriate conclusions about the state of the subsoils. The following soil sampling and analysis plan details the necessary sampling procedures and analysis methods that will be employed to verify clean closure of the soils.

This section describes the specific assessment protocols to be utilized to determine if clean closure can be achieved for the EQ Basin subsoils. The methodology presented below is based on meeting the data requirements outlined. Figure 3-1 shows the 15 grid nodes developed for the basin. The grid consists of 50'x50' sections.

The plan described below was developed in accordance with sound standard statistical methods. All data obtained will be reviewed, summarized, and analyzed according to the methods described in this section. Statistical techniques used throughout the analysis will be clearly explained and will be supported by citing appropriate references. Full citations can be found in the References. The closure plan consists of the followings aspects:

- Background characterization
- Initial random sampling of the subsoils
- Possible excavation, repeated sampling, or contingent closure
- Repeat excavation and sampling or contingent closure
- "Hot spot" sampling of the subsoils if random sampling indicates hot spots exist.

The initial random sampling will be conducted to determine if clean closure can be achieved and whether soil removal will be required to achieve clean closure. A "hot spot" sampling approach may be used to better delineate contaminated areas for excavation and subsequent disposal, depending on the results from random sampling. The samples will be discrete samples. Radford Army Ammunition Plant reserves the option, at any point during the EQ Basin subsoils assessment, to abandon attempts to demonstrate clean closure and immediately implement contingent and contingent post closure, or to request to modify the closure plan to incorporate health based criteria.

The subsoils will be evaluated by collecting a minimum of seven soil borings, randomly distributed across the grid nodes. Samples will be collected at the surface (0-3 inches), 6 inches, 12 inches, 18 inches, and

24 inches. The samples will be analyzed by vertical stratum for the established hazardous constituents of concern. If analytical results of the surface samples are below the generated background cleanup goal, the unit will be considered clean and no additional sampling and analysis will be performed.

If the surface samples' analytical results are statistically above background levels, each successive set of samples (6 inches, 12 inches, 18 inches, 24 inches) will be analyzed until all sample analytes are statistically below the background levels of constituents. The subsoils will be excavated to the depth where all sample analytes are below the background levels.

Alternatively, Radford may choose to sample, test, and compare each one of the 15 sampling node locations. The nodes located as "hot spots" by this testing will then be excavated to a point where the sample analytes are below clean-up goals.

If random sampling indicates that contamination is widespread across the EQ Basin in a layer, then the layer may be excavated without performing additional sampling to reduce sampling costs. On the other hand, if it appears that contamination is localized, more sampling and testing may be performed with the intention of reducing disposal costs.

If random sampling results in a node sample above the critical background value, then the entire representative six inch lift must be excavated. During hot spot sampling, only the node which exceeds the critical value must be excavated. The excavation of "hot spot nodes" will be the entire 50'x50' grid.

A sufficient number of samples will be analyzed to statistically confirm clean closure. Sample values will be compared to the upper tolerance limits as discussed in "Background Sampling". Data values reported as less than the Practical Quantitation Limit will be treated as one half ($\frac{1}{2}$) the Practical Quantitation Limit (PQL) unless the facility chooses another method in accordance with the methods outlined in Guidance on Statistical Methods for Groundwater Data Analysis at a Solid Waste or Hazardous Waste Site, Virginia Department of Environmental Quality, Office of Waste Resource Management, 1994, and by the procedures summarized in Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Interim Final Guidance (April, 1989).

If the samples taken at any level contain hazardous constituents of concern statistically above the background levels, a decision may be made to continue sampling and excavation, discuss with VDEQ health based performance standards, or to implement the contingent closure plan. A determination of the appropriate point to discontinue excavation and begin implementation of the contingent closure plan or discuss health based performance standards will be based on actual field conditions encountered.

3.8.1 Background Soil Sampling

Background conditions will be established as follows. Four background samples are the minimum number to achieve statistically usable background data. VDEQ recommends 8 background sampling locations for Radford's EQ Basin Closure. It is Radford's option to select more than eight background sampling locations to provide variance in the statistical background. The sampling locations shall be in soil geologically similar to the soil under the concrete EQ Basin liner. These background sample locations will be selected from an area of the plant reasonably assumed (based on general knowledge of the area and plant operations) to be uncontaminated by any industrial activities that could have resulted in past or

present releases of hazardous constituents. Background soil sample results along with the quality assurance-quality control (QA/QC) documentation required by SW-846 will be submitted to the VDEQ prior to performing statistical comparisons for approval of background soil sample locations. All data will be verified via Data Quality Objectives (DQO). Data quality objectives must be met before performing statistical comparisons. The DQO verification process includes checking if the appropriate analytical method for each analyte was used, check if laboratory reported PQLs are appropriate, and are they below the required performance standard. For example, the method with the lowest detection limit does not have to be used once the performance standard (background) is established, as long as the method detection limit is below that performance standard. The DQO must be validated for the sampling data to be statistically useful.

Standard statistical methods will be used to test assumptions of normality and to check for possible data outliers; techniques supported by the statistical literature will be used, and relevant references will be cited; (i.e., "Outliers in Statistical Data," V. Barnett and T. Lewis, 1984). For normality, Shapiro-Wilk test is appropriate. For outliers, test methods presented in the EPA guidance on "Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Interim Final Guidance, April 1989, page 8-11, or ASTM Papers: E-178-80 & E-178-75, Standard Practice for Dealing with Outlying Observations or other procedures published in a peer reviewed Journal is appropriate.

Any outlier data identified will either be:

- Replaced by data obtained in a subsequent supplemental background sampling effort;
- Replaced by the sample value closest to the outlier value (if no further supplemental background sampling is conducted); or

If any other method(s) are identified to handle outliers, justification will be provided for the use of the selected method(s).

Data transformations will be applied, as needed, to ensure that the key assumptions are met when computing interval estimates and/or conducting hypothesis tests. We need to mention that data transformation must be used cautiously when constructing tolerance and confidence intervals. For example, depending on the data set, a log-transformation tolerance limit could be an entire order of magnitude higher than the maximum value in the background sample. This is one reason why log-transformation should not be used as a default procedure for parametric statistical test methods in detecting contamination. Therefore, the default method for determining the background value will be the highest value of the background data, when the data is not normal or not log-transformed normal.

Radford Army Ammunition Plant reserves the option to take additional background samples for purposes of determining whether collected data are non-normal so that appropriate adjustments can be made.

Special handling will be required for samples with "not-detected" values as the analytical result. Therefore, the attached "Guidance on Statistical Methods for Groundwater Data Analysis", version 2.0 dated August 10, 1995, will be used to determine the procedure for non-detects. The number and type of non-detects will determine the procedure and thus numerical replacement for "not detected."

After an appropriate assessment of the background data is conducted and the data are formally approved by the VDEQ, a background critical value will then be calculated based on a one-sided upper tolerance limit.

3.8.2 Initial Physical Observation

Radford Army Ammunition Plant may observe physical signs of contamination including discoloration of subsoils, odor, X-ray fluorescence (XRF), or others. If physical signs of contamination are observed, Radford reserves the option to excavate potentially contaminated subsoils until the physical signs of contamination are no longer apparent prior to initial random sampling. XRF will analyze the soils samples for total lead. The XRF data will be used to guide the excavation and aid in removal of contaminated soils prior to initial random sampling. While XRF can be a screening tool for removal, all removed soils must be appropriately characterized. Soil material shall be disposed of in accordance with VHWMR and VSWMR.

3.8.3 Random Sampling

Random sampling is the preferred first sampling event strategy to minimize sampling cost and to characterize the subsoils. The sample grid will be assembled by field personnel prior to sampling. Wooden stakes or other suitable material will be used to mark all points along the sample grid.

A minimum of seven (7) soil borings, distributed randomly across the 15 grid nodes will be advanced to a depth of 24 inches. The seven nodes selected for sampling will be determined via use of a random number generator. All seven samples taken will be analyzed for each of the hazardous constituents of concern specified in this closure plan. Additional borings may be placed in areas of suspected contamination. Samples will be collected at the surface, 6 inches, 12 inches, 18 inches, and 24 inches.

In the event that the contaminated soils cannot be practically removed, then the contingent closure plan will be implemented. A determination of the appropriate point to discontinue excavation and begin implementation of the contingent closure plan will be based on actual field conditions encountered.

The surface samples will be collected using stainless steel hand corers. A stainless steel auger will be used for collecting the 6, 12, 18, and 24 inch samples. The auger will be forced down into the soil and then withdrawn. The bottom of the six inch soil layer will be placed in the sample container. If the desired depth cannot be reached using the hand auger or if the soil is tightly packed, then a portable power auger will be used for sample collection. Soil sampling will be performed in accordance with the representative sampling methods contained in VHWMR Appendix 3.2.

A random approach as described in SW-846 will be used to select sampling locations within the grid. Seven samples will be collected from each 6 inch lift, unless results indicate more samples will be needed. The equations in SW-846, Chapter nine, page 3 require calculating if enough samples were taken, which requires knowing a regulatory threshold value called "RT." The regulatory threshold value will be the critical value, calculated from the background, using a tolerance interval statistic. If testing results indicate more samples will be needed, this implies that the appropriate number of samples to collect for a lift is found to be more than the actual number of samples taken. The statistical equations for random sampling are shown in SW-846, Chapter nine, page 3. This random sampling approach discussed is based on a statistical confidence interval method. Thus, for a particular clean closure parameter, if the equations are satisfied for the number of samples, and the statistic of the individual random sample values is at or below the established background or health based level, then the EQ Basin subsoils will be considered "clean" with respect to that clean closure parameter and no further sampling for that parameter will be required.

However, if the statistic of the individual random sample values is above the established background or health based level, then the data will be evaluated for trends. Based on the random data generated, Radford may decide to excavate the whole representative lift based on the data, decide to abandon the clean closure attempt, or choose to further delineate any contamination via "hot spot" sampling (discussed below). The decisions to move from one method to another will be based on actual field conditions encountered.

3.8.4 "Hot Spot" Sampling

Based on the results of the initial random sampling, supplemental "hot spot" delineation sampling will be conducted for all clean closure parameters. (However, as previously noted, Radford reserves the option at any point in the sampling process to abandon attempts to achieve clean closure and immediately implement the Contingent Closure and Post-Closure Plans.)

With respect to the tolerance limit approach discussed herein as a hot spot methodology, many references can be cited, but the method and numbers quoted in this section come from Handbook 91, Experimental Statistics, United States Department of Commerce, National Bureau of Standards, issued August 1, 1963. From this reference (specifically pages 2 through 14 subsection 2.5.3), the upper tolerance limit for a normal distribution is as follows:

$$X_{cv} = X_{ave} + (K)(s)$$

where, X_{cv} is the critical value computed for the one sided upper tolerance limit;

X_{ave} is the computed average of the background samples;

s is the computed standard deviation of the background samples; and,

K is a theoretically-determined value given in a table.

The parameter K (or $K_{95, 95, n}$) establishes the upper tolerance limit such that there is a 95% chance that at least 95% of the time, the actual constituent background concentration will be below this upper bound. The value of this parameter for eight samples ($n=8$) is 3.188. To establish clean closure of the soil, the results of the analyses of each sample will be compared to the upper tolerance limit for the HCOCs. If the values for each HCOC are below the respective upper tolerance limit, then the sample has been demonstrated to be "statistically clean."

The established statistical conditions are to be 95% confident that at least 99.75% of the background population can be expected to lie below the critical value, X_{cv} . Therefore, if a clean closure parameter observed in a EQ Basin soil sample yields a value that exceeds X_{cv} , then it will be concluded that the soil (in the sample's representative location) is statistically greater than background and must be removed to establish clean closure of the soil.

If implemented, the hot-spot delineation method will proceed as follows:

1. Additional sampling of the existing surface soil (0-6) inch layer will be conducted at the remaining ($15-7=8$) eight grid nodes not previously sampled under the previous random sampling effort. These additional samples will be analyzed for all clean closure parameters for which clean closure was not confirmed under the previous random sampling effort.
2. For all 15 grid nodes sampled, independent comparisons will be made of each individual node sample value to the background critical value (X_{cv}).

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2. For all 15 grid nodes sampled, independent comparisons will be made of each individual node sample value to the background critical value (X_{cv}).

The protocols detailed above will continue to be extended to soil layers below.

Discuss risk/health based performance standards, and modify the closure plan to incorporate risk based closure performance standards.

As previously stated, the facility reserves the option, at any point during the EQ Basin subsoils assessment, to abandon attempts to demonstrate clean closure based on background, and propose a closure plan modification based on health based performance standards with DEQ, or immediately implement contingent closure and post-closure.

3.9 Field Quality Control

To ensure the collection of representative samples, the following field quality control procedures will be utilized during the closure operations.

Equipment blanks will be collected after every 20th sample. If equipment blanks indicate contamination, then resampling will occur only if sample results are above cleanup levels. Samples will be analyzed for the hazardous constituents of concern identified in this document. Laboratory quality control will be according to the methods detailed in SW-846, Chapter 1, (as updated).

3.9.1 Sample Preservation and Maximum Holding Times

Soil samples usually require no preservation other than storing at 4°C until analyzed. The maximum holding times vary for different measurements. Table 3-2 provides the maximum holding times for certain inorganic and organic analyses. Although these criteria were specifically designed and tested for water samples, they are also applicable for soil sampling studies (Barth and Mason, 1984).

TABLE 3-2 REQUIRED CONTAINERS AND MAXIMUM HOLDING TIMES FOR SOIL SAMPLES		
Name	Container	Maximum Holding Time
Inorganic Tests: Acidity	P.G	14 days
Alkalinity	P.G	14 days
Ammonia	P.G	28 days
Chemical Oxygen Demand	P	28 days
Cyanide, total and amenable to chlorination	P.G	14 days
Metals: Chromium VI	P.G	24 hours
Mercury	P.G	28 days
Metals, except chromium VI and mercury	P.G	6 months
Nitrate	P.G	48 hours
Nitrate-nitrite	P.G	28 days
Nitrite	P.G	48 hours
Oil and grease	G	28 days
Organic carbon	P.G	28 days
Orthophosphate	P.G	48 hours
Phenols	G only	28 days
Phosphorus (elemental)	G	48 hours
Phosphorus, total	P.G	28 days
Sulfate	P.G	28 days
Sulfide	P.G	7 days
Sulfite	P.G	Analyze immediately
Organic Tests: Volatile Organics	4 ounce, (120 ml) wide mouth glass with teflon liner	14 days
Semivolatile Organics/Organochlorine Pesticides/PCBs	8 ounce, wide mouth glass with teflon liner	Samples must be extracted within 14 days and extract analyzed within 40 days following extraction.

Notes: Soil samples collected for purgeable organic compounds analyses shall be thoroughly mixed and containerized as soon as possible after sampling. The samples shall be placed in the sample container so that no head space is left in the container after the container is closed.

3.9.2 Split Samples, Spiked Samples and Blanks

Blanks, split samples and spiked samples are collected to provide a measure of the internal consistency of the sample collection and handling methodology and to provide an estimate of the components of variance and the bias in the analytical process. Samples can be split to:

- Provide a measure of the within sample variability.
- Provide material for spiking in order to test recovery.
- Provide a measure of the sample extraction error.

The component of variation that is measured by a split sample is determined by the location of the sample splitting. A field split measures errors associated with field handling and within sample variation. A split of samples made in the laboratory for extraction purposes measures the extraction error (Barth and Mason, 1984).

A true split of sediment, soil or sludge samples is almost impossible to accomplish under field conditions. The difficulty of splitting a sample increases as the sample's moisture content increases. The sample should be considered a duplicate sample, rather than a split sample (EPA Region IV, Standard Operating Procedures and Quality Assurance Manual, 1986).

Spike samples are made by adding a known amount of a reference chemical to one of a pair of split samples. The recovery of the analytical process is measured by comparing the analysis results of the spiked sample with the non-spiked sample. The difference in results provides a measure of the analytical bias.

Spike samples are difficult to prepare with soil material. Usually, the spike solution is added to the extract of the soil. Utilizing this procedure avoids the problem of mixing, etc., but does not provide a measure of the interaction of the chemicals in the soil with the spike nor does it provide an evaluation of the extraction efficiency. Due to these constraints, field spikes are not commonly used (Barth and Mason, 1984). Field spikes will not be used in these investigations.

Blanks are collected to provide measures of various cross-contamination sources, background levels in the reagents, decontamination efficiency and any other potential errors that can be introduced from sources other than the sample. The blanks associated with field QA/QC include the trip blank, field blank and equipment blank. A trip blank measures any contamination that may be introduced into the sample during shipment of containers from the laboratory to the field and back to the laboratory. A field blank measures input into the sample from contaminated air or dust. An equipment blank measures chemicals that may have been in the sample container or on the tools after equipment decontamination is complete.

The SW-846 recommends that QA/QC samples be collected at least once with every analytical batch with a minimum of once per twenty samples. This sampling frequency has also been stated in the document Soil Sampling Quality Assurance Users Guide (Barth and Mason 1984).

Table 3-3 presents a breakdown of the recommended field QA/QC procedures for soil sampling. The contracting laboratory may desire to collect more QA/QC samples than detailed. Prior to sampling, Radford will consult with the contracting laboratory about the appropriate QA/QC procedures. These procedures will be in accordance with SW-846 (as updated).

TABLE 3-3 FIELD QA/QC PROCEDURES FOR SOIL SAMPLES	
PROCEDURE	COMMENTS
1. Field Blank	Field blanks are metal-and/or organic free water aliquots that contact sampling equipment under field conditions and are analyzed to detect any contamination from sampling equipment, cross-contamination from previously collected samples, or contamination from conditions during sampling (i.e. airborne contaminants that are not from the waste being sampled). One sample of site tap water will be collected every day in which tap water is used for decontamination purposes.
2. Duplicate Samples	Field duplicates are employed to document precision. The precision in sample duplicates is a function of the variance of waste composition, the variance of the sampling technique, and the variance of the analytical technique. Duplicate samples should be collected in the field by aliquotting a sample into separate containers. One duplicate sample will be collected for every twenty samples. The containers should be labeled as duplicate samples.
3. Trip Blanks	Trip blanks are used to detect any contamination or cross-contamination during handling and transportation. Trip blanks should accompany sample containers to and from the field. The appropriate trip blank containers should be filled with analyte-free water. Preservatives and additives will be added as required for each parameter group. Trip blanks should be sealed and stored in an ice chest where real samples will be stored and transported. A pair of trip blanks will accompany each cooler containing empty or filled volatile sample containers.
4. Equipment Blanks	An equipment blank should be prepared for each parameter group sampled where a particular piece of sampling equipment was employed for sample collection and subsequently decontaminated in the field for use in additional sampling. The equipment blank should be composed in the field by collecting, in the appropriate container for the parameter group, a blank water rinse from the equipment (auger, pump tubing, etc.) after execution of the last step of the proper field decontamination protocol. Preservatives or additives must be added to the equipment blank where appropriate for each parameter group. The type and frequency of these samples are specified within the text discussing the extent of contamination sampling.
NOTES:	
1) Reference: SW-846, Chapter Nine, Pages Nine 61-63; Chapter One Page 1-10.	
2) Field QA/QC samples should be collected at least once with every analytical batch with a minimum of once per twenty samples.	

3.9.3 Sampling Equipment Decontamination

All non-disposable sampling equipment will be decontaminated between each sample. Those sampling implements which cannot be decontaminated effectively will be containerized and properly disposed of based on sample analytical results.

The decontamination of sampling equipment (hand auger, scooplula, trowel, etc.) will be performed as follows and follows the decontamination procedures for sampling equipment (EPA Region IV, Standard Operating Procedures and Quality Assurance Manual, 1986.):

1. Clean with tap water and a soap solution (A phosphate-free laboratory detergent such as Alconox, Aliquinox, Liquinox will be used for cleaning) using a brush if necessary to remove particulate and surface films.
2. Rinse thoroughly with Radford's potable water.
3. Rinse thoroughly with deionized water.
4. Rinse thoroughly with organic-free water and allow to air dry as long as possible. If organic-free water is not available, allow equipment to air dry as long as possible. Do not rinse with distilled or deionized water.

All rinsate waters will be contained and analyzed for the constituents of concern prior to discharge. Disposal of rinsate will be performed based on sampling results and in accordance with the VHWMR. All sampling equipment will be decontaminated prior to sampling, between sample depths, and between samples unless new or dedicated (i.e. used only for one sample) equipment is used. Sampling equipment will be disposed of as hazardous waste at the conclusion of the sampling program, where appropriate.

Large equipment used for closure activities will be cleaned prior to its use on site. The decontamination of the larger sampling equipment will occur in a temporary constructed decontamination area. A 20-ft x 30-ft area will be graded with at least a 2% slope towards one corner of the area. The area will be lined with an appropriate plastic liner to prevent infiltration of decontamination water into the soils. The area will drain into a polyethylene container. Rinsate and other wastes generated during decontamination will be placed into 55 gallon drums. This proposed decontamination area has been designed so as not to meet the definition of a surface impoundment. Following closure, the large sampling equipment will be decontaminated using steam cleaning followed by a potable water rinse.

All wastes generated during the decontamination process will be accumulated in 55 gallon drums for less than 90 days accumulation.

The decontamination area's synthetic liner will be disposed of in accordance with the VHWMR and VSWMR. If analytical results show the liner is a hazardous waste by characteristic, then the liner will be transported via a Virginia permitted hazardous waste transporter and disposed of off-plant at an approved hazardous waste facility. If it is not hazardous, it will be disposed of in a permitted debris or sanitary landfill.

The rinsate collected during the decontamination process will be transferred to 55-gallon drums for storage until test results are received. If the water in the drums tests to be hazardous, it will be accumulated according to VHWMR, § 6.4.E., transported via a Virginia permitted hazardous waste transporter and disposed of off-plant at an approved hazardous waste facility. If it is not hazardous, it will be disposed of in the biological waste water treatment plant with VDEQ approval. Equipment blanks will be collected for decontamination quality control.

3.9.4 Sample Handling

Each sample jar should be clearly labeled with an identifying number, the point of sampling as documented on a diagram of the area, the time and date of sample collection, the name of the individual responsible for sample collection, and the parameters for analysis.

When the sample jars are shipped to the laboratory, a seal will be placed on the shipping container in such a way that the containers cannot be opened in transport without breaking the seal.

A chain-of-custody record will be maintained to document the responsibility for sample possession from the time of collection until the analysis is completed.

A field log book will be maintained. The sample location, the time, date, parameters for analysis, and approximate volume of each sample will be recorded. The appearance of the sample, the conditions at the time of sampling and any other relevant field observations will be recorded.

3.10 Sample Custody

Sample identification and chain-of-custody establishes the documentation and control required to identify and trace a sample from collection to completion of analysis. Sample identification and chain-of-custody will be maintained during all closure activities conducted at Radford Army Ammunition Plant through the following chain-of-custody procedures and documentation:

- Sample labels, which prevent misidentification of samples;
- Custody seals to preserve the integrity of the sample from the time it is collected until it is opened in the laboratory;

- Field logbook and pictures to record information about closure activities and sample collection;
- Chain-of-custody record to establish the documentation necessary to trace sample possession from the time of collection to laboratory analysis; and
- Sample analysis request sheet to inform the laboratory of pertinent information noted in the field logbook.

The purpose of these procedures is to ensure that the quality of the sample is maintained during its collection, transportation, storage and analysis. A sample is in custody if it is (1) in someone's physical possession or view, (2) locked up, or (3) kept in a secure area that is restricted to authorized personnel. As few persons as possible should handle samples in the field. The sample collector is personally responsible for the care and custody of samples collected until they are transferred to another person. The site team leader for the closure activities will determine whether proper custody procedures were followed during field work and decide if additional samples are required.

3.10.1 Sample ID

Identification sample labels are to be attached to the field sample containers. Gummed paper labels or tags should be used. The tags should contain the following information:

1. Name of collector
2. Date and time of sample collection
3. RAAP-#10-XX-YY-ZZ
where: RAAP = Site name (RAAP)
 #10 = Unit Number
 XX = Grid Location Number
 YY = Sample Depth (As depth below datum, i.e., bottom of concrete liner)
 ZZ = Special Code as follows:
 01-Normal Sample
 02-Duplicate Sample
 03-Field Blank
 04-Trip Blank
4. Type of sample with brief description (i.e., grab, composite, background, soil, liquid, concrete, bedding material; random, "hot spot", decontamination test, etc.)

Sample information will be printed on the label in a legible manner using waterproof ink. The identification on the label must be sufficient to enable cross reference with the laboratory logbook. Sample labels will be affixed to the sample containers prior to or at the time of sampling. The labels will be filled out at the time of collection. Custody seals are reprinted adhesive-backed seals with security slots designed to break if the seals are disturbed. Seals are placed over the cap of the individual sample

bottle and in as many places as possible on shipping containers. The seals will be affixed to the sample bottles and shipping containers before the samples and containers leave the custody of the sampling personnel. The custody seals will at a minimum contain the following information:

- Sample number (This number must be identical with the number on the sample label)
- Name of collector
- Date and time of sampling
- Place of collection

Field logbooks are necessary to provide sufficient data to enable field participants to reconstruct events that occurred during the closure activities. All pertinent sampling and field survey information will be recorded in a logbook. All logs will be kept in a waterproof bound notebook with numbered pages (8-1/2 by 11 inches). All entries will be printed in waterproof ink. No pages will be removed and corrections will be made by drawing a single line through the incorrect data and initializing and dating the correction that was made to the side of the error. Entries in the logbook should contain at a minimum the following information:

- Location of sampling point (and location code XX-YY-ZZ as stated above)
- Name and address of field contact
- Type of waste (i.e. soil, sludge, wastewater)
- Suspected waste composition, including concentrations (i.e. D008)
- Number and volume of samples taken
- Purpose of sampling (i.e. contract number, closure activities)
- Description of sampling point and sampling methodology
- Date and time of collection
- Collector's sample identification number
- Sample distribution and how transported (i.e. name of laboratory, UPS, Federal Express)
- References, such as maps or photographs, of the sampling site
- Field observations
- Any field measurements made (i.e. pH, conductivity)
- Signatures of personnel responsible for observations

A chain-of-custody record will accompany every sample. The record should contain the following information:

- Sample number
- Signature of collector
- Date and time of collection
- Place and address of collection
- Waste type
- Signature of persons involved in the chain of possession
- Inclusive dates of possession

Documentation of a photograph is crucial to its validity as a representation of an existing situation. Therefore, the following information regarding photographs will be recorded in the Field Logbook:

- Date, time, location of photograph
- Photographer
- Weather conditions
- Reasons why photograph was taken
- Sequential number of photograph and the film role number
- Camera lens system used

Once the photographs have been developed, this information will be recorded on the back of the photograph.

Photographs cannot be readily taken without the permission of Radford Army Ammunition Plant's Commanding Officer. Thus, prior to closure activities, a request will be made to the Commanding Officer asking for permission to photograph the closure activities.

A sample analysis request sheet will accompany the sample on delivery to the laboratory. The person who collects the sample will complete the field portion of the form. All pertinent information recorded in the field logbook will also be included on the sample analysis request sheet. The laboratory portion of the form will be completed by laboratory personnel. The following minimal information will be recorded:

- Name of person receiving the sample
- Laboratory sample number
- Date and time of sample receipt
- Sample allocation
- Analyses to be performed

All samples will be delivered to the laboratory as soon as practicable (usually within 1 or 2 days after sampling and samples must always be kept at 4°C). The sample will be accompanied by a chain-of-custody record and also by a sample analysis request sheet. The sample will be delivered to the laboratory personnel who is authorized to receive samples.

Sampling locations at the EQ basin will be marked with stakes and surveyed to determine the coordinate and elevation where possible. Once the stake is marked and in place, the area will be photographed. The stake will be marked with the appropriate station and/or sample number.

Samples collected from each location, other than those collected for on-site field measurements or analyses, will be identified by using a standard label which is attached to the sample container.

For sampling packing and shipping, Radford Army Ammunition Plant will comply with the U.S. Postal Service Regulations, Department of Transportation Regulations and/or the Virginia Regulations Governing Transportation of Hazardous Materials.

3.11 Data Reporting

During the EQ Basin Closure, the following data reporting will be conducted:

- Background soil sampling results along with the QA/QC documentation required by Chapter I of SW-846 will be submitted to the VDEQ prior to performing statistical comparisons for approval of background soil sample locations.
- Upon completion of the sub-soil assessment sampling, the data will be tabulated and the required statistical comparisons performed. The results will be submitted to the VDEQ for review. Based on the results, either:
 - Clean closure will be achieved and the corresponding closure certification report will be prepared and submitted to the VDEQ.
 - Additional soil removal efforts will be conducted in an attempt to achieve clean closure.
 - Contingent closure and post closure will be implemented as detailed in this plan.

3.12 Groundwater Closure

Groundwater at the EQ Basin has been monitoring since 1981. An up to date monitoring plan was established in 1992 when the Part B Application was submitted. Background data was submitted in May 1995 to DEQ. The subsequent quarterly statistical data was submitted in the Fall of 1995. The Groundwater Quality Assessment Plan shall be the document that regulates groundwater closure at this site.

Groundwater will be monitored in accordance with the Groundwater Quality Assessment Program (as updated) until:

- Clean closure for both saturated soils (groundwater) and unsaturated soils (subsoils) have been demonstrated; or,
- A post-closure care permit is obtained for the unit.

The specific procedures and criteria for determining "clean" closure with respect to groundwater will be specified in the groundwater quality assessment plan (as updated). The procedures for determining clean closure for groundwater are outlined in detail in the groundwater quality assessment plan.

Background concentrations will be established for all wells, and for all constituents in Table 3-1.

For each parameter on the "clean" closure list, specific statistical methods listed in the groundwater quality assessment plan will be used to make statistical comparisons.

3.13 "Clean" versus "Dirty" Closure and Post Closure Permitting (if required)

After the approved statistical well data comparison and subsoil sampling is performed and analyzed, the following three scenarios are possible:

1. If "clean" closure with respect to both the soil and groundwater is achieved, then no further groundwater monitoring will be required and a post closure permit will not be required.
2. If the soils are determined "clean" closed and the groundwater is not "clean" closed, then the groundwater will have been determined to have been contaminated. Therefore, quarterly sampling of the groundwater will be required, pursuant to the VHWMR § 9.5.D, during the post-closure care period and a post closure permit will be required.
3. If the soils are not clean closed and the groundwater is determined to be clean closed, then monitoring of the groundwater will be required pursuant to the VHWMR § 9.5.C and 10.5, during the post-closure care period. In addition, a final cover system will be placed over the area to address non-clean closure of soils and a post closure permit will be required.

The reader is referred to the separate Groundwater Quality Assessment Plan for further details on the groundwater monitoring system and groundwater sampling/analytical protocols.

3.14 Certification of Closure

Radford Army Ammunition Plant will provide for an independent licensed Professional Engineer in the Commonwealth of Virginia to verify that the EQ Basin was closed in accordance with this closure plan. The independent engineer's certification will include all documentation such as daily reports, test results, observations, photographs, etc. which demonstrate that the closure was completed in accordance with this approved plan.

The certification of closure will be submitted, by registered mail, to the Director of the Commonwealth of Virginia's Department of Environmental Quality. The certification will be submitted within 60 days of the completion of final closure. The certification will be signed by both the independent licensed Professional Engineer and the responsible official for Radford Army Ammunition Plant.

3.15 Closure Schedule

Efforts to closure the unit in accordance with the approved closure plan will commence immediately upon receipt of approval from VDEQ. The regulations require that the final closure of a hazardous waste unit be completed within 180 days of receipt of the Commonwealth of Virginia's written notice of approval (VHWMR Section 10.6.D.2). The regulations also state that an extension to the closure process may be approved by the Commonwealth of Virginia if the final closure activities will take longer than 180 days (VHWMR Section 10.6.D.2.a(1)). Table 3-4 shows the proposed closure schedule.

TABLE 3-4 CLOSURE SCHEDULE DURING CLEAN CLOSURE ATTEMPT	
Activity	Day
Closure Plan Approved	0
Sample Background/ Calculate Background Critical Value/ Submit Results to VDEQ for approval of background (DEQ response 7 days)	20
Remove and Decontaminate Piping, Pumps, Concrete	30
Take Soil Samples in Subsoil Assessment	40
Receive Lab Analyses/ Statistical Analysis and Submit to VDEQ	60-160
Remove contaminated soil/ resample/ or contingent close	60-160
Receive Additional Lab Analyses/ Statistical Analysis and Submit to VDEQ	60-160
Submit Monthly QA/QC Reports as Work Continues	monthly
Remove contaminated soil/ resample/ or contingent close	60-160
Repeat Sampling and Excavation as Necessary to "Clean" Close or submit a letter to VDEQ and go to Contingent Closure Plan	160
Equipment Decontamination	161
Receive Lab Analyses of Pre- and Post- Rinses	170
Submit Final Report of QA/QC on Work Performed	180-240

Should an extension be required to perform the necessary tasks, Radford will inform VDEQ of the need for an extension prior to moving off schedule. Please see the contingent closure plan's contingent closure schedule for estimates of construction times.

3.16 Clean Closure Excavation Filling

Once any contamination has been removed, the excavation will be back-filled with clean soils, graded to promote positive drainage, and re-vegetated.

4.0 CONTINGENT CLOSURE PLAN

4.1 Introduction

In the event that all contaminated soils cannot be practically removed, Radford will notify the Virginia Department of Environmental Quality, Waste Division and begin implementation of the following contingent closure plan and the contingent post-closure plan.

Knowledge of the EQ Basin, plus knowledge gained from attempting clean closure will be utilized in determining the area and boundaries of the landfill. The entire open area will be covered by the RCRA cap. If, during cap construction, additional information becomes available, cap coverage will be extended or reduced accordingly. All changes to the cap boundaries will be fully documented.

4.2 VHWMR Contingent Closure Plan Requirements (VHWMR Sections 10.10.I.1.b and 10.10.I.3.a(1))

Contingent closure plan requirements are outlined in VHWMR Section 10.10.I.1.b. These requirements consist of three main elements: (1) elimination of free liquids; (2) stabilization of remaining wastes to a bearing capacity sufficient to support a final cover; and (3) construction of a final cover designed and constructed to:

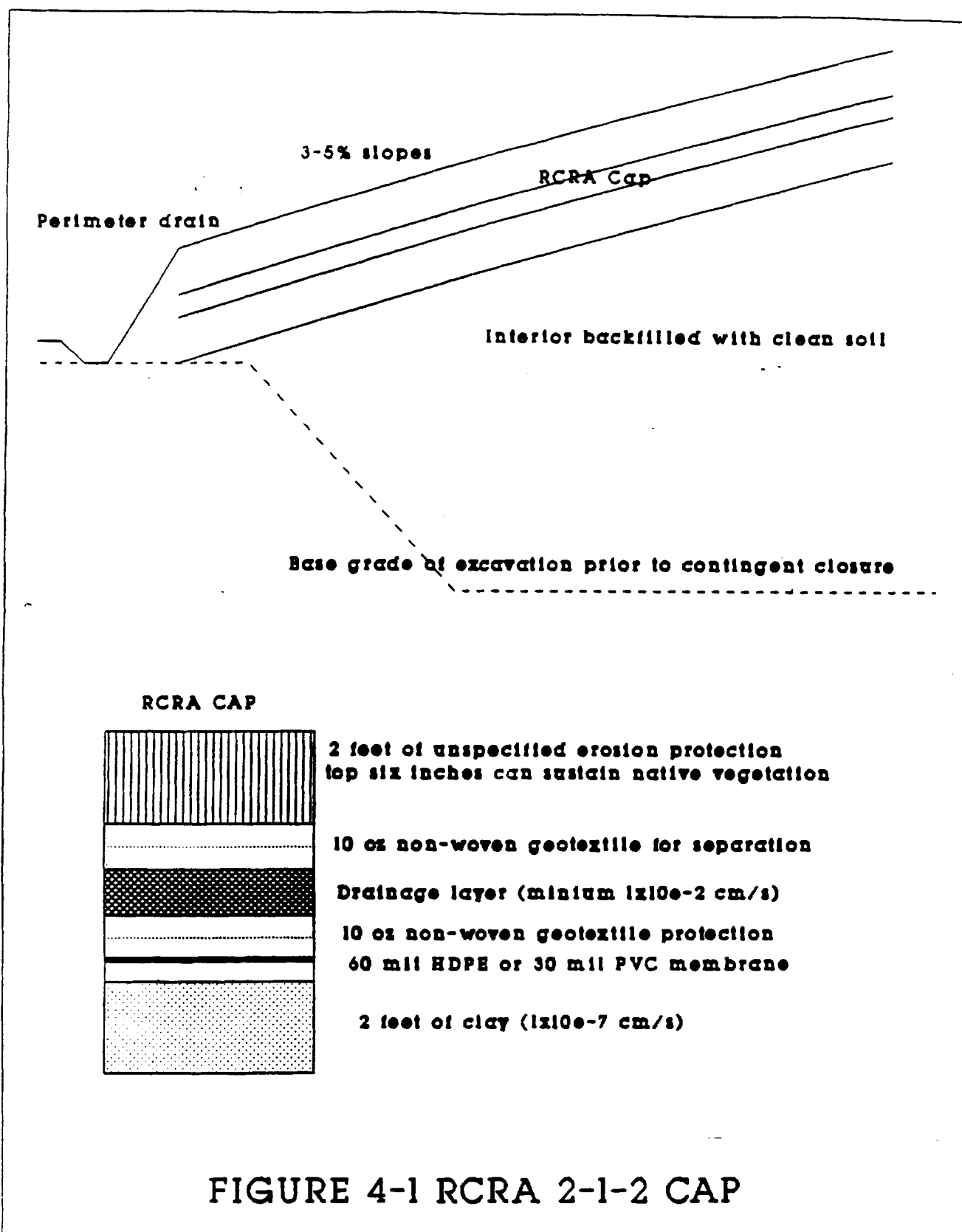
- Provide long-term minimization of the migration of liquids through the closed pond;
- Function with minimum maintenance;
- Promote drainage and minimize erosion or abrasion;
- Accommodate settling and subsidence so that the cover's integrity is maintained; and
- Have a permeability less than or equal to the permeability of any native subsoils present.

4.3 Contingent Closure Implementation

All free liquid will be removed, characterized, and disposed. Any sludge, soil liner, associated concrete structure, piping and bedding materials will be removed. Contaminated subsoils will then be removed as practicality dictates and as detailed in the closure plan. A final cover will then be installed if clean closure is no longer to be attempted or is no longer economically feasible.

4.4 Final Cover Design

A typical schematic of the multi-layer RCRA cover is illustrated in Figure 4-1. The cover will contain three layers. From the surface down these are: a top layer consisting of vegetation and soil; a soil drainage layer, and a low-permeability bottom layer. The design requirements for each layer are discussed below.



4.4.1 Plans and Discussion

Available information from previous closure activities will determine the boundary of the landfill. All changes to the area capped will be documented with photographs and surveyed so the final as-built drawings are accurate. Photographs also will be taken to document each stage of cap construction. An independent, professional engineer registered in the Commonwealth of Virginia will be on-site during all cap construction activities to ensure that the cover system is constructed in accordance with this closure plan. The Quality Control/Quality Assurance (QA/QC) Plan discussed in this document will be followed during cap construction; the contractor's quality control officer (CQCO) will maintain complete QA/QC records as outlined.

4.4.2 Specifications

The construction specifications for this closure plan are to be provided in a report, *Specifications for EQ Basin Closure*, once it is decided that clean closure will no longer be attempted and submitted to VDEQ from Radford, in accordance with the schedule. In the case of conflicting information between the construction specifications and the closure plan, the closure plan will take precedence. Radford Army Ammunition Plant will develop final construction drawings and specifications for the EQ Basin final cover. These construction drawings and specifications will meet the design requirements detailed herein. Also, Radford will finalize the Construction Quality Assurance (CQA) plan for the final cover system.

The following sections, at a minimum, will be included in the construction specifications:

- General Paragraphs
- Clearing and Grubbing
- Excavation
- Filling
- Clay Cap Placement
- FML Cap
- Geofabrics
- Drainage Layer Construction
- Erosion Layer Construction
- Erosion and Sediment Control
- Leachate Collection and Removal System
- Decontamination Area Construction
- Fencing
- Turf

- Cast-in-Place Concrete (Minor Construction)
- Signs
- Groundwater Monitoring System

The following plan sheets will be submitted to VDEQ:

- Cover Sheet
- Pre-Closure Conditions
- Existing Conditions
- Final Grading Plan
- Gas, Leachate, and Groundwater Monitoring Plan Sheet
- Erosion and Sediment Control
- Cross Section of EQ Basin
- Details

4.4.3 Cap Design

Closure will be initiated by grading the site to slopes between 3-5 percent and constructing a RCRA cap to cover all areas where waste is left in place. The landfill cap will consist of a 24-inch clay liner with a maximum permeability of 1×10^{-7} cm/sec, a 60-mil high density polyethylene (HDPE) flexible membrane cap (FMC) in direct and uniform contact with the clay liner, a 10-ounce geotextile fabric filter, a 12-inch drainage layer designed to maintain less than 12 inches of head above the FMC, a second 10-ounce geotextile filter fabric, an 18-inch erosion layer, and a 6-inch topsoil layer which can sustain native plant growth.

4.4.4 Cap Foundation

The site will be cleared of existing vegetation in preparation for placement of the RCRA cap. It will be graded to provide a slope of 3-5 percent over the area. Clean backfill will be obtained from an off-site borrow area to establish the base for the cap.

4.4.5 Settlement Potential

Since all the waste materials and containment structures will be removed from the EQ Basin prior to placement of the cover, the foundation material beneath the cover will be compacted soil fill. Installation of the cap will not introduce loading rates on the foundation in excess of those historically observed. For these reasons, the potential for further settlement, consolidation, or creep of these foundation materials is minimal. Each soil layer of the cover is compacted as it is placed and it is therefore not anticipated that

objectionable settlement of the cap will occur. Settlement is not anticipated in the final cover and thus the ability of the cap to minimize infiltration should not be compromised.

The average depth of frost penetration in the Radford area is 15 inches (EPA). The top layer (the soil and root zone layer) will be constructed at a thickness of 24 inches. Frost penetration will only extend into the top layer of the cover and not to the low permeability compacted clay layer. Frost will not adversely affect the cover performance.

4.4.6 Bearing Capacity and Stability

The existing area is judged to have sufficient bearing capacity for the cap system. The HDPE cap material was selected for its flexibility and durability in the event settlement does occur. Preparation and placement of a protective bedding layer is required to cushion and support the FMC. The compacted subgrade and protective bedding layer will support the FMC and protect it from irregularities in the foundation soil during the post-closure period. The bedding layer for this RCRA cap is the uppermost lift of the clay layer. This bedding material will be free of rock, fractured stone, debris, cobbles, rubbish, and roots. The surface of this layer will be fine-finished with a vibrating roller prior to placement of the FMC.

A 10-ounce, non-woven polypropylene geotextile filter fabric with a puncture resistance of at least 600 N will cover the FMC and prevent penetrations from angular stones in the drainage layer.

The upper bedding layer will be placed soon after installation, seaming, and seam testing of the FMC. As sections of the FMC are approved by the CQCO and Radford representative, placement of the drainage layer will begin. No vehicles will be allowed to drive directly on the FMC. The geotextile and drainage layer stone will be placed on the FMC with the drainage stone spread to its full depth before vehicles are driven on the FMC. The drainage stone layer will be used as a bridge for equipment movement on the FMC. The drainage stone will be placed at the base of the slopes and pushed up the slopes to minimize damage to the underlying geotextile and FMC. Equipment used in construction of the cap will be limited to 6 psi or less ground contact pressure. Materials will be placed on the liner using only wide tracked vehicles.

As sections of the drainage layer are completed, the second geotextile fabric filter will be placed followed by the 18-inch erosion and 6-inch topsoil layers.

The QA/QC Plan discusses inspections, monitoring, and testing needed to ensure the foundation is properly installed to support the FMC.

4.4.7 Cap System

The cap will be constructed and closure will proceed as follows:

- The site will be cleared and grubbed (as necessary) to ensure adhesion between the existing soil and the cap system. Backfill will be placed to establish the slopes for the cap system.

- No gas vents will be required due to the removal and nature of the waste.

- A 2-foot thick low-permeability clay barrier with an in-place saturated hydraulic conductivity of no more than 1×10^{-7} cm/sec will be constructed over the cap foundation to provide a base for the flexible geomembrane liner and minimize liquid infiltration should the geomembrane fail.

- A geomembrane liner will be placed on the clay layer to prevent infiltration of precipitation through the cover and into the underlying waste. The geomembrane cap will provide maximum flexibility to conform with any settlement which may occur. The liner will be textured to provide added stability to the side slopes and allow increased friction necessary for support of the drainage media. The liner will have enough tensile strength and durability to withstand the applied force of the topsoil layer for the duration of the closure and post-closure periods without breakdown or reduced ability to perform as designed.

- A 10-ounce per square yard non-woven geotextile fabric filter, designed to protect the FMC from puncture by the overlying drainage layer, will serve as the upper bedding layer for the FMC. The synthetic filter material will be non-woven polypropylene mat with sufficient tensile strength and durability to withstand the applied force of the drainage and soil layers for the duration of the closure and post-closure periods without breakdown or a reduction in its ability to perform as designed.

- A 12-inch drainage layer of VDOT No. 8 clean crushed stone (containing no calcium carbonate) with a minimum permeability of at least 1.1 cm/sec will be placed on the geotextile. This layer is designed to remove surface water which infiltrates the top layer and maintain a head of less than 12 inches on the FMC.

- A geotextile filter layer designed to allow surface water infiltration and separate the overlying soil layer from the underlying drainage layer will be placed over the drainage layer. The filter layer will be an 10 oz/sy non-woven geotextile fabric filter designed to prevent clogging of the drainage

layer. The synthetic filter material will be non-woven polypropylene mat with a minimum permittivity of 0.8/sec and tensile strength and durability to perform as designed throughout closure and post-closure.

An 18-inch erosion layer of common fill will be placed over the geotextile filter fabric and drainage layer. A 6-inch layer of topsoil capable of sustaining vegetation will be placed over the erosion layer. These soil layers will protect underlying layers from mechanical and frost damage.

The entire area will be seeded to stabilize the soil and prevent erosion. Seed will be applied at a rate of 200 lbs/acre in the following percentages:

Kentucky 31 on Turf Type Tall Fescue	95-100%
Kentucky Bluegrass	0-5%

Fertilizer (10-20-10) will be applied at 28 lbs/1000 square feet (sf) and lime (pulverized agricultural grade limestone) will be applied at 90 lbs/1000 sf. All seeding operations will be conducted in accordance with the *Virginia Sediment and Erosion Control Handbook*, Third Edition (1992).

4.4.8 Clay Liner

A 2-foot thick low-permeability clay barrier will be constructed over the cap foundation to provide a base for the flexible geomembrane liner and to reduce liquid infiltration should the geomembrane fail. The clay soil used in the liner will be free of rock, clods, and soil, debris with a minimum of 20% fines (20% passing the No. 200 sieve), maximum of 10% retained on the No. 4 sieve, plasticity index between 10 and 35 percent, and maximum in-place permeability of 1×10^{-7} cm/sec. The layer will be placed in 6-inch lifts and compacted to 95% of its maximum dry density and within 2 to 4 percent wet of optimum moisture content as determined in the Standard Proctor test (ASTM Method D-698). In-place hydraulic conductivity will be measured using the two-stage borehole method.

If the water content of the clay borrow is less than specified during the design, water will added by spraying from a truck or large hose before the clay is compacted. Adequate curing time must be allowed. If the clay is too wet, it will be allowed to dry before compaction. Efforts will be made to reduce clod size during excavation and placement to achieve the required permeability. The clay will be compacted using equipment such as sheepsfoot rollers to achieve the required compaction/permeability and bonding between lifts. The surface of each lift will be scarified so there will be an adequate bond with the lift above it. The edges of the lifts will be beveled or overlapped to ensure complete coverage. The final lift

of the clay layer will be compacted with a steel drum roller to obtain a uniform, smooth surface for the EMC. To prevent drying resulting in cracking, the clay layer will be kept moist until the geomembrane is placed. The maximum slope of the capped area is 2.5%. Material will be placed at the toe of the slope and worked upward to the top.

The low permeability layer must be entirely below the maximum depth of frost penetration estimated for the area in which the facility is located. According to the EPA, the frost depth is approximately 15 inches in the Radford area. The top of the clay liner will be 3 feet below grade which is well below the frost penetration depth.

A small-scale construction test pad will not be constructed on the cap because of the relatively small size of the EQ Basin.

4.4.8.1 Clay Material Specifications

The 2-foot clay layer of the cap will be constructed of borrow materials. The material must possess an in-place recomacted coefficient of permeability (k) equal to or less than 1×10^{-7} cm/sec. Testing and inspection methods necessary to ensure this in-place permeability are detailed in the subsequent sections.

The clay material will meet the following requirements in order to be classified as select clay fill for use in construction of the clay liner.

- Clay will be classified according to the Unified Soil Classification System (USCS) as CH or CL (ASTM D 2487-83). A liquid limit of at least 30, plasticity index (PI) equal to or greater than 15, and a fines content of greater than 50% passing the No. 200 sieve will be considered for proper classification.

- Select clay fill materials will be reasonably free of gypsum, ferrous, and/or calcareous concretions and nodules, refuse, roots, or other deleterious substances.

4.4.8.2 Preconstruction Testing

All soil to be used for construction of the clay cap will be inspected by the CQA inspection personnel. Rock fragments, boulders and cobbles contained in the soil will not exceed 3 inches in any dimension. Material will be inspected to remove limbs, roots, and other deleterious materials to the extent practical. Continuous and repeated visual inspection of the materials being used will be performed by the Contractor to ensure that proper soils are being used.

The Quality Assurance tests specified in the following tables will be performed on material proposed for liner construction at the specified frequencies and whenever a change in material occurs. Tables 4-1 and 4-2 delineate the quality controls for construction of the two foot thick relatively impermeable clay cap.

TABLE 4-1 CLAY BORROW SOURCE TESTING

Factor to be Inspected	CQA Inspection Method/Test	Sampling Frequency
Grain Size Analysis	ASTM D-422 and ASTM D-1140	1 per 1000 CY
Moisture Content	ASTM D-2216	1 per 1000 CY
Specific Gravity	ASTM D-854	1 per 5000 CY
Soils Classification	ASTM D-2487	1 per 5000 CY
Atterburg Limits	ASTM D-4318	1 per 5000 CY
Moisture Density Curve	D-698, D-1557, and/or reduced proctor (15 blows per inch)	1 per borrow source
Lab Permeability	ASTM D-5084	1 per 10,000 CY

TABLE 4-2 TESTING METHODS AND FREQUENCIES DURING CONSTRUCTION OF THE LINER

Factor to be Inspected	CQA Inspection Method	Sampling Frequency
Clay Layer Thickness	Observation and Field Measurement	5/lift
Moisture Content	ASTM D-3017, D-4643, D-4944, or D-4959 calibrated against ASTM D-2216	5/lift
Density	ASTM D-2922 or D-2937 calibrated against ASTM D-1556 or D-2167	5/lift
Classification	ASTM D-2487	1/lift
Atterburg Limits	ASTM D-4318	1/lift
In-situ Permeability	Two-Stage Borehole Test, ASTM Draft Test Method	3
Lab Permeability	ASTM D-5084	3/lift

The moisture/density relationship to control actual field placement of the clay cap will be established using a laboratory procedure. The coefficient of permeability relative to minimum compaction will be determined in the laboratory as follows:

A sample of the selected material which will be used to construct the clay cap will be taken to the laboratory.

A standard moisture-density curve will be developed to determine optimum moisture content and maximum dry density of the compacted soil in accordance with the Standard Proctor Test, ASTM D698.

A sample will be compacted at or above optimum moisture content to a density of not less than 90% of the maximum dry density.

Permeability tests will be conducted in accordance with ASTM D 5084 to determine the coefficient of permeability (k). If k is less than 1×10^{-7} cm/sec., the soil will be placed in accordance with the permitted plans at a density of not less than 90% of the maximum dry density (as determined in ASTM D698). If k is greater than 1×10^{-7} cm/sec, the soil will either be considered to be unsuitable and another source(s) will be located and tested, until the permeability requirement is met, or a series of tests varying moisture content and density will be conducted to determine an alternate moisture or density standard which conforms to the specified maximum permeability.

4.4.8.3 Clay Cap Construction

Select clay fill material will be applied such that the lift thickness (after compaction) will be no greater than 6 inches. Thinner lifts are permissible. Prior to compaction, each lift of select clay fill material will be thoroughly diced to provide soil particle sizes less than 4 inches in diameter. Equipment or truck traffic on the surface will not be permitted during the period between scarifying and placement of the following lift. In order to ensure that the clay liner becomes one continuous mass of clay from bottom to top of the liner, the surface of each lift must be maintained at the specified moisture content and it must be scarified (lightly chopped with a disc), not smooth, when covered by the succeeding lift.

After scarifying of the underlying lift, representative samples of the new lift will be taken and tested for moisture content prior to any compactive efforts. If the moisture content is within the specified range (range determined by laboratory testing of borrow source), compaction may begin. If the moisture content is outside of this range, the select clay fill will be wetted or dried and reworked accordingly. The select fill should be sprinkled or sprayed with water (most probably from a water truck) and dozed, wind-rowed, and/or disc-plowed to uniformly increase moisture content of the clay if the material is below the optimum moisture content. The select clay fill should be dozed, wind-rowed, and/or disc-plowed to help air dry the clay if the moisture content is too high.

Each lift will be thoroughly compacted and satisfy moisture and density controls through field testing before a subsequent lift is placed. Compaction of lifts will be conducted as follows:

- Compaction of lifts will be performed with an appropriately heavy, properly ballasted, penetrating-foot compactor (such as a CAT 815 or equivalent) subject to approval from the CQA inspection personnel. A minimum of 6 passes will be required on each lift regardless of whether the lift meets density specifications. This requirement is to allow thorough remolding of the clay by kneading action.

- The daily work area will extend a distance no greater than necessary to maintain moist soil conditions (facilitate bonding) and continuous operations. Desiccation and crusting of the lift surface will be avoided as much as possible.

- If desiccation and crusting of the lift surface occurs before placement of the next lift, this area will be sprinkled with water and then scarified and tested for water content to ensure uniform moisture before placement of a subsequent lift.

- Transition from full depth liner to beginning of adjacent new section will be accomplished by sloping (cutting back) the end of a full depth section at 5:1 (horizontal to vertical) or flatter for tying in a new lift. Alternatively, each new lift will be benched into the previously constructed liner at 2-foot horizontal intervals.

- Dozer or scraper equipment will not be used for primary compaction efforts.

The select fill will be compacted to meet or exceed the density determined from the Standard Proctor Test, described in the previous preconstruction testing section. Densities less than the specified density will be recompacted and/or removed and reworked to meet density objectives. In addition, unless laboratory testing indicates otherwise, the compacted material's dry density/moisture content will lie within the 80% saturation line, to be established from tested specific gravities.

No select fill will be placed or compacted during a sustained period of temperatures below 30°F. Select fill may be placed and compacted during periods of early morning and evening freezing temperatures with warming trends above freezing during the day. During construction, finished lifts or sections of compacted clay liner may be sprinkled with water as needed to prevent drying and desiccation. At the end of each construction day's activities, completed lifts or sections of compacted clay liner will be sealed by rolling with a rubber tired or smooth drum rollers and sprinkled with water as needed.

The compacted clay cap will be a minimum of 24 inches. Thickness of the clay liner on the side slopes will be measured perpendicular to the slope face. The as-built thickness of the compacted clay liner will be determined by non-destructive survey methods as described below. An individual lift may be sampled upon completion (but prior to subsequent lift placement) with an approved sampler or other investigative tool, but the resulting penetration will be properly backfilled with hand tamped select clay fill or bentonite. Samples of the in-place compacted clay liner will be tested and evaluated prior to acceptance.

After completion of a segment of compacted clay cap, but before installation of the subsequent layers of the cap. The top of the clay will be surveyed to ensure that: (a) the specified thickness of compacted clay liner has been achieved; (b) the top of the clay liner slopes across the cell at the grades specified on the permitted plans.

4.4.9 Flexible Membrane Cap

4.4.9.1 Materials Specification

The geomembrane will be constructed of 60-mil HDPE, 30 mil VLDPE, or 30 mil PVC. Raw polymer specifications and manufactured sheet specifications for the HDPE membrane are as follows:

HDPE	TEST METHOD	VALUE
Gauge	---	60 mils
Density	ASTM D1505	0.94
Melt Flow Index (g/10 min.) (max)	ASTM D1238 Condition E (190°C, 2.16 kg.)	0.5
Minimum Tensile Properties	ASTM D 638 Type IV (Dumbbell at 2 ipm)	
1. Tensile at Break (lbs/inch width)		216
2. Tensile at yield (lbs/inch width)		126
3. Elongation at Break (%)		630
4. Elongation at Yield (%)		12
5. Modulus of Elasticity	ASTM D882	1.1
Tear Resistance	ASTM D1004	41
Low Temp Brittleness	ASTM D746	-112
Dimensional Stability	ASTM D1203	-2
Carbon black content	ASTM D-1603	2%

These specifications may be superseded by more stringent specifications of the manufacturer. Radford will submit the exact type of membrane proposed for use and the manufacturer's product specifications.

4.4.9.2 Differential Settlement in the Foundation Soils

Due to the small area to be capped and minimal depth of backfill soil the differential settlement effects are negligible. During clearing and grubbing operations and placement of soil fill to establish the final grade for cap placement compaction will occur. Settlement resulting in foundation compression and soil liner compression will be minimal. There is no solid waste in place like landfills to biodegrade and cause settlement or gas production.

4.4.9.3 Strain Requirements at the Anchor Trench

The membrane and geotextile will be anchored in a trench at the toe of the cap. In the case of the membrane, the anchor trench does not affect the potential for sliding because it is at the toe rather than at the top of the slope. For these reasons, calculation of strain requirements of the anchor trench is not applicable.

4.4.9.4 Strain Requirements Over Side Slopes

The membrane and geotextile must be strong enough to resist tensile forces acting from the weight of the soil above. The selection of membrane provides maximum strength during installation. The steepest slope of the capped area will 5%. At such "flat" slopes, the membrane will support its own weight and not slide. The membrane will be beneath 2 feet of cover soil and 1 foot of granular drainage material which is well below the 8-inch frost penetration depth, reducing stresses associated with climatic conditions.

4.4.9.5 Chemical Compatibility

Polyethylene and PVC liners are non-reactive with most leachate constituents (Koerner, 1986). The liner will be placed above the waste constituents in the "landfill" and, therefore, will not contact chemicals in the "landfill." The liner will be in direct contact with the clay barrier soil layer and the granular drainage layer. The only liquid contacting the liner will be precipitation that percolates into the granular drainage layer.

4.4.9.6 Liner Strength Requirements and Integrity Under Mechanical Stresses

The membrane must be capable of withstanding both the stresses of installation and stresses after placement. The 60-mil HDPE membrane, 30 mil VLDPE, or 30 mil PVC membrane is suitable for both conditions. The 60-mil thickness and strength of the HDPE will provide sufficient strength to withstand installation stresses such as wind, temperature and seaming. The flexibility and strength of 30 mil PVC or VLDPE liner will provide sufficient strength to withstand installation stresses such as wind, temperature and seaming. As previously discussed, the membrane will be placed on a smooth clay foundation, free

of rocks, clods, and other debris that might puncture the geomembrane. A geotextile fabric filter will be placed over the membrane to protect it from the overlying stone drainage layer. No vehicles will be driven on the membrane until the geotextile and 12-inch stone drainage layer have been placed.

Prior to installation, the membrane will be protected from sunlight and the weather by a cover or under a temporary shelter. After placement, the liner will be covered with the geotextile and stone layer as quickly as possible after approval of seaming. The 3-foot cover (1-foot granular drainage layer and 2-foot soil layer) will provide long-term protection from mechanical and thermal stresses. Except during installation, the geomembrane will not be exposed to wind, sunlight, or direct precipitation.

4.4.9.7 Friction Factors

The literature indicates a friction angle of approximately 11 to 14 degrees for polyethylene sheets and clay. A review of available literature indicates a friction angle of 16 degrees between the polyethylene sheets and overlying geotextile. These friction angles are more than adequate for use on a small relatively "flat" cap design for an impoundment closure.

4.4.9.8 Best Anchorage Configuration for the FMC

The anchorage of the membrane is not a design issue. The liner will be anchored in a one-foot wide, two-foot deep trench located at the edge of the cap system around the perimeter of the "landfill." This is a typical anchoring method shown in EPA guidance documents.

4.4.9.9 Soil Cover Stability on Top of FMC

Stability of cover soil is an important concern in designing a landfill cap. However, due to the small size, and relatively flat slopes, sliding instability is negligible. A geotextile will be placed between the flexible membrane and the drainage layer to provide reinforcing and increase friction. Another layer of geotextile will be provided between the drainage layer and the soil erosion protection layer. Calculations show that the erosion layer will be stable, and universal soil loss is much less than 2 for 5% slopes, less than 100 feet of slopes, and a moderate stand of grass.

4.4.9.10 Installation

The earthwork contractor will be responsible for preparing and maintaining the subgrade in a condition suitable for liner installation. The clay liner subgrade will be smooth and firm. Sharp stones, gravel, debris, or any other objects which could penetrate the liner will be removed. Any ruts caused by the compaction equipment or the geomembrane placement equipment will be leveled. The subgrade will be visually inspected prior to installation of the membrane.

The membrane will be delivered to the site on rolls, stored off the ground in small stacks, and protected with a covering or stored in a temporary storage shelter. The storage space will be protected from theft, vandalism, and passage of vehicles. Geosynthetics will be handled in a manner to prevent physical damage, contamination, and exposure.

Before moving a roll from the storage site, an anchor trench 2-feet and 1-foot wide will be completed. Slightly rounded corners will be provided where the geomembrane adjoins the trench to avoid sharp bends in the geomembrane.

The construction contractor will submit a geomembrane layout plan to the owner and CQCO for approval prior to placing the membrane. The membrane will be installed during dry, moderately warm weather to minimize the effects of thermal expansion and contraction. The manufacturer's instructions will be followed for liner placement and seam overlap. The method used to unroll the panels will not cause scratches or crimps in the geomembrane. Sandbags will be placed along the edges of the geomembrane to prevent uplift pressures of up to 37 psf and the resulting wind damage. Field panels will be placed one at a time in a manner which minimizes wrinkles.

The panels will be seamed immediately after placement following the manufacturer's recommended seaming procedures. The ambient temperature should be above 5° F during seaming. Surfaces to be seamed will be clean and dry when the seams are made. Seams will be oriented parallel to the line of maximum slope. All field seams will be non-destructive tested in accordance with ASTM D 4437 seam evaluation using the vacuum box technique. Destructive tests will be performed on test specimens in accordance with ASTM D-413 and ASTM D-638 for peel and shear of geomembrane seams. One sample will be taken for destructive testing every 500 linear feet of weld.

The liner will be covered within the time limits specified by the manufacturer. The geotextile fabric will be placed on the geomembrane as soon as possible after approval of the geomembrane placement. The stone drainage layer will be placed on the geotextile using equipment which will either not need to move on to the cap area or rubbered tired equipment. Vehicles will be driven only on the full depth stone drainage layer or subsequent soil cover. Vehicles will not be allowed to drive directly on the geomembrane or geotextile layers.

QA/QC procedures to be followed during cap installation, including inspections, material certifications, and testing will be discussed in Section 7 of this document.

4.4.10 Filter Layer

The design properties of concern for the geotextile filter layer above the drainage layer are permittivity and clogging potential. The minimum permittivity required for the geotextile is 6.0×10^{-3} /sec. The permittivity of the geotextile specified in the design is 0.08/sec, well above the minimum. Therefore, the geotextile will easily allow surface water to flow through it to the drainage layer.

The potential for the geotextile to clog must be evaluated using site specific cover soil and recommended geotextile. The suggested test is the U.S. Army Corps of Engineers Gradient Ratio Test CW-02215 with the gradient ratio calculated value less than 3. The chosen geotextile must have an apparent opening size (O_{95}) meeting the following specifications (recommended by Carroll, 1983 and Chen, 1981):

$$O_{95}/D_{85} < 2.0$$

$$O_{95}/D_{15} > 2.0$$

Clogging potential will be determined by the contractor after the source of the backfill is selected and the specific geotextile is chosen.

The geotextile filter located above the FMC is designed as a protective layer and permittivity of this geotextile is not a concern.

4.4.11 Drainage Layer

The drainage layer is required to reduce the head of water on the soil barrier layer and also to prevent water backup into the vegetative layer. The minimum thickness of the middle drainage layer will be 12 inches. The saturated hydraulic conductivity of the drainage materials will not be less than 1×10^{-2} cm/sec at the time of installation.

The upper portion of the drainage layer will be designed to prevent clogging, and will be overlain by a synthetic fabric filter or graded granular material. The upper slope will be at least 3 percent after allowance has been made for settling and subsidence, and will be overlain by granular materials such as sand. The granular material will be no coarser than 3/8 inch and classified as SP. The material will be crushed and angular with no debris that may damage the underlying flexible membrane liner, or fines that may lessen permeability, or dissolvable minerals such as lime.

Discharge from the drainage layer will flow freely so that fluid does not back up into the vegetative layer during a major sustained storm event. The drainage layer will be sloped to an exit drain which will allow the percolated water to drain.

4.4.12 Vegetative Layer

The top layer is required to retain soil moisture, minimize root penetration into the barrier layer, and provide greater tolerance to the adverse impact of erosion. The top layer will have a thickness of no less than 24 inches, of which a minimum of the top six inches will be topsoil and will contain sufficient nutrients necessary for the growth and sustenance of a vegetative cover.

The entire area will be seeded to stabilize the soil and prevent erosion. Seed will be applied at a rate of 200 lbs/acre in the following percentages:

Kentucky 31 on Turf Type Tall Fescue	95-100%
Kentucky Bluegrass	0-5%

Fertilizer (10-20-10) will be applied at 28 lbs/1000 square feet (sf) and lime (pulverized agricultural grade limestone) will be applied at 90 lbs/1000 sf. All seeding operations will be conducted in accordance with the *Virginia Sediment and Erosion Control Handbook*, Third Edition (1992). Cover vegetation should be drought resistant, persistent, erosion resistant and adapted to local conditions.

The surface drainage system will be capable of efficiently conducting runoff across the cap. The drainage ditches will be adequate to accommodate the runoff from a 24-hour, 25-year storm.

4.4.13 Drainage Evaluation

In order to limit runoff infiltration and to limit erosive velocities from runoff on the impoundment surface it is recommended that a uniform 3-5% grade be incorporated into the design of the final cover. One of the most effective ways to minimize surface water infiltration through the final cover is to divert runoff away from the closed structure. Since the site will be graded for positive drainage, and based on existing site topography, positive drainage will be maintained away from the site. Run-on from an off site source is not expected due to site specific conditions.

4.4.14 Survey Control

The following procedures will be followed with respect to the survey of the completed clay cap:

The completed clay surface will be surveyed, before the placement of subsequent cover layers, to verify that grades are in accordance with the plans. In addition, a comparison of the pre- and post-clay cap construction surveys will be conducted to verify construction to the permitted thickness.

4.4.12 Vegetative Layer

The top layer is required to retain soil moisture, minimize root penetration into the barrier layer, and provide greater tolerance to the adverse impact of erosion. The top layer will have a thickness of no less than 24 inches, of which a minimum of the top six inches will be topsoil and will contain sufficient nutrients necessary for the growth and sustenance of a vegetative cover.

The entire area will be seeded to stabilize the soil and prevent erosion. Seed will be applied at a rate of 200 lbs/acre in the following percentages:

Kentucky 31 on Turf Type Tall Fescue	95-100%
Kentucky Bluegrass	0-5%

Fertilizer (10-20-10) will be applied at 28 lbs/1000 square feet (sf) and lime (pulverized agricultural grade limestone) will be applied at 90 lbs/1000 sf. All seeding operations will be conducted in accordance with the *Virginia Sediment and Erosion Control Handbook*, Third Edition (1992). Cover vegetation should be drought resistant, persistent, erosion resistant and adapted to local conditions.

The surface drainage system will be capable of efficiently conducting runoff across the cap. The drainage ditches will be adequate to accommodate the runoff from a 24-hour, 25-year storm.

4.4.13 Drainage Evaluation

In order to limit runoff infiltration and to limit erosive velocities from runoff on the impoundment surface it is recommended that a uniform 3-5% grade be incorporated into the design of the final cover. One of the most effective ways to minimize surface water infiltration through the final cover is to divert runoff away from the closed structure. Since the site will be graded for positive drainage, and based on existing site topography, positive drainage will be maintained away from the site. Run-on from an off site source is not expected due to site specific conditions.

4.4.14 Survey Control

The following procedures will be followed with respect to the survey of the completed clay cap:

The completed clay surface will be surveyed, before the placement of subsequent cover layers, to verify that grades are in accordance with the plans. In addition, a comparison of the pre- and post-clay cap construction surveys will be conducted to verify construction to the permitted thickness.

A minimum of one cross-section for every 100 linear feet of cell length and width will be surveyed. At a minimum, survey points will be established at the top, mid-point, and bottom of each slope. These survey points will be coincident with those of the previous cross-section lines.

Acceptable tolerances on survey coordinates will be ± 0.2 feet on elevations and ± 1.0 foot on coordinates. The clay cap will be greater than or equal to the thickness specified.

The CQA inspection personnel certifying the survey results will be either a Registered Land Surveyor or a Professional Engineer.

The CQA Officer will certify that the clay cap meets the requirements in the plans and specifications and submit documentation to the Project Manager.

4.5 Construction Quality Assurance Plan

The CQA plan will detail procedures for inspecting the quality of construction materials and the construction practices employed during their placement. The CQA plan will further provide assurance that: (1) the materials for each layer are as specified in the design specifications; (2) each layer is constructed as specified in the plans; and (3) all layers of the final cover are uniform and damage-free. The CQA plan can be found in the appendix.

4.6 Site Access

Access to the Radford Army Ammunition Plant is severely limited due to the on site security required for operations. All vehicles entering the Radford must pass through the main entrance and a second security checkpoint before approaching the site. Existing fences, gates, and vegetation will be utilized to restrict unauthorized access to the waste disposal area. A clearly visible and legible sign will be maintained at the closure area indicating the hazards.

4.7 Engineer's Certification of Contingent Closure

Radford will provide for an independent licensed Professional Engineer in the Commonwealth of Virginia to verify that the EQ Basin was closed in accordance with the specifications in this closure plan. The independent engineer will be present during all closure activities. The independent engineer's certification will include all documentation such as daily reports, test results, observations, photographs, etc. which demonstrate that the closure was completed in accordance with the approved plan.

The certification of closure will be submitted, by registered mail, to the Director of the Commonwealth of Virginia's Department of Environmental Quality. The certification will be submitted within 60 days of the completion of final closure. The certification will be signed by both the independent Professional Engineer and the responsible official for Radford Army Ammunition Plant.

4.8 Notification of Type, Quantity and Location of Wastes

No later than 60 days after certification of closure of the EQ Basin, Radford will submit to the County Board of Supervisors and to the Director of the Commonwealth of Virginia's Department of Environmental Quality a record of the type, location, and quantity of hazardous waste located in the closed EQ Basin.

4.9 Survey Plat

Within 60 days of closure, a survey plat indicating the location and dimensions of the EQ Basin closure as a landfill with respect to permanently surveyed benchmarks will be submitted to the local zoning authority and to the Director of the Commonwealth of Virginia's Department of Environmental Quality. The plat will be prepared and certified by a Professional Land Surveyor in the Commonwealth of Virginia. Radford will submit a certification to the Director that a survey plat and record of the type, quantity, and location of the hazardous wastes has been submitted to the local zoning authority.

4.10 Deed Restriction

Within 60 days of certification of closure of the Basin, Radford will record in accordance with state and local law, a notation on the deed to the facility property, or on some other instrument which is normally examined during title search, that will in perpetuity notify any potential purchaser of the property that:

- The land has been used to manage hazardous wastes; and
- Its use is restricted under VHWMR Section 10.6; and
- The survey plat and record of the type, location, and quantity of hazardous wastes disposed of within each hazardous waste unit required by VHWMR Sections 10.6.G and 10.6.J.1., have been filed with the local government and with the Director of the Commonwealth of Virginia's Department of Environmental Quality.

Radford will submit to the Director a certification stating that the facility has recorded the notation specified in VHWMR Section 10.6.J.2.a. A copy of the document in which the notation has been placed will also be submitted.

4.11 Post Closure Care Permit Application

Within 180 days of contingent closure, an application for a post-closure care permit with the applicable permit fee will be submitted to the Virginia Department of Environmental Quality, Waste Division.

4.12 Contingent Closure Schedule

The contingent closure schedule for the EQ Basin is detailed in Table 4-3.

TABLE 4-3 CONTINGENT CLOSURE SCHEDULE	
Activity	Days
If contaminated soils cannot be practically removed, notify VDEQ, then begin construction of final cover system.	0
Survey Excavation	0
Backfill with Clean Soils	10
Submit Plan Sheets, Geomembrane Type & Layout, Erosion Control Plan with Support Calculations, and Specifications	20
Begin Construction of Cap	60
clay	90
geomembrane	100
geotextile	110
drainage layer	120
geotextile	130
soil	140
topsoil spread	150
topsoil seeded and erosion controls placed	160
Submit Monthly QA/QC Reports	170
Submit Final Report of QA/QC on Work Performed	180
Submit Certification of Closure	
Within 60 Days of Completed Cap Construction Submit: Record of Type, Location, and Quantity of Waste Closed in Place Certification Letter that Survey Plat was Submitted to Local Zoning Authority with copy of Survey Plat Certification Letter that Permanent Notation was made on Property Deed, with Wording Submitted to VDEQ for Approval	180-240
Within 180 Days of Completed Cap Construction Submit: Application for Post Closure Care Appropriate Application Fee	180-360
Upon Completion of the 30 Year Post-Closure Care Period: Within 60 Days of Completion of the Post Closure Care Period Submit a Certification Letter that Post-Closure is Completed	30 years + 60 days

5.0 CONTINGENT POST-CLOSURE PLAN

5.1 Introduction

Post-closure care will begin after completion of contingent closure and continue throughout the post-closure care period. Post-closure care consists of maintaining the final cover and performing monitoring, and response, as necessary, to prevent adverse impacts to human health and the environment (VHWMR Sections 10.6.H through 10.6.K, 10.10.I.2, and 10.10.I.3.a.(2)).

Post-closure activities will be directed by the requirements of this plan until the post-closure permit becomes effective. The post-closure requirements will be as follows.

5.2 Post-Closure Care Period

Unless extended or reduced by subsequent modification of this plan or by permitting action, the post-closure care period will begin after closure of the EQ Basin and continue for 30 years after that date.

5.3 Ground Water Monitoring and Reporting

The ground water monitoring system, detailed in the document Groundwater Quality Assessment Plan (as updated), will be maintained for ground water compliance monitoring throughout the post-closure care period.

5.4 Maintenance of Final Cover

The integrity and effectiveness of the final cover will be maintained for a period of thirty years. The vegetative cover will be mowed at least twice yearly and re-fertilized in accordance with the recommendations of the local office of the U.S. Department of Agriculture's Soil Conservation Service (SCS). The cover and drainage system will be inspected quarterly during the first year and every 6 months thereafter by a qualified person. These inspections will determine if there have been any changes to the structural integrity of the cover due to settling, subsidence, erosion, and if the vegetative cover is well established and healthy. Following cap placement, the cover drainage system will be inspected weekly to initially establish the effectiveness of the drainage system design. Any damage or failure of the cover and/or drainage system will be repaired within 30 days of inspection.

Any erosion or ponding will be repaired by excavating the cover materials, regrading, and replacing the cover according to the QA/QC specifications to prevent surface water infiltration. Bald and spottily vegetated areas will be disked and otherwise prepared for re-vegetation. New topsoil will be added as

necessary. Re-vegetation will stabilize the surface from further erosion by wind and water and will contribute to the development of a naturally fertile and stable surface environment. Mulching, seeding with native grasses, and fertilizing will be performed as soon as possible after regrading/disking, and in accordance with the recommendations of the local SCS office.

5.5 Maintenance of Groundwater Monitoring Wells

Groundwater monitoring wells require regular inspections and maintenance over time in order to maintain them in the originally completed condition. Monitoring wells should be inspected and maintained for the following potential conditions or problems, at each sampling event:

- Aboveground portions of monitoring wells should be inspected for evidence of tampering or actual physical damage each time the well is sampled or checked for static ground water level.
- The total depth of monitoring wells should be checked in order to ascertain if there has been excessive sediment influx into the well casing that could potentially clog the well screen.
- Unusual well conditions may warrant using downhole geophysical tools or a downhole camera in order to properly assess deep hole well conditions of both riser casing and well screen.
- Extreme or unexpected water level changes may also be indicators of downhole casing or screen problems. Very low levels may indicate a problem such as screen clogging with sediment or bacterial growth.
- Maintenance should be performed on ground water monitoring wells as required, and should consist of purging the well to clear any sediment influx over time and to allow checking for unusual or unexpected well conditions that may have developed since initial well completion.

5.6 Maintenance of Run On and Runoff Control Structures

The Commonwealth of Virginia requires a plan for continued maintenance of storm water management facilities. Where local government does not choose to accept maintenance responsibility the responsible entity is required to accept maintenance responsibility and a maintenance agreement must be entered into with the local government.

In order to guard against the cumulative effects of erosion and storm damage it is important to prepare and follow a maintenance plan for the facility. Inspections will be conducted as indicated in the inspection reports. Maintenance will be conducted as indicated below.

- The cap surface, adjacent swales, storm water management area will be inspected quarterly and after major storm events.

- Berms shall be specifically inspected for evidence of slope failure, erosion and overall integrity.

- Evidence of erosion, outlet structure blockage, vegetation over-growth, and other features which may effect the function of the drainage system for the facility shall be noted.

- After an inspection is conducted, if required, areas of erosion shall be filled and seeded with appropriate cover vegetation. swales and berms shall be inspected by qualified personnel and assessments of the integrity of the structures made.

5.7 Benchmark Integrity

Numerous USGS benchmarks are located at Radford Army Ammunition Plant. All survey work will be conducted using at least one of these benchmarks. Due to the controlled nature of Radford, the benchmarks should be secure.

5.8 Post-Closure Inspection Log [VHWMR Section 10.6.H.1.a.(2)]

The Post-Closure Inspection Log form is included in the Appendices. This form will be utilized to guide and document the above-described inspection activities.

5.9 Recordkeeping/Contact Persons

The post-closure care plan and records (i.e. inspection logs) will be maintained at the facility. The plan and records will be available for review by the Commonwealth of Virginia's Department of Environmental Quality.

The Radford Army Ammunition Plant representative to contact about post-closure care will be:

EPA ID No. VA1210020730

Owner/Operator - U.S. Army, Radford Army Ammunition Plant / Alliant Tech Systems, Inc.

Address - Radford Army Ammunition Plant, P.O. Box 1, Radford, Virginia 24141-7536.

Contacts Telephone No. - Jerome Redder at (540) 639-7436 or Robert Richardson at (540) 639-8641.

5.10 Certification of Completion of Post-Closure Care (VHWMR 10.6.K)

No later than 60 days after completion of the established post-closure care period, Radford Army Ammunition Plant will submit to the Commonwealth of Virginia's Department of Environmental Quality Director, by registered mail, a certification that the post-closure care period for the EQ Basin was performed in accordance with the specifications in this approved post-closure plan. The certification will be signed by the official representative for Radford and an independent Professional Engineer in the Commonwealth of Virginia.

5.11 Post Closure Inspection Form

SAMPLE POST CLOSURE INSPECTION LOG SHEET SURFACE IMPOUNDMENT CLOSURE

Scheduled Inspection (Yes or No): _____
 Supplemental Inspection (Yes or No): _____

Date: _____ Time: _____ Inspector: _____

Inspection Item	Potential Problems	Status
1. <u>Security Controls</u>	Missing	_____
Fencing	Damaged	_____
Warning Signs	Inadequate	_____
2. <u>Erosion Controls</u>	Inadequate slope/vegetation	_____
3. <u>Final Cover</u>	Erosion damage	_____
	Settlement/subsidence or displacement	_____
	Water pooling/inadequate drainage	_____
	Insect/rodent damage	_____
	Damaged/dead vegetation	_____
	Trees/shrubs, or other deep rooted growth	_____
4. <u>Drainage System</u> (Runon/Runoff Controls)	Drainage Blocked	_____
	Debris Present	_____
	Inadequate Drainage	_____
5. <u>Benchmarks</u>	Missing/damaged	_____
	No Identification	_____
6. <u>Groundwater Monitoring System</u>	Not capped/locked	_____
	Damaged	_____
	No identification	_____

Overall Status (Acceptable or Unacceptable): _____

OBSERVATIONS: _____

CORRECTIVE ACTION TAKEN AND DATE: _____

6.0 QUALITY ASSURANCE QUALITY CONTROL (QA/QC) PLAN INTRODUCTION

6.1 Introduction

This QA/QC Plan is provided as part of the Contingent Closure for the EQ Basin at the Radford Army Ammunition Plant. The purpose of this Plan is to establish standards that, when followed by the Owner's inspection personnel (Quality Control - QC Engineer or Officer), will ensure that the contractor constructs the cap in accordance with the plans and the VHWMR. Radford will be responsible for ensuring through the implementation of the QA/QC Plan that the terms and conditions of the closure plan are fulfilled during construction. The Radford representative on the site, hereinafter referred to as the Project Manager, will be responsible for coordination between Construction Contractor(s) and the QC Engineer (or Officer), as well as for the overall project management during construction and implementation of the full QA/QC Plan attached to this document as an appendix.

Prior to construction, the Project Manager, the Contractor and the QC Officer will review the proposed cover plans for clarity and completeness. In the event that additional clarification is required, the design engineer will be consulted for necessary clarification or modifications.

6.3 QC Engineer

A QC Engineer, who will be an independent party and not responsible to the Construction Contractor, will be contracted by Radford during construction of the cover. The QC Engineer must be a Professional Engineer, licensed in the State of Virginia. The QC Engineer will direct the construction inspection, testing and documentation efforts with specific responsibilities for the following activities:

- Ensure that the attached full QA/QC Plan is implemented so that the final structure constructed meets the design requirements and the VHWMR.
- Reviewing the construction plans and specifications for clarity and completeness.
- Reporting and documenting construction activities to the owner (and VDEQ in a final report) that the plans and specifications were followed by the contractor.
- Educating the QA/QC inspection personnel on the QA/QC requirements and procedures.
- Scheduling and coordinating the QA/QC inspection activities.

- Directing and supporting the QA/QC inspection personnel in performing observations and tests with respect to test equipment calibration, and data collection, validation, reduction, interpretation and reporting.
- Reviewing and interpreting all data sheets and reports associated with the construction activities and reporting them to Radford.
- Identifying work that should be accepted, rejected, or uncovered for observations, or work that may require special testing, inspection or approval, and reporting it to Radford.
- Rejecting defective work and verifying that corrective measures have been implemented.
- Furnishing to the facility representative and to the Contractor the results of all observations and tests as the work progresses, and coordinating with the Contractor when modifications to the plans are necessary to ensure compliance with the specified design.

6.4 QA/QC Inspection Personnel

The responsibilities of the QA/QC inspection personnel will include:

- Conducting independent on-site inspection of construction activities to assess compliance with the facility design plans and specifications.
- Verifying that the equipment used for testing meets the QA/QC specified test requirements, and that all tests are conducted according to the QA/QC Plan procedures.
- Reporting to the QC Engineer the results of all inspections, including work that is not of acceptable quality or that fails to meet the specified design.

6.5 Project Meetings

6.5.1 Preconstruction QA/QC Meetings

A meeting will be held to resolve any uncertainties following the award of the construction contract. The Project Manager, the QA/QC inspection personnel and the Contractor will be present. The topics of the meeting will include, but will not be limited to:

- Providing each organization representative with the QA/QC documents and the supporting information.

- Reviewing all aspects of the site-specific QA/QC Plan to ensure understanding of the responsibilities, duties and inspection/monitoring procedures.
- Discussing the established procedures or protocol for handling construction deficiencies, repairs and retesting.
- Reviewing methods for documenting and reporting inspection data, and for distributing and storing documents and reports.
- Identifying any changes to the QA/QC Plan necessary to ensure that construction will be conducted in accordance with the permit.
- Discussing procedures for the location and protection of construction materials and for the prevention of damage to the materials from inclement weather or other adverse events.

6.5.2 Daily Progress Meetings

A progress meeting will be held daily at the work area just prior to commencement or just following the completion of work. At a minimum, the meeting will be attended by the Contractor and the QA/QC inspection personnel. The purpose of the meeting will be to:

- Review the previous day's activities and accomplishments.
- Review the work locations and the activities for the day.
- Identify the Contractor's personnel, and the equipment assignments for the day.
- Discuss any potential construction problems.

Daily meetings will be documented by a member of the QA/QC inspection personnel, and copies of the documentation will be compiled into a weekly summary report for submission to Radford.

6.5.3 Problem or Work Deficiency

A special meeting may be held when and if a problem or deficiency is present or is likely to occur. At a minimum, the meeting will be attended by the Contractor and the QA/QC inspection personnel. The purpose of the meeting will be to define and resolve a problem or a recurring work deficiency as follows:

- Define and discuss the problem or deficiency.
- Review alternative solutions.
- Implement a plan to resolve the problem of deficiency.

These meetings will be documented by a member of the QA/QC inspection personnel, and the documentation will be included in the weekly summary report.

6.6 Test Equipment Calibration

All field test equipment will be kept under the control of the QA/QC inspection personnel. The QA/QC inspection personnel will be fully trained in the use of equipment, test procedures, and interpretation of results for each piece of test equipment. A copy of the calibration certificate will be kept by the QC Engineer. The equipment will be calibrated in accordance with the Quality Assurance procedures.

Calibration of nuclear density gauges will conform to the frequencies and methods outlined in ASTM D 2922-78 and D 3017-78. Unstable or erratic gauges will not be used for density testing and will be immediately removed from the site.

6.7 Non-Conforming Test Results

Density and moisture content test locations which fail to meet or exceed construction criteria will require reworking. The boundaries of the area to be reworked will be defined by the closest test locations which meet density and moisture content specifications. The non-conforming area will be reworked, dried or wetted as necessary, and retested. A non-conformance report will be prepared for areas which do not meet construction specifications after reworking and retesting.

Laboratory permeability test results which demonstrate a permeability above 1×10^{-7} cm/sec will be immediately brought to the attention of the QC Engineer. Non-conforming permeability test results may result in a review of previous test results, retesting, and/or a reevaluation of compaction criteria. After review and/or retesting areas which do not meet the specified permeability will require reworking.

All non-conformance reports will be brought to the attention of the Project Manager by the QC Engineer and will be documented in the Quality Assurance files.

6.8 Documentation

6.8.1 Daily Recordkeeping

Standard daily reporting procedures will include preparation of a summary report with supporting inspection data sheets. When appropriate, problem identification and corrective measures reports will be appended.

6.8.2 Daily Summary Report

A standard Daily Summary Report will be prepared by the QC Engineer or the QA/QC inspection personnel. This report will summarize that day's construction activities and the chronological framework for identifying and recording all other reports. The Daily Summary Report will include the following information:

- Unique identifying sheet number for cross-referencing and document control.
- Date, project name, location, or other identification.
- Data on weather conditions.
- Reports on any meetings held and their results.
- Unit processes and locations of construction underway during the time frame of the Daily Summary Report.
- Equipment and personnel present on-site, including subcontractors.
- Descriptions of areas and/or activities being inspected and/or tested, and related documentation.
- Description of off-site materials received, including any Quality Control certifications received.
- Calibration of test equipment.
- Decisions made regarding approval or rejection of materials or construction activity, and any corrective actions taken.
- Reference to pertinent data sheets or corrective measures reports prepared.
- Signature of the QC Engineer or the QA/QC inspection personnel preparing the report.

6.8.3 Inspection Data Sheets

Pertinent observations and laboratory and/or field data will be recorded on inspection data sheets. A standard data sheet format will be developed by the QC Engineer. Where possible, a checklist will be used to ensure that no pertinent factors of a specific observation are overlooked. Inspection data sheets will include the following information:

- Unique identifying sheet number for cross-referencing and document control.
- Description of the inspection activity.
- Location of the inspection activity or location where sampling or testing activities occurred.
- Type of inspection activity and procedure used.
- Recorded observation or test data, with related calculations.
- Results of the inspection activity or test results and comparison with specification requirements.
- Personnel involved in the inspection activity.
- Signatures of the appropriate QA/QC inspection personnel and concurrence by the QC Engineer.

6.9 Acceptance Reports

All daily inspection summary reports and inspection data sheets will be reviewed by the QC Engineer.

- The documentation will be evaluated and analyzed for internal consistency and for consistency with similar work.

This information will periodically be assembled and summarized into acceptance reports for submittal to Radford. These reports should indicate that the materials and construction processes comply with the permitted plans.

6.10 Final Documentation

At the completion of the project, a final certification report will be issued by the QC Engineer and transmitted to Radford. This document will include, but not be limited to, the following:

- Scope of work. — *Plans & specs*
- All daily field reports. — *Neel*
- ✓ All laboratory and field test results.
- ✓ Test methods. —
- Evaluation of all test results with respect to project specifications.
- Any non-conformance reports. — *have USACE draft bullets of any dev*
- Personnel involved with the project and their respective qualifications.

- As-built drawings and survey notes.
- Certification of final construction as meeting or exceeding construction specifications. This certification should be signed and stamped by the QC Engineer.

At the completion of the project, Radford will submit a final report to the VDEQ - Waste Division. This report will include a summary of the observations and testing conducted during construction, deviations from design and material specifications (with justifying documentation), and as-built drawings. This document will be prepared and certified correct by the QC Engineer and included as part of the QA/QC Plan documentation.

6.11 Document Control

The QC Engineer will initiate a project filing system which will include, but not be limited to, the following:

- File copy of the Quality Assurance procedures, updated as necessary.
- Photographic construction documentation.
- Survey measurements.
- Field and laboratory test results.
- Daily and weekly field results and reports.
- Field certification reports including as-built drawings.
- Non-conformance and corrective action reports.
- Minutes of construction meetings.

6.12 Storage of Records

During all construction activities, the QC Engineer will be responsible for all facility QA/QC documents. This includes the QC Engineer's copy of the design plans, the QA/QC Plan, and the originals of all the data sheets and reports. Duplicate records will be maintained by the facility to avoid loss of this information if the originals are destroyed. A copy of all documents will be maintained by Radford throughout the post-closure care period.

7.0 REFERENCES

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FINAL

GUIDANCE ON STATISTICAL METHODS FOR GROUNDWATER DATA ANALYSIS
AT A SOLID WASTE OR HAZARDOUS WASTE SITE

THE DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF WASTE RESOURCE MANAGEMENT

Prepared by:

Dr. Golam Mustafa

and

Mr. Howard Freeland

Guideline Version 2.0
August 10, 1995

GUIDANCE ON STATISTICAL METHODS FOR GROUNDWATER DATA ANALYSIS
AT A SOLID WASTE OR HAZARDOUS WASTE FACILITY
THE DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF WASTE RESOURCE MANAGEMENT
August 10, 1995

The following guidance is provided for groundwater data analysis at a solid waste or hazardous waste facility. Please note that this guidance is subject to change depending on new scientific knowledge, changes in regulations and policies. If you have any questions or suggestions regarding the text of this guidance, please contact Dr. Golam Mustafa at (804)-762-4197, or Mr. Howard Freeland at (804)-762-4219.

1. Verification of the Upgradient and Downgradient Monitoring Wells: Locations, Depths and Groundwater Yields:

The verification of monitoring wells locations, depths and groundwater yields must include, but is not limited to:

- a. Piezometric contour maps should be used to verify the locations for the upgradient and downgradient monitoring wells.
- b. Vertical depths and the screen locations for each monitoring wells must be checked using the well logs. For statistical comparison make sure that the upgradient and the downgradient monitoring wells are placed on the same portion of the aquifer or a portion of the aquifer which is hydraulically connected and similar in geochemistry.
- c. Make sure that the monitoring wells are yielding adequate groundwater for samples.
- d. If the hydraulic conditions do not allow a determination of what wells are upgradient, sampling at other wells that are representative of background groundwater quality should be used for statistical comparison.

2. Verification of the Data Quality Objectives (DQO):

The DQO verification process must include, but is not limited to:

- a. Check if the appropriate (and/or approved by DEQ) analytical method(s) for each analytes were used.

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- b. Check if the laboratory reported MDLs/PQLs are appropriate (and/or approved by DEQ), and are below the MCLs/ACLs or the GWPS, or other applicable standards established in the facility permit. If the laboratory reported MDLs/PQLs are above the MCLs/ACLs or the GWPS, or other applicable standards established in the facility permit, then the facility must submit a demonstration (e.g., matrix interference study for MDL/PQL) showing that the laboratory specific MDLs/PQLs are appropriate.
- c. Check if the samples are physically and/or seasonally independent. Physical independence is usually achieved by collecting samples at certain time intervals depending on the flow characteristics of the groundwater. If replicate samples were collected, then use an average of the replicates as an independent sample. For a given situation, it may be difficult to avoid seasonality in groundwater samples. If the data exhibit an obvious seasonal trend, then the data should be treated to remove the seasonal component using appropriate statistical methods. In general, to detect or remove a seasonal trend, at least three years of monthly or quarterly data is needed. For the initial phase of groundwater monitoring, the groundwater samples should be collected at a minimum of monthly or quarterly intervals to assure independent samples.

3. Treatment of Censored Data:

When 15% or fewer of the background data values are less than the MDL and/or PQL for the given constituent(s), the treatment of censored data values shall be based upon information concerning the following characteristics for each constituent and analytical method:

- a. Method of Detection Limit (MDL; as published in SW-846),
- b. Practical Quantitation limit (PQL; as published in SW-846),
- c. Limit-of-Detection (LOD; as determined within the laboratory), and
- d. Limit-of-Quantitation (LOQ; as determined within the laboratory).

In general, the laboratory Limit of Detection and Limit of Quantitation should be known, such that the following treatments are warranted:

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- A. In those cases where the laboratory LOD is known and verified and approved by the DEQ, then any data less than the LOD shall be treated as one-half of the LOD.
- B. In those cases where the laboratory LOQ is known and verified and approved by the DEQ, then any data greater than the laboratory LOD, but less than the laboratory LOQ, shall be treated as one-half of the laboratory LOQ.
- C. In those cases where the laboratory LOD is not known, then any data reported as "not detected," shall be treated as one-half of the appropriate published SW-846 MDL.
- D. In those cases where the laboratory LOQ is not known, then any data reported as greater than MDL, but "less than PQL" shall be treated as one-half of the appropriate published SW-846 PQL.

When more than 15%, but less than or equal to 50% of the background data values are less than the MDL and/or PQL for the given constituent(s), the treatment of censored data values should be as follows:

- a. If the detected-only values are normally distributed, then use Cohen's or Aitchison's method of adjustment for the mean and standard deviation.
- b. If the detects-only values are log-normally distributed then use the log-normal delta distribution (or log-transformed Cohen's or Aitchison's method of adjustment) to adjust the mean and standard deviation.

When more than 50% of the background data values are less than the MDL and/or PQL for the given constituent(s), the treatment of censored data values shall be according to the procedures presented in sections 7.(c) through 7.(f) of this guidance.

4. Treatment of Missing Data:

In the event of a failure to obtain chemical analytical data for one or more constituents from one or more wells, then those wells shall be re-sampled for those constituents as soon as is practical to do so.

5. Treatment of Outliers:

The presence of outliers should be tested for the upgradient wells and/or background period for the downgradient wells in accordance with EPA guidance presented in Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Interim Final Guidance, April, 1989, page 8-11 or ASTM Papers: E-178-80 & E-178-75 (Standard Practice for Dealing With Outlying Observations) or other procedures published in a peer reviewed Journal. It is common to find outliers in environmental data. The question often asked is: Should we remove the outlier or not? Fortunately, there is a simple solution to this problem which is another virtue of verification resampling as presented later in section 8. By the definition of an outlier, its frequency must be low. The probability of observing a rare event twice in a row in a downgradient well, even if it is real and not an error, is remote. Note that no verification resampling is or should be allowed on the upgradient or background data; therefore excluding outliers is a good practice as long as new downgradient measurements that exceeds background limits can be verified on or between the next scheduled sampling event.

6. Normality Test Methods:

The original data must be tested for normality using the Shapiro - Wilk Test of Normality (either single group or multiple group version) for sample size up to 50 and the Shapiro - Francia Test of Normality for sample size more than 50. The following are used for decisions:

- (a) If the original data shows that the data are not normally distributed, then the data must be log-transformed and tested for normality using the above methods.
- (b) If the original or the log-transformed data confirm that the data are normally distributed, then a normal distribution test must be applied.
- (c) If neither the original or the log-transformed data fit a normal distribution, then a distribution free test must be applied.

7. Selection of Alternate Statistical Methods:

- (a) In those cases where the background data consist of a minimum of eight (8) independent data values obtained from the upgradient well(s), and when less than or equal to 15% of the background data values are less than the MDL and/or PQL for a given constituent and the original or the log-transformed detects-only data follows a normal distribution, then the nondetected data should be adjusted in accordance with the procedures described in section 3 above.

After the adjustments are made, the downgradient values shall be compared to the parametric tolerance interval at 95% level of confidence with 95% or 99% (depending on number of comparisons) coverage of the population or the prediction interval at 95% level of confidence in accordance with the procedure described by Gibbons (1991A & 1994) and summarized in the EPA guidance documents, Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Interim Final Guidance (April, 1989) and Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Addendum to Interim Final Guidance (April, 1992).

- (b) In those cases where the background data consist of a minimum of eight (8) independent data values obtained from the upgradient wells, and when more than 15%, but less than or equal to 50% of the background data values are less than the MDL and/or PQL for a given constituent, and the original or the log-transformed detects-only data are normally distributed, then the mean and standard deviation shall be adjusted in accordance with the procedures described in section 3 above and summarized by Gibbons (1994) and in the EPA guidance document, Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Addendum to Interim Final Guidance (April, 1992). Note that the mean and the standard deviation is adjusted directly using these methods, no substitution for the nondetected values are required.

After the adjustments are made, the downgradient values shall be compared to the parametric tolerance interval at 95% level of confidence with 95% or 99% (depending on number of comparisons) coverage of the population or the prediction interval at 95% level of confidence in accordance with the procedure described by Gibbons (1991A and 1994) and summarized in the EPA guidance documents, Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Interim Final Guidance (April, 1989) and Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Addendum to Interim Final Guidance (April, 1992).

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- (c) In those cases where the background data consist of a minimum of thirteen (13) independent data values obtained from the upgradient wells, and when more than 50% of the background data values are less than the MDL and/or PQL for a given constituent (or when neither the original or the log-transformed data fit a normal distribution), then the downgradient data values shall be compared to the non-parametric prediction interval at 95% level of confidence in accordance with the procedures described by Gibbons (1990, 1991B & 1994) and summarized in the EPA guidance documents, Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Interim Final Guidance (April, 1989) and Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Addendum to Interim Final Guidance (April, 1992). Note that no adjustment for the nondetected values are needed for this case.
- (d) In those cases where 100% of the background data are "non-detects": the downgradient wells data values shall be compared to Practical Quantitation Limits (PQLs) in a non-parametric statistical manner. This only applies for those wells and constituents that have at least thirteen (13) background samples. Thirteen samples provides a 99% confidence nonparametric prediction limit with one verification resample. If less than 13 background samples are available more background data must be collected.
- (e) As an alternative to (d), perform a statistical analysis using the Poisson Prediction Limit at 95% level of confidence in accordance with the procedure described by Gibbons (1987A, 1987B & 1994) and Cox and Hinkley (1974). The Poisson Prediction limit can be computed from only 8 background measurements regardless of the detection frequency. Since the mean and variance of the Poisson distribution is the same, the Poisson Prediction limit is defined even there is no variability (e.g., even if the constituent is never detected in background). In this case, the PQLs are used in place of the measurements and the Poisson Prediction limit is computed directly.
- (f) If none of the above statistical methods are applicable, then contact Dr. Golam Mustafa at (804)-762-4197 for selection of an appropriate statistical method(s).

8. Verification Resampling Strategy:

Verification resampling is an integral part of the statistical methods presented in section 7 above. A statistically significant exceedance is not declared and should not be reported until the results of the verification resample are known. If the initial test 'triggered' in a compliance well for a constituent, then one or two independent verification resample is feasible. To go from one to two verification resample, the effect on the site-wide false positive and false negative rates must be demonstrated by the owner/operator. For two verification resample, failure is indicated only if both exceeds the limit.

The criteria for selecting the best-performing verification resampling strategy are: (1) an approximate 5% facility-wide false positive rate; and (2) power equivalent to or better than the EPA Reference Power Curve. Note that the number of background samples has an important effect on the recommended verification resampling strategy. Therefore, as the number of background samples grows, fewer resamples are needed from each potentially contaminated well to maintain adequate power. If, as is expected, the number of feasible, independent retests is limited, a facility operator may have to collect additional background measurements in order to establish an adequate retesting strategy.

9. Updating Background Samples:

Certain states have interpreted the Subtitle C & D regulations as indicating that background be confined to the first four samples collected in a day or a semi-annual monitoring event or a year.

The first approach (i.e., four samples in a day) violates the assumptions of independence and confounds day to day temporal and seasonal variability with potential contamination.

In the second example of restricting background to the first four events taken in 6 months, the measurements may be independent if groundwater flows fast enough, but seasonal variability is confounded with contamination.

In the third example in which background is restricted to the first four quarterly measurements, independence is typically not an issue and background versus point of compliance monitoring well comparisons are not confounded with season.

However, restricting the background to only four measurements dramatically increases the size of the statistical prediction limit thereby increasing the false negative rate of the test (i.e., the prediction limit is over five standard deviation units above the background mean concentration). The reason for this is that the uncertainty in the true mean concentration covers the majority of the normal distribution. As such we could obtain virtually any mean and standard deviation by chance alone. By increasing the background sample size, uncertainty in the sample based mean and standard deviation decrease as does the size of the prediction limit, therefore both false positive and false negative rates are minimized.

Due to the above reasons, the DEQ will allow the facilities to add new data to update the background concentrations, as monitoring continues, provided the new data are in control. Every year or two all new data should be pooled with the initial background samples for the upgradient wells only, and construct future prediction or tolerance limits. The statistical outlier detection procedure presented in section 5 must be applied to remove the possibility of spurious background results falsely inflating the size of the background prediction limit.

10. Intra-well Comparisons:

In some cases, significant spatial variability may exist at a facility and upgradient versus downgradient comparisons will not produce meaningful results (i.e., significant upgradient versus downgradient differences will be due to spatial variability and not a site impact). In these cases the best alternative is to perform intra-well comparisons however, it must be demonstrated that the well has not been impacted by the site. To this end, the owner/operator must test the appropriateness of intra-well comparisons by demonstrating (1) the absence of any significant trend in that well and constituent and (2) the absence of any constituents of concern (e.g., volatile organic priority pollutant list compounds or other constituents that characterize the leachate from the facility). Of course, at those facilities for which predisposal data are available, intra-well comparisons are the method of choice. Two good statistical methods for performing intra-well comparisons are (1) combined Shewart-CUSUM control chart and (2) prediction limits (see Gibbons 1994 chapter 8).

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It should be noted that when justified, intra-well comparisons are always more powerful than their inter-well counterparts because they completely eliminate the spatial component of variability. Due to the absence of spatial variability, the uncertainty in measured concentrations is decreased making intra-well comparisons more sensitive to real releases (i.e., false negatives) and false positive results due to spatial variability are completely eliminated. Combined Shewart-CUSUM control charts have the added advantage of being sensitive to both gradual and immediate releases.

11. Some Statistical Methods to be Avoided:

The statistical methods that should be avoided are:

- a. Cochran's Approximation to the Behrens Fisher (CABF) t-test.
- b. Analysis of Variance (ANOVA), both parametric and non-parametric methods.

For technical details, please refer to EPA's publication on Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities Addendum to Interim Final Guidance (April, 1992); a text book on 'Statistical Methods for Groundwater Monitoring' by Dr. Robert D. Gibbons (1994) and technical notes on 'Why ANOVA Should Be Avoided' by Dr. Golam Mustafa (1994).

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COMMONWEALTH of VIRGINIA

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Secretary of Natural Resources

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Certified Mail
Return Receipt Requested

March 9, 1998

C.A. Jake
Alliant Techsystems Inc.
Environmental Manager
Radford Army Ammunition Plant
P.O. Box 1
Radford, VA 24141-0100

RE: Radford Army Ammunition Plant (RAAP)
EPA ID# VA1210020730
Equalization Basin Closure Plan Amendment

Dear Ms. Jake:

Your letter requesting an amendment to the approved closure plan for RAAP's Equalization Basin was submitted to the Department of Environmental Quality (DEQ) on December 17, 1997. This amendment will allow RAAP to pursue closure to risk-based standards for the referenced hazardous waste management unit.

Based on the information submitted, the amendment requested is approved. An update to the closure plan's pages are attached and will need to be added to the closure plan. Please update your closure plan, as needed.

As provided in Rule 2A:2 of the Supreme Court of Virginia, you have 30 days from the date of service of this decision to initiate an appeal by filing a notice of appeal with:


Thomas L. Hopkins, Director
Virginia Department of Environmental Quality
629 East Main Street
P.O. Box 10009
Richmond, Virginia 23240-0009

An Agency of the Natural Resources Secretariat

In the event that this decision is served to you by mail, the date of service will be calculated as three days after the postmark date. Please refer to Part Two A of the Rules of the Supreme Court of Virginia, which describes the required content of the Notice of Appeal, including specifications of the Circuit Court to which the appeal is taken, and additional requirements concerning appeals from decisions of administrative agents.

If you should have any questions, concerning this matter, please contact Debra Miller, Environmental Engineer Senior, of my staff at (804) 698-4206.

Sincerely,


for Thomas L. Hopkins

Attachment

cc: Jerry Redder, Alliant Techsystems-RAAP
Robert Greaves, EPA Region III
Debra Miller, DEQ
Glenn VonGonten, DEQ
Claire Ballard, DEQ (w/out Attachment)
Aziz Farahmand, DEQ/RRO-Compliance
Melissa Porterfield, DEQ (w/out Attachment)
CENTRAL HW FILES

The plan described below was developed in accordance with sound standard statistical methods. All data obtained will be reviewed, summarized, and analyzed according to the methods described in this section. Statistical techniques used throughout the analysis will be clearly explained and will be supported by citing appropriate references. Full citations can be found in the References. The closure plan consists of the following aspects:

- * Background characterization
- * Initial random sampling of the subsoils
- * Possible excavation and repeated sampling, or initiation of risk-based closure or contingent closure
- * Repeat excavation and sampling or, initiation of risk-based closure or contingent closure
- * "Hot spot" sampling of subsoils, if random sampling indicates hot spots exist.

The initial random sampling will be conducted to determine if clean closure can be achieved and whether soil removal will be required to achieve clean closure. A "hot spot" sampling approach may be used to better delineate contaminated areas for excavation and subsequent disposal, depending on the results from the random sampling. The samples will be discrete samples. Radford Army Ammunition Plant reserves the option, at any point during the EQ Basin subsoils assessment, to abandon attempts to demonstrate clean closure and immediately implement one of the following options:

- Continue with removal activities and sampling of soil layers, as detailed above;
- Perform closure to risk-based standards as detailed in Section 3.8.5 and Appendix A of this closure plan; or
- Implement contingent closure and post-closure procedures of this plan.

The subsoils will be evaluated by collecting a minimum of seven soil borings, randomly distributed across the grid nodes. Samples will be collected at the surface (0-3 inches, 6 inches, 12 inches, 18 inches, and

3. If the background critical value (X_{cv}) is equal to or greater than the individual EQ Basin node sample value, that particular node is considered "clean" with respect to the closure parameter being evaluated. If, on the other hand, the background critical value (X_{cv}) is less than the node sample, then:
4. Based on the results from surrounding sample location nodes, hot spot area(s) within the defined areal extent of the EQ Basin will be delineated for subsequent soil removal efforts.
5. Additional subgrid sampling may be performed to further refine delineation of identified "hot spots" for soil excavation.
 - a. After excavation of the existing surface soil (0-6 inch) layer within defined hot spot(s), resampling will be performed at all established grid nodes, within the "hot spot" area(s). Samples will be analyzed for all clean closure parameters (HCOCs) for which clean closure has not been demonstrated.
 - b. Following resampling, comparison to background¹ along with additional 6-inch soil layer excavation (if required) will be performed in accordance with the protocols previously outlined.

If upon following the protocols detailed in Section 3.8 in an attempt to achieve clean closure, the basin subsoils sampling results still remain above the background values of one or more constituents, Radford Army Ammunition Plant (RAAP) will:

- Continue with removal activities and sampling of soil layers, as detailed above;
- Perform closure to risk-based standards as detailed in Section 3.8.5 and Appendix A of this closure plan; or
- Implement contingent closure and post-closure procedures of this plan.

As previously stated, the facility reserves the option, at any point during EQ Basin subsoils assessment, to abandon attempts to demonstrate clean closure to either background or risk-based standards and immediately implement contingent closure and post-closure.

¹(Optional) The background critical value described thus far will have been computed from the top layer (0-6 inches) of the background area. It may be necessary to sample background at lower intervals (6-12 inches, 12-24 inches) for comparison at lower intervals to avoid bias. The option should be implemented, if, for example, distinctly different soil types are encountered at depth, thereby necessitating re-establishment of background.

3.8.5 Risk Assessment for Closure

As discussed in Section 3.2, an alternative to the clean closure to background standards or in conjunction with clean closure to background standards for some, but not all, constituents, RAAP may demonstrate that the concentrations of hazardous constituents, which were shown to be statistically above background, do not pose an unacceptable level of risk to human health or the environment. RAAP may propose this to the DEQ following the requirements as outlined in this section and as detailed in Appendix A.

In order to estimate the risk for HCOCs, a risk assessment will be conducted according to the DEQ document titled "Guidance for development of health based cleanup goals using decision tree/REAMS program (herein after "Virginia Risk Guidance"), November 1, 1994, prepared by Old Dominion University and the approved closure plan. The risk goals/performance standards will be a hazard index of 1.0 for non-carcinogens and an individual carcinogenic risk of 1×10^{-6} and cumulative carcinogenic risk of 1×10^{-4} . This risk assessment will be conducted assuming a future residential use of the property.

The Department will review the risk assessment report to determine that it conforms to risk assessment requirements for residential risk-based protocols. If acceptable, attainment of the closure standards may then be demonstrated using the residential risk-based assessment in lieu of the clean closure to background standards established under Section 3.8.1 Background Soil Sampling and Section 3.7.6 Subsoil Investigation.

Note, if the EQ Basin cannot meet the residential risk closure standards, then RAAP may propose to modify this closure plan for industrial risk-based closure. Modification will require notification of the DEQ and the submittal of a closure amendment, in accordance with 9 VAC 20-60-580.C.

For the remaining sections of the closure plan, any discussions of "clean" closure of the EQ Basin's unsaturated subsoils, will signify either clean closure to background levels and/or closure to risk based closure standards, as described in this section.

3.9 Field Quality Control

To ensure the collection of representative samples, the following field quality control procedures will be utilized during the closure operations.

Equipment blanks will be collected after every 20th sample. If equipment blanks indicate contamination, then resampling will occur only if sample results are above cleanup levels. Samples will be analyzed for the hazardous constituents of concern identified in this document. Laboratory quality control will be according to the methods detailed in SW-846, Chapter 1, (as updated).

3.9.1 Sample Preservations and Maximum Holding Times

Soil samples usually require no preservation other than storing at 4°C until analyzed. The maximum holding times vary for different measurements. Table 3-2 provides the maximum holding times for certain inorganic and organic analyses. Although these criteria were specifically designed and tested for water samples, they are also applicable for soil sampling studies (Barth and Mason, 1984).

Appendix A

RISK-BASED CLOSURE

1. Introduction

This document discusses the protocol for conducting a risk assessment to implement closure of a hazardous waste management unit (HWMU) in accordance with the Virginia Hazardous Waste Management Regulations (VHWMR) as codified in Title 9 of the Virginia Administrative Code, Agency 20, Chapter 20 (9 VAC 20-60-10 et seq).

2. Risk-Based Evaluation

In order to estimate the risk for hazardous constituents of concern (HCOC) associated with the materials remaining in a HWMU, a risk assessment will be conducted according to the Virginia DEQ document titled "Guidance for Development of Health Based Cleanup Goals Using Decision Tree/REAMS Program (herein after "Virginia Risk Guidance") (November 1, 1994) prepared by Old Dominion University and the approved closure plan. The risk assessment report will contain the following sections:

- site evaluation,
- development of a site conceptual model,
- identification of contaminants of concern,
- identification of media and exposure pathways,
- toxicity assessment,
- estimation of contaminant concentration at the point of exposure, and
- summary of health risk.

The submission instructions contained in Appendix IX of the Virginia Risk Guidance will be reviewed prior to submitting the report to confirm that all necessary risk issues have been addressed. The risk goals associated with the closure performance standards (risk goals) will include:

- i. a hazard index of 1.0 or less for non-carcinogens;
- ii. a risk of $1\text{E-}06$ or less for individual carcinogens;
- iii. cumulative risk of $1\text{E-}04$ or less for all carcinogens; and
- iv. the concentrations of HCOC remaining in the HWMU will not result in contamination of other environmental media of concern, including the groundwater underneath the unit.

Compliance with the closure standard shall be verified by comparing the calculated individual and cumulative risk/hazard for all HCOC that failed the background statistical comparison (if such comparison is performed) to the risk goals.

The risk assessment will be conducted assuming a future residential/industrial use of the property. The methodology and equations for estimating the exposure concentration are presented in subsequent sections.

The initial step in the risk assessment will be to develop a site conceptual exposure model (SCEM) which depicts all potential exposure routes and media for the site and the receptors which may be exposed. Then HCOC for the risk assessment are identified (See Section 3 of this document).

In the next step, the exposure assumptions outlined in the Virginia Risk Guidance will be employed to estimate the risk. Information will also be taken as needed from U.S. EPA documents and databases (e.g., the Risk Assessment Guidance for Superfund (RAGS), and the Integrated Risk Information System (IRIS)). The chemical intake equations and exposure parameter assumptions

used to estimate risk (obtained from the Virginia Risk Guidance) are shown in Tables 1 through 4. Additional details on the approach and assumptions used for each potential exposure pathway are provided below.

As a part of the Risk Exposure and Analysis Modeling System (REAMS) evaluation, fate and transport modeling is conducted to demonstrate that the residual soil concentrations of contaminants of concern would not result in contamination of other environmental media of concern including the groundwater underneath the closure unit. For this purpose, representative soil sample(s) will be collected around the unit (subjected to closure) for analysis of the properties listed on page 62 of the REAMS document. In certain situations, groundwater sampling is preferable.

3. Identification of Hazardous Constituents of Concern for Risk Assessment

For the purpose of REAMS evaluation associated with a HWMU, HCOC are those closure constituents present at concentrations statistically exceeding the background levels. If the concentrations of a closure constituent did not statistically exceed the background levels, no further risk-based evaluation for such constituent is required.

4. Exposure Assessment

The exposure assessment will identify transport mechanisms for the contaminants of concern that may potentially impact human receptors. The results of this assessment will be used to document the current and potential exposure posed by the HWMU.

With regard to the soil, a residential exposure will be assumed to document unrestricted closure of the soil. If the risk for potential residential exposure does not exceed the performance standards, unrestricted closure of soil will be accepted. If the site cannot be clean closed for residential use, then the option to pursue restricted closure (commercial/industrial) will be exercised. Closure to commercial/industrial scenario will require the facility to enact a deed restriction that eliminates the possibility of future residential use of the site. The requirements

for establishing such a deed restriction are detailed in VDEQ's Guidelines for Developing Health-Based Cleanup Goals Using Risk Assessment at A Hazardous Waste Site Facility for Restricted Industrial Use, dated June 1995. (A copy of this document is attached.)

Exposure routes will include ingestion, dermal absorption, and inhalation of vapors and dust particles.

With regard to impact to the groundwater underneath the HWMU, REAMS fate and transport modeling² will be required to assess impact from residual soil contamination to the groundwater. If the groundwater does not qualify for clean closure, the scope of future groundwater monitoring will be discussed with VDEQ. The groundwater exposure routes to be evaluated include ingestion, dermal absorption, and inhalation of volatiles emitted from the contaminated groundwater.

The exposure assumptions presented in the following sections are based on residential exposure. These constitute a reasonable maximum exposure scenario (RME), an exposure which is unlikely to occur but is reasonably possible. The exposure pathways for residential exposure include ingestion of soil, dermal contact with soil, inhalation of resuspended soil particulates, and inhalation of volatile organic compounds.

4.1 Ingestion of Soil

The equation for potential chemical intake by soil ingestion on-site is included in Table

1. This scenario also assumes that weather or other conditions (e.g., frozen ground/ snow

²REAMS includes the unsaturated zone fate and transport model SESOIL. The purpose of running the model is two fold: a) determine whether the contaminants will reach the groundwater table in next 30 years. b) calculate the risk associated with the estimated concentration in the groundwater. For constituents with a promulgated MCL, the estimated concentration will be directly compared against the MCL. However, prior to running the SESOIL model the facility should obtain all the information identified on page 62, of the Virginia Risk Guidance. The closure report must include evaluation of model results (concentrations reaching the groundwater) and a copy of SESOIL output file.

/other cover) do not affect exposure and that all soil ingested is from contaminated areas of the site. These assumptions are protective of human health and the environment.

4.2 Dermal Contact with Soil

The equation for calculating the potential absorbed chemical dose by dermal contact with contaminated soil is provided in Table 1. This scenario assumes that weather or other conditions (e.g., frozen ground/ snow or other cover) do not affect exposure, that contaminated soil remains on the skin long enough for the HCOC to be absorbed and that all soil adhering to the skin is from contaminated areas of the site.

The skin surface areas (SA) used in the dermal pathway have been identified in Virginia Risk Guidance as 4,860 cm² for adults, which is the 50th percentile value for the arms, hands and lower legs (U.S. EPA, 1989b - See Attachment A).

A skin-soil adherence factor of 1.45 mg/cm² will be used in the dermal intake calculations. The U.S. EPA guidance for dermal exposure assessment (*Dermal Exposure Assessment: Principles and Applications*, EPA/600/8-91/011B) states that a range of values from 0.1 mg/cm² to 1.5 mg/cm² per event appear possible for dermal adherence factors (AF). In order to estimate the amount of a particular HCOC which may potentially be absorbed through the skin, chemical-specific dermal absorption factors (ABS_{derm}) are used.

4.3 Inhalation of Resuspended Soil

The equation for potential chemical intake by inhalation of resuspended contaminated soil is included in Table 1. An inhalation rate of 0.83 m³/hr will be used as specified in the Virginia Risk Guidance. This scenario assumes that the concentration of HCOC in indoor dust will be equal to that in outdoor soil and that weather or other conditions, (e.g., frozen ground/snow or other cover) do not affect resuspension or exposure.

However, an appropriate model or equations in Table 1 will be used to estimate the potential amount of respirable particulate matter generated by wind erosion. The estimated generation rate for eroded particulate matter will then be used to derive an ambient air particulate concentration. Justification for and documentation of the model(s) used will be submitted to the Department as part of the risk assessment.

4.4 Inhalation of Volatilized HCOC in Soil

Since the HCOC have appreciable vapor pressures, they are expected to volatilize from soil. Inhalation of HCOC as volatilized vapors is considered for this risk assessment. The equations in Table 1 will be considered for estimating the intake for this condition.

5. Toxicity Assessment

The two principle indices of toxicity used in risk assessment are the reference dose (RfD) and the cancer slope factor (SF). An RfD is the intake or dose per unit of body weight (mg/kg-day) that is unlikely to result in toxic (non-carcinogenic) effects to human populations, including sensitive subgroups (e.g., the very young or elderly). The RfD allows for the existence of a threshold dose below which no adverse effects occur.

The SF is used to express the cancer risk attributable to a discrete unit of intake; that is, the cancer risk per milligram ingested per kilogram of bodyweight per day ($[\text{mg/kg-day}]^{-1}$). The SF is an estimate of the upper-bound probability of an individual developing cancer as a result of exposure to a particular carcinogen. Unlike the RfD, the SF assumes that there is no threshold dose below which the probability of developing cancer is zero. Note that SFs are only developed for those chemicals which have been shown to be carcinogens in man or in at least several animal species. A carcinogenic weight of evidence rating is used to describe the strength of the experimental evidence for carcinogenicity. The U.S. EPA has developed SFs for most chemicals

with weight of evidence ratings of "A" (known human carcinogen) or "B" (probable human carcinogen).

RfDs and SFs are derived by the U.S. EPA for the most toxic chemicals generally associated with chemical releases to the environment for which adequate toxicological data are available. If both the carcinogenic and non-carcinogenic effects of a particular compound are significant, both values may be established. However, in most cases only one value is available.

5.1 Inhalation and oral RfDs and SFs

RfDs and SFs pertinent to the oral and inhalation exposure pathways will be obtained from U.S. EPA's IRIS database. The IRIS (Integrated Risk Information System) on-line database was established by the U.S. EPA to provide risk assessors with peer reviewed toxicological data on chemicals commonly encountered at environmental sites of contamination. If data is not available from IRIS, it will be obtained from the Health Effects Assessment Summary Tables (HEAST), a compilation of toxicity values produced by the USEPA on a quarterly basis. The hierarchy presented in Appendix III of Virginia Risk Guidance will be followed for using these sources.

5.2 Dermal RfDs and SFs

Chemical specific oral-route absorption values (ABS_{oral}) are used to adjust the oral RfD or SF, which is computed from an administered dose, for use in the dermal exposure pathway. This correction is necessary due to the differences in absorption between the skin and the gastrointestinal tract. By correcting the administered-dose oral RfD or SF for the fraction expected to be absorbed in the gut, a dermal absorption factor can be used to estimate the correct dose received through the skin.

6. Evaluation of Risk

Using the toxicity criteria and identified exposure pathways discussed above, and the procedures described in the Virginia Risk Guidance, the risk presented by the HCOC will be estimated. The estimated risk will consider the effects from multiple constituents and all routes of exposure. The risk goals will be a total cumulative hazard index of 1.0 for multiple noncarcinogens and a total cumulative carcinogenic risk of $1\text{E-}04$ for multiple carcinogens. However, the risk from each individual carcinogen shall not exceed $1\text{E-}06$ (i.e., one case of cancer per 1,000,000 population).

6.1 Estimation of exposure concentration

For the contaminants detected at the site, an exposure point concentration (EPC) for each exposure pathway will be calculated for each contaminant by estimating the 95th upper confidence limit (UCL) on the arithmetic mean of the concentrations. If the calculated 95th UCL is greater than the maximum detected concentration, then the maximum detected concentration will be used as the EPC. The risk for contaminants will be calculated as per the equations and assumptions described in Tables 1 through 4. If for a contaminant both carcinogenic and noncarcinogenic risk-based cleanup goal exists, the lower of the two will be used as a pathway specific to estimate the risk.

6.2. Risk Estimation

Health risk assessments are based on the relationship involving intake, contaminant concentration, risk, and toxicity. Chronic daily intake (CDI), a product of intake and contaminant concentration, are estimated using the exposure equations and assumptions associated with each route of exposure. CDIs are then combined with the RfDs or SFs to determine the resulting risk. For carcinogen(s), cumulative potential risk (RISK_c) can be calculated as follows:

$$\text{RISK}_c = \text{CDI}_{\text{ingestion}} * \text{SF}_{\text{ingestion}} + \text{CDI}_{\text{dermal}} * \text{SF}_{\text{dermal}} + \text{CDI}_{\text{inhalation-VOCs}} * \text{SF}_{\text{inhalation-VOCs}} \\ + \text{CDI}_{\text{inhalation-particles}} * \text{SF}_{\text{inhalation-particles}}$$

For noncarcinogen(s), cumulative hazard index (HI_c) can be calculated as follows:

$$\text{HI}_c = \text{CDI}_{\text{ingestion}} / \text{RfD}_{\text{ingestion}} + \text{CDI}_{\text{dermal}} / \text{RfD}_{\text{dermal}} + \text{CDI}_{\text{inhalation-VOCs}} / \text{RfD}_{\text{inhalation-VOCs}} \\ + \text{CDI}_{\text{inhalation-particles}} / \text{RfD}_{\text{inhalation-particles}}$$

where, taking into account all HCOC and relevant exposure pathways, the excess cancer risk is 10^{-6} or the hazard index is 1.0.

Table 1
Risk Assessment Algorithm for Carcinogenic Exposure

<u>Exposure Route</u>	<u>Chronic Daily Intake (CDI), mg/L-day</u>	
	<u>Residential Exposure</u>	<u>Occupational/Industrial Exposure</u>
Ground Water		
Ingestion	$\frac{CW \times IRW_{adj} \times EF}{AT_c}$	$\frac{CW \times IRW_a \times EF_o \times ED_o}{BW_a \times AT_c}$
Inhalation	$\frac{CW \times IRA_{adj} \times EF \times K}{AT_c}$	$\frac{CW \times IRA_a \times EF_o \times ED_o \times K}{BW_a \times AT_c}$
Dermal	$\frac{CW \times SAW_{adj} \times PC \times ET \times EF \times CF}{AT_c}$	$\frac{CW \times SAW_a \times PC \times ET \times EF_o \times ED_o \times CF}{BW_a \times AT_c}$
Soil		
Ingestion	$\frac{CS \times IRS_{adj} \times CF \times FI \times EF}{AT_c}$	$\frac{CS \times IR \times CF \times FI \times EF_o \times ED_o}{BW_a \times AT_c}$
Dermal	$\frac{CS \times CF \times SAS_{adj} \times AF \times ABS \times EF}{AT_c}$	$\frac{CS \times CF \times SAS_a \times AF \times ABS \times EF_o \times ED_o}{BW_a \times AT_c}$

Inhalation of vaporizing VOCs from soil	$\frac{VF \times IRA_{adj} \times ET \times EF}{AT_c}$	$\frac{VF \times IRA_s \times ET \times EF_o \times ED_o}{BW_s \times AT_c}$
Inhalation of emitting particles from soil	$\frac{PEF \times IRA_{adj} \times ET \times EF}{AT_c}$	$\frac{PEF \times IRA_s \times ET \times EF_o \times ED_o}{BW_s \times AT_c}$

Table 2
Risk Assessment Algorithm for Non-carcinogenic Exposure

<u>Exposure Route</u>	<u>Chronic Daily Intake (CDI), mg/L-day</u>	
	<u>Residential Exposure</u>	<u>Occupational/Industrial Exposure</u>
Ground Water		
Ingestion	$\frac{CW \times IRW_c \times EF \times ED_c}{BW_c \times AT_n}$	$\frac{CW \times IRW_o \times EF_o \times ED_o}{BW_o \times AT_n}$
Inhalation	$\frac{CW \times IRA_c \times EF \times ED_c \times K}{BW_c \times AT_n}$	$\frac{CW \times IRA_o \times EF_o \times ED_o \times K}{BW_o \times AT_n}$
Dermal	$\frac{CW \times SAW_c \times PC \times ET \times EF \times ED_c \times CF}{BW_c \times AT_n}$	$\frac{CW \times SAW_o \times PC \times ET \times EF_o \times ED_o \times CF}{BW_o \times AT_n}$
Soil		
Ingestion	$\frac{CS \times IRS_c \times CF \times FI \times EF \times ED_c}{BW_c \times AT_n}$	$\frac{CS \times IRS_o \times CF \times FI \times EF_o \times ED_o}{BW_o \times AT_n}$
Dermal	$\frac{CS \times CF \times SA_c \times AF \times ABS \times EF \times ED_c}{BW_c \times AT_n}$	$\frac{CS \times CF \times SA_o \times AF \times ABS \times EF_o \times ED_o}{BW_o \times AT_n}$

Inhalation of vaporizing VOCs from soil	$\frac{VF \times IRA_c \times ET \times EF \times ED_c}{BW_c \times AT_n}$	$\frac{VF \times IRA_a \times ET \times EF_o \times ED_o}{BW_a \times AT_n}$
Inhalation of emitting particles from soil	$\frac{PEF \times IRA_c \times ET \times EF \times ED_c}{BW_c \times AT_n}$	$\frac{PEF \times IRA_a \times ET \times EF_o \times ED_o}{BW_a \times AT_n}$

Note: Occupational noncarcinogenic risk assessment is based on adult exposure

Table 3
Age Adjusted Factors

$$IRA_{adj} = \frac{ED_c \times IRA_c}{BW_c} + \frac{(ED_{tot} - ED_c) \times IRA_a}{BW_a}$$

$$IRW_{adj} = \frac{ED_c \times IRW_c}{BW_c} + \frac{(ED_{tot} - ED_c) \times IRW_a}{BW_a}$$

$$SAW_{adj} = \frac{ED_c \times SAW_c}{BW_c} + \frac{(ED_{tot} - ED_c) \times SAW_a}{BW_a}$$

$$IRS_{adj} = \frac{ED_c \times IRS_c}{BW_c} + \frac{(ED_{tot} - ED_c) \times IRS_a}{BW_a}$$

$$SAS_{adj} = \frac{ED_c \times Sa_c}{BW_c} + \frac{(ED_{tot} - ED_c) \times Sa_a}{BW_a}$$

Note regarding age adjusted factor:

Because contact rate with tap water, ambient air, and residential soil are different for children and adults, carcinogenic risk during the first 30 years of life were calculated using age adjusted factor. These factors approximate the integrated exposure from birth until age 30 by combining contact rates, body weights, and exposure durations for two age groups - small children and adults.

Table 4
Exposure Variables Included in Tables 1, 2, and 3

Symbol	Term	Unit	Value	Reference
ABS	Absorption factor	-	User specified	
AF	Adherence factor	-	1.45	a, c
AT _c	Averaging time carcinogens	days	25550	
AT _n	Averaging time non-carcinogens	days	ED x 365	
BW _a	Body weight adult	kg	70	c
BW _c	Body weight child	kg	15	c
CF	Conversion factor	-	0.000001	-
CS	Chemical concentration in soil	mg/Kg-day	User specified	
CW	Chemical concentration in water	mg/L	User specified	
ED _c	Exposure duration child	years	6	c
ED _{total} ED	Exposure duration for carcinogen total or Residential	years	30	c
ED _o	Exposure duration occupational	years	25	c
EF	Exposure frequency residential	days	350	c
ET	Exposure Time General/Occupational Groundwater Surface Water - ingestion Surface water - dermal Air -inhalation	hrs/day	8.0 0.2 2.6 2.6 24.0	c, d
FI	Fraction ingested Residential Occupational	-	1.0 0.5	b
IRA _a	Inhalation rate air adult	m ³ /day	20	b

IRA _{adj}	Inhalation rate - air adjusted	-	11.66	
IRA _c	Inhalation rate child	m ³ /day	12	b
IRA _a	Inhalation rate adult	m ³ /day	20	b
IR	Ingestion rate food Fruit/veggies Fish	kg/day	0.28 0.122 0.054	c,d
IRS _a	Ingestion rate soil adult	mg/day	100	b
IRS _c	Ingestion rate soil child	mg/day	200	b
IRS _{adj}	Ingestion - soil adjusted	-	114.29	
IRS _c	Ingestion rate soil child	mg/day	200	b
IRW _a	Ingestion rate water adult	L/day	2	b
IRW _{adj}	Ingestion -water adjusted	L-y/kg-d	1.09	
IRW _c	Ingestion rate water child	L/day	1	b
K	Volatilization factor, water to air	-	0.5	
PC	Permeability constant	cm/hr	User specified	b
PEF	Particulate emission factor	kg/m ³ <i>use inverse to get m³/kg = 1,472,727 m³-1</i>	6.789926E08	f
SAW _c	Surface area child groundwater dermal surface water dermal	cm ²	7500	b,e
SAS _a SAS _c	Surface area soil occupational - adult child	cm ² /event	4500 1875	e
SAS _{adj}	Surface area soil adjusted	cm ² /event	2290	
SAW _a	Surface area for water contact adult	cm ²	820	b
SAW _{adj}	Surface area for water contact	cm ² /event	9200	
VF	Volatilization factor, soil to air	kg/m ³	User specified	-

References:

- a. Risk Assessment Guidance for Superfund, Volume I, EPA/540/1-89/002, December 1989.
- b. Region III values
- c. Exposure Factors handbook, EPA/600/8-89/043, July 1989
- d. Human health evaluation manual supplemental guidance, OSWER Directive 9285.6-03, March 25, 1991.
- e. Dermal exposure Assessment, Principles and Applications, Interim Report, EPA/600/8-91/011b, January 1992.
- f. Technical Background Document for Draft Soil Screening Level Guidance, Office of Solid Waste and Emergency Response, EPA/540/R-94/101, December 1994.

Attachment 2
Landfill Disposal Report

Permitted Landfill
No. 581

COUNTRY SOUTH, LLC

7390 Merriman Road, S.W.
Roanoke, Virginia 24018
Phone (540) 772-0010
Mailing Address — P.O. Box 4132
Roanoke, Virginia 24015

Nº 4503

MATERIAL DUMPED

- ☐ Stumps, Brush, Yard Waste
☐ Soils, Fill Dirt
☒ Concrete, Asphalt, Rock

OTHER

☐ Total Loads: 1
☐ Total Price: 66.00
County: _____

Customer Signature M. F. Davis

TRUCK PRICE

- ☐ Pick-up or Small Trailer \$ 7.50
☐ Single Axle — 1 Ton \$ 25.00
☐ Single Axle — 2 Ton \$ 50.00
☐ Tandem Axle \$ 75.00
☐ Trailer up to 24 ft. \$ 135.00
☐ Trailer up to 30 ft. \$ 150.00
☐ Trailer 30 ft. & up \$ 155.00
☐ Other \$ _____

Date: 3/12/98

Truck No.: 161434

Customer: Cimarrillo Svs. Co.

Address: 170 Cooper Ave.

Tomball, N.Y.

Phone: 718/1151

P.O.: _____

Job #: E. Sullivan

C.O.D. ☐ Open Check # _____

Charge ☒ Other ☐

Permitted Landfill
No. 581

COUNTRY SOUTH, LLC

7390 Merriman Road, S.W.
Roanoke, Virginia 24018
Phone (540) 772-0010

Mailing Address — P.O. Box 4132
Roanoke, Virginia 24015

Nº 4492

MATERIAL DUMPED

- ☐ Stumps, Brush, Yard Waste
☐ Soils, Fill Dirt
☐ Concrete, Asphalt, Rock

OTHER

☐ Total Loads: 1
☐ Total Price: 66.00
County: _____

Customer Signature M. F. Davis

TRUCK PRICE

- ☐ Pick-up or Small Trailer \$ 7.50
☐ Single Axle — 1 Ton \$ 25.00
☐ Single Axle — 2 Ton \$ 50.00
☐ Tandem Axle \$ 75.00
☐ Trailer up to 24 ft. \$ 135.00
☐ Trailer up to 30 ft. \$ 150.00
☐ Trailer 30 ft. & up \$ 155.00
☐ Other \$ _____

Date: 3/12/98

Truck No.: 161434

Customer: Cimarrillo Svs. Co.

Address: 170 Cooper Ave.

Tomball, N.Y.

Phone: 718/1151

P.O.: _____

Job #: E. Sullivan

C.O.D. ☐ Open Check # _____

Charge ☐ Other ☐

Permitted Landfill
No. 581

COUNTRY SOUTH, LLC

7390 Merriman Road, S.W.
Roanoke, Virginia 24018
Phone (540) 772-0010

Mailing Address — P.O. Box 4132
Roanoke, Virginia 24015

Nº 4490

MATERIAL DUMPED

- ☒ Stumps, Brush, Yard Waste
☐ Soils, Fill Dirt
☐ Concrete, Asphalt, Rock

OTHER

☐ Total Loads: 1
☐ Total Price: 66.00
County: _____

TRUCK PRICE

- ☐ Pick-up or Small Trailer \$ 7.50
☐ Single Axle — 1 Ton \$ 25.00
☐ Single Axle — 2 Ton \$ 50.00
☐ Tandem Axle \$ 75.00
☐ Trailer up to 24 ft. \$ 135.00
☐ Trailer up to 30 ft. \$ 150.00
☐ Trailer 30 ft. & up \$ 155.00
☐ Other \$ _____

Date: 3/12/98

Truck No.: 161434

Customer: Cimarrillo Svs. Co.

Address: 170 Cooper Ave.

Tomball, N.Y.

Phone: _____

P.O.: _____

Job #: E. Sullivan

C.O.D. ☐ Open Check # _____

Charge ☐ Other ☐

Attachment 4
Daily Reports

QUALITY ASSURANCE REPORT

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

132

Tuesday

12 May 1998

Concur with the contractor's report for this period?

☒ Yes ☐ No*

Was any QC testing/inspection observed or were any specific QA
evaluations or verifications performed?

☒ No ☐ Yes*

Were any instructions given to or information received from the Contractor?

☒ No ☐ Yes*

Did anything develop on the work which might lead to a change order
or contract claim?

☒ No ☐ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.


MARK A. BISHOP

15 May 98
DATE


SUPV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

CONTRACTORS NAME: Ciminelli Services Corp.

Date 5-12-78 Report No. 127-133 Contract No. DAC(A)
65-98-C-0015 Project Name and Location of work:For Basin ClosureWeather: [Clear] [~~P. Cloudy~~] [Cloudy] [Rain: _____ inches]
[Temp. _____ min. 70 max.] Other Weather Conditions

1. Contractor (C) or Sub-contractor (S), and Area of Responsibility:

a. () Ciminelli - demo and extra work b. ()
() c.
()
d. () e. ()
()

2. Equipment Data. (Indicate items of construction equipment, other than hand tools, at the job site and whether or not used):

NO equip

3. Work Performed Today (Indicate identity of Contractor and Sub-contractors, location, and description of work:

Ciminelli - complete grading of extra work begin
demo
Note NO work done due to weather days 127-132

4. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken):

a. Preparatory

Phase: N/A

b. Initial

Phase: N/A

c. Follow-up

Phase: N/A

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

N/A

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

Permission was given by Mark Bishop to begin demobilization

7. Job Safety (Include deficiencies and corrective action taken:

N/A deficiencies

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

no equip

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

N/A

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

N/A

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED



CONTRACTOR'S QC SYSTEM MANAGER

DATE 5-12-98

[illegible]

QUALITY ASSURANCE REPORT

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

124

Monday

04 May 1997

Concur with the contractor's report for this period?

☒ Yes ☐ No*

Was any QC testing/inspection observed or were any specific QA
evaluations or verifications performed?

☒ No ☐ Yes*

Were any instructions given to or information received from the Contractor?

☒ No ☐ Yes*

Did anything develop on the work which might lead to a change order
or contract claim?

☒ No ☐ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

No work 02 and 03 May due to rain.

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.


MARK A. BISHOP

05 May 98
DATE


SUPV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

CONTRACTORS NAME: Ciminelli Services Corp.

Date 5-4-98 Report No. 124-126 Contract No. DAC(A)
65-98-C-0015 Project Name and Location of work:

FR Basin Closure

Weather: [Clear] [P. Cloudy] [~~Cloudy~~] [Rain: 0.5 inches]
[Temp. 60 min. 60 max.] Other Weather Conditions

1. Contractor (C) or Sub-contractor (S), and Area of Responsibility:

a. ()

b. ()
c. ()
d. () Ciminelli - Remove Silt Fence & Const. Barrier

e. ()

2. Equipment Data. (Indicate items of construction equipment, other than hand tools, at the job site and whether or not used):

N/A

3. Work Performed Today (Indicate identity of Contractor and Sub-contractors, location, and description of work:

Ciminelli - remove Silt Fence & Const. Barrier

4. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken):

a. Preparatory
Phase:

N/A

b. Initial
Phase:

N/A

c. Follow-up
Phase:

N/A

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

N/A

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

Mack Bishop - for drainage problem in NW corner

7. Job Safety (Include deficiencies and corrective action taken:

NO DEFICIENCIES

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

N/A

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

N/A

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

N/A

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED



CONTRACTOR'S QC SYSTEM MANAGER

DATE 5-4-98

[illegible]

QUALITY ASSURANCE REPORT

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

121

Friday

01 May 1998

Concur with the contractor's report for this period?

☒ Yes ☐ No*

Was any QC testing/inspection observed or were any specific QA
evaluations or verifications performed?

☒ No ☐ Yes*

Were any instructions given to or information received from the Contractor?

☒ No ☐ Yes*

Did anything develop on the work which might lead to a change order
or contract claim?

☒ No ☐ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.


MARK A. BISHOP

05 May 98
DATE


SUPV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

CONTRACTORS NAME: Ciminelli Services Corp.

Date 5-1-98 Report No. 123 Contract No. DAC(A)
65-98-C-0015 Project Name and Location of work:EO Basin ClosureWeather: [Clear] [P.Cloudy] [Cloudy] [Rain: .75 inches]
[Temp. min. 50 max.] Other Weather Conditions

1. Contractor (C) or Sub-contractor (S), and Area of Responsibility:

a. () Ciminelli - drain pipe installation ~~extra~~ b. ()
() c. ()
d. () e. ()

2. Equipment Data. (Indicate items of construction equipment, other than hand tools, at the job site and whether or not used):

Backhoe - used

3. Work Performed Today (Indicate identity of Contractor and Sub-contractors, location, and description of work:

Ciminelli - install 150' drain pipe with end wall

4. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken):

a. Preparatory
Phase: N/Ab. Initial
Phase: N/Ac. Follow-up
Phase: N/A

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

N/A

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

N/A

7. Job Safety (Include deficiencies and corrective action taken:

NO DEFICIENCIES

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

Ditchhoe - used

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

drain pipe and endwall - in spec

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

N/A

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED

B. G. Smith

CONTRACTOR'S QC SYSTEM MANAGER

DATE 5-1-98

[illegible]

QUALITY ASSURANCE REPORT

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

120

Thursday

30 April 1998

Concur with the contractor's report for this period?

☒ Yes ☐ No*

Was any QC testing/inspection observed or were any specific QA
evaluations or verifications performed?

☒ No ☐ Yes*

Were any instructions given to or information received from the Contractor?

☒ No ☐ Yes*

Did anything develop on the work which might lead to a change order
or contract claim?

☒ No ☐ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.


MARK A. BISHOP

08 May 98
DATE


SUPV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

CONTRACTORS NAME: Ciminelli Services Corp.

Date 4/30 Report No. 122 Contract No. DAC(A)
65-98-C-0015 Project Name and Location of work:FR Basin ClosureWeather: [Clear] [P. Cloudy] [Cloudy] [Rain: inches]
[Temp. min. 70 max.] Other Weather Conditions

1. Contractor (C) or Sub-contractor (S), and Area of Responsibility:

a. ()

b. ()
Ciminelli - Supervision ~~finishes~~ fine gradingc. ()
finishes fence - fencingd. ()
Current elect - grounding

e. ()

2. Equipment Data. (Indicate items of construction equipment, other than hand tools, at the job site and whether or not used):

N/A

3. Work Performed Today (Indicate identity of Contractor and Sub-contractors, location, and description of work:

Ciminelli - fine gradingfinishes - fence plansCurrent - grounding fence + electrical fence walkthrough

4. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken):

a. Preparatory

Phase: N/A

b. Initial

Phase: N/A

c. Follow-up

Phase: N/A

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

N/A

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

N/A

7. Job Safety (Include deficiencies and corrective action taken:

NO deficiencies

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

N/A

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

N/A

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

N/A

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED



CONTRACTOR'S QC SYSTEM MANAGER

DATE 4-30-98

LABOR CLASSIFICATION	PRIME		Powers Line		Current Elect.						EQUIPMENT DESCRIPTION	NO. HOURS	
	#	HRS	#	HRS	#	HRS	#	HRS	#	HRS		USED	IDLE
QC Mgr	1	10											
Superintendent	1	10											
Laborer	1	10											
Foreman			1	3									
Laborer			2	3									
Electrician					2	4							
Apprentice					1	4							
TOTALS													
NO. OF EMPLOYEES (SUBTOTALS)	3		3		3							9	
NO. OF HOURS (SUBTOTALS)		30		9		12						51	
PREVIOUS TOTAL HOURS											3395.5		
TOTAL HOURS THROUGH THIS DATE											3446.5		

QUALITY ASSURANCE REPORT

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

119

Wednesday

29 April 1998

Concur with the contractor's report for this period?

☒ Yes ☐ No*

Was any QC testing/inspection observed or were any specific QA
evaluations or verifications performed?

☒ No ☐ Yes*

Were any instructions given to or information received from the Contractor?

☒ No ☐ Yes*

Did anything develop on the work which might lead to a change order
or contract claim?

☒ No ☐ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.


MARK A. BISHOP

08 May 98
DATE


SUPV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

CONTRACTORS NAME: Ciminelli Services Corp.

Date 4-29-98 Report No. 121 Contract No. DAC(A)
65-98-C-0015 Project Name and Location of work:

Weather: [Clear] [~~P~~Cloudy] [Cloudy] [Rain: _____ inches]
[Temp. _____ min. 70 max.] Other Weather Conditions

1. Contractor (C) or Sub-contractor (S), and Area of Responsibility:

a. ()
b. ()
c. ()
d. ()
e. ()

Ciminelli - Fine grading

2. Equipment Data. (Indicate items of construction equipment, other than hand tools, at the job site and whether or not used):

N/A

3. Work Performed Today (Indicate identity of Contractor and Sub-contractors, location, and description of work):

Fine grading

4. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken):

a. Preparatory

Phase: N/A

b. Initial

Phase: N/A

c. Follow-up

Phase: N/A

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

N/A

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

N/A

7. Job Safety (Include deficiencies and corrective action taken:

No deficiencies

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

N/A

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

N/A

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

N/A

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED

BGS/He

CONTRACTOR'S QC SYSTEM MANAGER

DATE 4-29-98

[illegible]

QUALITY ASSURANCE REPORT

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

118

Tuesday

28 April 1998

Concur with the contractor's report for this period?

☒ Yes ☐ No*

Was any QC testing/inspection observed or were any specific QA
evaluations or verifications performed?

☒ No ☐ Yes*

Were any instructions given to or information received from the Contractor?

☒ No ☐ Yes*

Did anything develop on the work which might lead to a change order
or contract claim?

☒ No ☐ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.


MARK A. BISHOP

08 May 98
DATE


SUPV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

CONTRACTORS NAME: Ciminelli Services Corp.

Date 4-28-98 Report No. 120 Contract No. DAC(A)
65-98-C-0015 Project Name and Location of work:EQ Basin ClosureWeather: [~~Clear~~] [P.Cloudy] [Cloudy] [Rain: inches]
[Temp. min. 72 max.] Other Weather Conditions

1. Contractor (C) or Sub-contractor (S), and Area of Responsibility:

a. ()

Ciminelli - fine grading b. ()

() c.

d. ()

e. ()

2. Equipment Data. (Indicate items of construction equipment, other than hand tools, at the job site and whether or not used):

Tractor - used

3. Work Performed Today (Indicate identity of Contractor and Sub-contractors, location, and description of work:

Ciminelli - fine grading, lime placement

4. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken):

a. Preparatory

Phase: N/A

b. Initial

Phase: N/A

c. Follow-up

Phase: N/A

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

N/A

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

N/A

7. Job Safety (Include deficiencies and corrective action taken:

NO DEFICIENCIES

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

Tractor - used

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

N/A

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

N/A

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED

BSE

CONTRACTOR'S QC SYSTEM MANAGER

CONSTRUCTION MANPOWER AND EQUIPMENT REPORT

CONTRACT NO. DACA65-98-C-0015

DATE 4-28-78

[illegible]

QUALITY ASSURANCE REPORT

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

117

Monday

27 April 1997

Concur with the contractor's report for this period?

☒ Yes ☐ No*

Was any QC testing/inspection observed or were any specific QA
evaluations or verifications performed?

☒ No ☐ Yes*

Were any instructions given to or information received from the Contractor?

☒ No ☐ Yes*

Did anything develop on the work which might lead to a change order
or contract claim?

☒ No ☐ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

No work 22 or 23 April due to rain.

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.


MARK A. BISHOP

01 May 98
DATE


SUPV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

CONTRACTORS NAME: Ciminelli Services Corp.

Date 4-27-98 Report No. 119 Contract No. DAC(A)
65-98-C-0015 Project Name and Location of work:EQ Basin ClosureWeather: [Clear] [P.Cloudy] [☒ Cloudy] [Rain: _____ inches]
[Temp. _____ min. 48 max.] Other Weather Conditions

1. Contractor (C) or Sub-contractor (S), and Area of Responsibility:

- a. () Ciminelli - Project oversight b. ()
c. ()
d. () Powers Fence - begin fence installation
e. ()

2. Equipment Data. (Indicate items of construction equipment, other than hand tools, at the job site and whether or not used):

No equip on site

3. Work Performed Today (Indicate identity of Contractor and Sub-contractors, location, and description of work):

Powers Fence - Fence poles set

4. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken):

a. Preparatory

Phase: meeting conducted for fence installation

b. Initial

Phase: N/A

c. Follow-up

Phase: N/A

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

N/A

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

N/A

7. Job Safety (Include deficiencies and corrective action taken:

no deficiencies

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

NO equip on site

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

Fence poles - in spec

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

N/A

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED

T. B. Smith

CONTRACTOR'S QC SYSTEM MANAGER

DATE 4-27-98

[illegible]

QUALITY ASSURANCE REPORT

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

111

Tuesday

21 April 1998

Concur with the contractor's report for this period?

☒ Yes ☐ No*

Was any QC testing/inspection observed or were any specific QA
evaluations or verifications performed?

☒ No ☐ Yes*

Were any instructions given to or information received from the Contractor?

☒ No ☐ Yes*

Did anything develop on the work which might lead to a change order
or contract claim?

☒ No ☐ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

Attended preparatory inspection for fencing. See details in CAC report

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.


MARK A. BISHOP

24 Apr 98
DATE


SUPV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

CONTRACTORS NAME: Ciminelli Services Corp.

Date 4-21-98 Report No. 113 Contract No. DAC(A)
65-98-C-0015 Project Name and Location of work:EQ Basin ClosureWeather: [Clear] [☒ Cloudy] [Cloudy] [Rain: inches]
[Temp. min. 70 max.] Other Weather Conditions

1. Contractor (C) or Sub-contractor (S), and Area of Responsibility:

- a. () Ciminelli - paper & prep work b. ()
() c.
d. ()
e. ()

2. Equipment Data. (Indicate items of construction equipment, other than hand tools, at the job site and whether or not used):

Roller - used
Roller used

3. Work Performed Today (Indicate identity of Contractor and Sub-contractors, location, and description of work):

Ciminelli - paper and prep work

4. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken):

a. Preparatory

Phase: N/A

b. Initial

Phase: N/A

c. Follow-up

Phase: N/A

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

N/A

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

Mark Bishop discussed grading the road

7. Job Safety (Include deficiencies and corrective action taken:

NO deficiencies

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

Roller used

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

N/A

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

N/A

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED

BG 

CONTRACTOR'S QC SYSTEM MANAGER

CONSTRUCTION MANPOWER AND EQUIPMENT REPORT

CONTRACT NO. DACA65-98-C-0015

DATE 4-21-98

[illegible]

PREPARATORY PHASE CHECKLIST

CONTRACTOR'S NAME Ciminelli Services Corp.

Contract No.: DACA65-98-C-0015

Date Preparatory Held: 4-27

Title: EQ Basin Closure

Spec Section: 02831

Drawing No(s): C-4

Definable Feature of Work: Installation of Fence

A. PERSONNEL PRESENT:

Name	Position	Company
1. Brandon Schleimer	QC mgr	Ciminelli
2. Mark Bishop	Engineer	ALOE
3. "Chuck" Sweet	Foreman	Towers Fence
4.		
5.		
6.		
7.		
8.		

(List additional personnel on reverse side)

B. DRAWINGS AND SPECS:

- I. Has each spec paragraph, contract drawing, and shop drawing been studied? YES ☒ NO ☐
- II. Do all parties have up-to-date drawings and specifications? YES ☒ NO ☐

C. SHOP DRAWINGS INVOLVED:

Transmittal/Item	Code	Contractor or Gov't Approval
1.		
2.		
3.		
4.		

G. EQUIPMENT Requiring Operational Check:

1. _____
2. _____
3. _____
4. _____

H. WORKMANSHIP: Have procedures for accomplishing work been reviewed with appropriate people? YES ☒ NO _____

I. PREVIOUS WORK: Has all preliminary work been accomplished in accordance with contract requirements and is this feature of work ready to start? YES ☒ NO _____

Explain any problems: _____

J. HI-LIGHTING SPECIFIC ITEMS: Hi-light specific items noted during the Preparatory Phase inspection. ie, (Med. Voltage cable shall be hi-pot tested).

K. OTHER COMMENTS: _____



Quality Control Representative
Signature

ACTIVITY HAZARD ANALYSIS

[illegible]

QUALITY ASSURANCE REPORT

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

110

Monday

20 April 1997

Concur with the contractor's report for this period?

☒ Yes ☐ No*

Was any QC testing/inspection observed or were any specific QA
evaluations or verifications performed?

☒ No ☐ Yes*

Were any instructions given to or information received from the Contractor?

☒ No ☐ Yes*

Did anything develop on the work which might lead to a change order
or contract claim?

☒ No ☐ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.


MARK A. BISHOP

24 Apr 98
DATE


SUPV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

CONTRACTORS NAME: Ciminelli Services Corp.

Date 4-26-98 Report No. 111-112 Contract No. DAC(A)
65-98-C-0015 Project Name and Location of work:EQ Basin ClosureWeather: [~~C~~lar] [P.Cloudy] [Cloudy] [Rain: _____ inches]
[Temp. _____ min. 75 max.] Other Weather Conditions

1. Contractor (C) or Sub-contractor (S), and Area of Responsibility:

- a. () Ciminelli - install road b. ()
) _____ c.
() _____
d. () _____ e. ()
) _____

2. Equipment Data. (Indicate items of construction equipment, other than hand tools, at the job site and whether or not used):

Digger - used
Poller - not used

3. Work Performed Today (Indicate identity of Contractor and Sub-contractors, location, and description of work:

Ciminelli - install road

4. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken):

a. Preparatory

Phase: N/A

b. Initial

Phase: N/A

c. Follow-up

Phase: N/A

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

N/A

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

N/A

7. Job Safety (Include deficiencies and corrective action taken:

No deficiencies

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

See equipment & manpower report

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

N/A

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

N/A

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED



CONTRACTOR'S QC SYSTEM MANAGER

CONSTRUCTION MANPOWER AND EQUIPMENT REPORT

CONTRACT NO. DACA65-98-C-0015

DATE 4-20-98

[illegible]

DAILY CONSTRUCTION QUALITY CONTROL REPORT

CONTRACTORS NAME: Ciminelli Services Corp.

Date 4-18-98 Report No. 109110 Contract No. DAC(A)
65-98-C-0015 Project Name and Location of work:Weather: [Clear] [P. Cloudy] [~~Cloudy~~] [Rain: 5 inches]
[Temp. 55 min. 55 max.] Other Weather Conditions

1. Contractor (C) or Sub-contractor (S), and Area of Responsibility:

a. ()

)

()

d. ()

)

Ciminelli - place topsoil
Hodge - hauling

b. (

c.

e. (

2. Equipment Data. (Indicate items of construction equipment, other than hand tools, at the job site and whether or not used):

Roller - used
Roller not used

3. Work Performed Today (Indicate identity of Contractor and Sub-contractors, location, and description of work:

Ciminelli - place topsoil
Hodge - Hauling

4. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken):

a. Preparatory

Phase: N/A

b. Initial

Phase: N/A

c. Follow-up

Phase: N/A

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

N/A

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

N/A

7. Job Safety (Include deficiencies and corrective action taken:

No deficiencies

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

Toner - used
Roller - not used

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

ref soil - waiting for test results

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

N/A

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED

BGE/Le

CONTRACTOR'S QC SYSTEM MANAGER

CONSTRUCTION MANPOWER AND EQUIPMENT REPORT

CONTRACT NO. DACA65-98-C-0015

DATE 4-18-58

[illegible]

QUALITY ASSURANCE REPORT

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

107

Friday

17 April 1998

Concur with the contractor's report for this period?

☒ Yes ☐ No*

Was any QC testing/inspection observed or were any specific QA
evaluations or verifications performed?

☒ No ☐ Yes*

Were any instructions given to or information received from the Contractor?

☒ No ☐ Yes*

Did anything develop on the work which might lead to a change order
or contract claim?

☒ No ☐ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.


MARK A. BISHOP

24 Apr 98
DATE


SUBV. INT

DATE

CONTRACTORS NAME: Ciminelli Services Corp.

EQ Basin Closure

1. Contractor (C) or Sub-contractor (S), and Area of Responsibility:

a. () Cimineilli - prep work for Topsoil b. ()
c. ()

d. () _____ e. () _____

Pözer - used
 Keller - not used

Ciminelli - prep work for Tapscot

N/A

n/a

N/A

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

N/A

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

N/A

7. Job Safety (Include deficiencies and corrective action taken:

No deficiencies

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

Dump - used
Roller not used

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

N/A

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

N/A

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED

B. G. Smith

CONTRACTOR'S QC SYSTEM MANAGER

CONSTRUCTION MANPOWER AND EQUIPMENT REPORT

CONTRACT NO. DACA65-98-C-0015

DATE 4-17-58

[illegible]

QUALITY ASSURANCE REPORT

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

106

Thursday

16 April 1998

Concur with the contractor's report for this period?

☐ Yes ☐ No*

Was any QC testing/inspection observed or were any specific QA
evaluations or verifications performed?

☐ No ☐ Yes*

Were any instructions given to or information received from the Contractor?

☐ No ☐ Yes*

Did anything develop on the work which might lead to a change order
or contract claim?

☐ No ☐ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.


MARK A. BISHOP

24 Apr 98
DATE


SUPV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

CONTRACTORS NAME: Ciminelli Services Corp.

Date 4-16-98 Report No. 108 Contract No. DAC(A)
65-98-C-0015 Project Name and Location of work:ER Basin ClosureWeather: [Clear] [~~P~~Cloudy] [Cloudy] [Rain: 0.5 inches]
[Temp. _____ min. 65 max.] Other Weather Conditions

1. Contractor (C) or Sub-contractor (S), and Area of Responsibility:

a. ()

Ciminelli - Backfill

b. ()

c. ()

d. ()

e. ()

2. Equipment Data. (Indicate items of construction equipment, other than hand tools, at the job site and whether or not used):

Dumper - used
Roller - used

3. Work Performed Today (Indicate identity of Contractor and Sub-contractors, location, and description of work:

Ciminelli Backfill

4. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken):

a. Preparatory

Phase: N/A

b. Initial

Phase: N/A

c. Follow-up

Phase: N/A

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

N/A

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

N/A

7. Job Safety (Include deficiencies and corrective action taken:

No deficiencies

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

Dozer - used
Roller - used

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

N/A

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

N/A

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED

BGS/K

CONTRACTOR'S QC SYSTEM MANAGER

CONSTRUCTION MANPOWER AND EQUIPMENT REPORT

CONTRACT NO. DACA65-98-C-0015

DATE 4-16-98

[illegible]

QUALITY ASSURANCE REPORT

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

105

Wednesday

15 April 1998

Concur with the contractor's report for this period?

☒ Yes ☐ No*

Was any QC testing/inspection observed or were any specific QA
evaluations or verifications performed?

☒ No ☐ Yes*

Were any instructions given to or information received from the Contractor?

☒ No ☐ Yes*

Did anything develop on the work which might lead to a change order
or contract claim?

☒ No ☐ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.


MARK A. BISHOP

24 Apr 98
DATE


SUPV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

CONTRACTORS NAME: Ciminelli Services Corp.

Date 4-15-98 Report No. 107 Contract No. DAC(A)
65-98-C-0015 Project Name and Location of work:EQ Basin ClosureWeather: [Clear] [~~P~~Cloudy] [Cloudy] [Rain: _____ inches]
[Temp. _____ min. 75 max.] Other Weather Conditions _____

1. Contractor (C) or Sub-contractor (S), and Area of Responsibility:

a. () Ciminelli - import & place fill b. ()
 Hodge - hauling c. ()
 FR - Soil testing
d. ()
 _____ e. ()

2. Equipment Data. (Indicate items of construction equipment, other than hand tools, at the job site and whether or not used):

Excavator - used
Loader - used
Roller - used

3. Work Performed Today (Indicate identity of Contractor and Sub-contractors, location, and description of work):

13th, 14th, 15th lifts

4. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken):

a. Preparatory

Phase: N/A

b. Initial

Phase: N/A

c. Follow-up

Phase: N/A

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

See test report

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

N/A

7. Job Safety (Include deficiencies and corrective action taken:

NO deficiencies

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

See manpower & equip report

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

bulk fill - in spec

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

N/A

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED

BG [Signature]

CONTRACTOR'S QC SYSTEM MANAGER

CONSTRUCTION MANPOWER AND EQUIPMENT REPORT

CONTRACT NO. DACA65-98-C-0015

DATE 4-15-98

LABOR CLASSIFICATION	PRIME		Hodge Trucking		FER						EQUIPMENT DESCRIPTION	NO. HOURS	
	#	HRS	#	HRS	#	HRS	#	HRS	#	HRS		USED	IDLE
QC Mgr	1	12									Dozer	8	4
Superintendent	1	12									Excavator off site	10	0
Operator	1	10									Roller	6	6
Lab. Laborer	1	12											
Trucker					2	10.5							
Trucker					5	10							
Trucker					4	9.5							
Trucker					4	9							
Trucker					1	6.5							
Soil Tech.			1	9									

TEST REPORT

CONTRACTOR'S NAME: Ciminelli Services Corp.

STRUCTURE OR
BUILDINGEQ Basin ClosureCONTRACT NO: DACA65-98-C-0015DESCRIPTION OF ITEM, SYSTEM OR PART OF SYSTEM
TESTED:13th, 14th, 15th liftsDESCRIPTION OF
TEST:See attached

NAME AND TITLE OF PERSON IN CHARGE OF PERFORMING TESTS FOR CONTRACTOR:

NAME

Perry Conner

TITLE

Field Tech

SIGNATURE

See attached

I HEREBY CERTIFY THAT THE ABOVE DESCRIBED ITEM, SYSTEM OR PART OF SYSTEM HAS
BEEN TESTED AS INDICATED ABOVE AND FOUND TO BE ENTIRELY SATISFACTORY AS
REQUIRED IN THE CONTRACT SPECIFICATIONS.

SIGNATURE OF CONTRACTOR QUALITY CONTROL INSPECTOR

BGS

DATE

7-16-98

REMARKS:



FROEHLING & ROBERTSON, INC.
GEOTECHNICAL • ENVIRONMENTAL • MATERIALS
ENGINEERS • LABORATORIES
"OVER ONE HUNDRED YEARS OF SERVICE"

DAILY REPORT

Project Name: RRR-BO Plant F & R Job No.: ☒
Client's Name: Liminelli Services Date: 4/15/98
Inspection of: Basin Enclosure Bldg. 11 Technician: P. Conner

This report and the attached data sheet(s) constitute a summary of observations and tests performed by F&R's engineering technician. The statements made herein do not constitute a certification. Approval of data for final report can only be made by F&R's engineers and cannot be conveyed on this form. Interpretations based on this data are the responsibility of others.
THIS IS A FIELD COPY AND IS SUBJECT TO REVIEW AND REVISION.

Contractor placed 8" lift at Basin Enclosure. Placement was done by a "650-John Deere" Dozer. Compaction was done by a vibratory roller.
Lift # 13, 14 ~~and~~ and # 15 Completed.

Technician observed the above mentioned
Performed Nuclear Density Tests.
Performed Sand-Cone, obtain sample for atturbeg limits,
and gradation.



FIELD DENSITY SUMMARY SHEETS

Project: RAAP-Bio-Plant

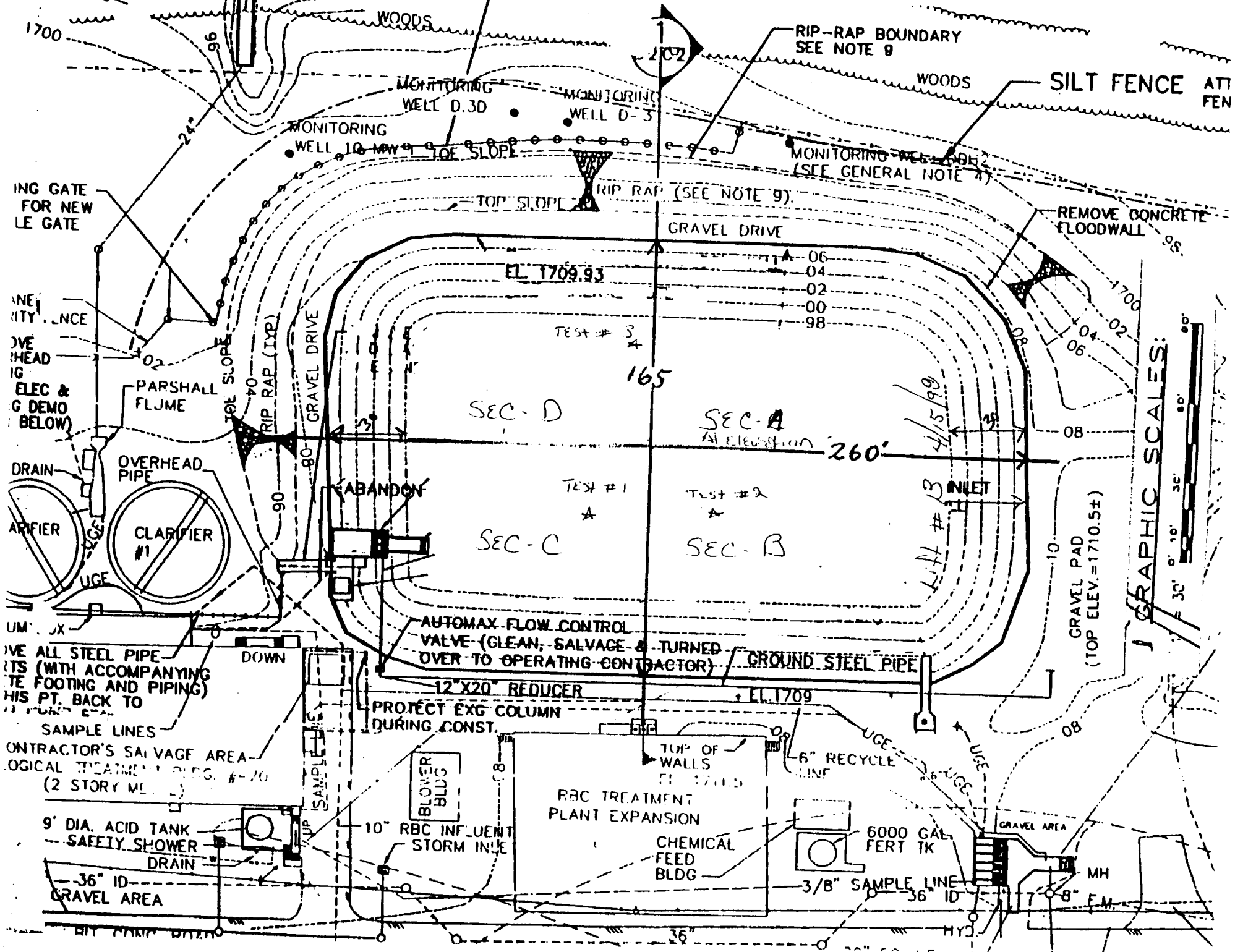
Date: 4/15/98

Client: Ciminelli Services

Record No.:

Test No.	Test Location	Elev.	Field Moisture Content (%)	Field Dry Density (pcf)	Percent of Maximum Dry Density		Field Test Type	Proctor No.
					Act.	Spec.		
1	30' S.W. From Top of slope sec. C	-1	15.7	113.2	95.5	90.8	NG	65969C
2	30' S.E. From Top of slope sec. A	-1	13.8	114.0	96.2	↓	↓	
3	15' N.W. From Top of slope sec. D	6"	16.6	110.6	96.9	↓	↓	
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								

Proctor No.	Max. Dry Density (pcf)	Optimum Moisture (%)	Soil Class.	Lab Test Type	Remarks: Lift # 13 Froehling & Robertson, Inc. Technician: P. Carner	Key: SC - Sand Cone (ASTM D1556) NG - Nuclear Gauge (ASTM D2922 & D3017) DC - Drive Cylinder (ASTM D2937) STD. - (ASTM D698) MOD. - (ASTM D1557)
	118.5	12.2	Grey Brown clayey			
	114.1		yellow tan sand			





FIELD DENSITY SUMMARY SHEETS

Project: RAAP- BIO Plant

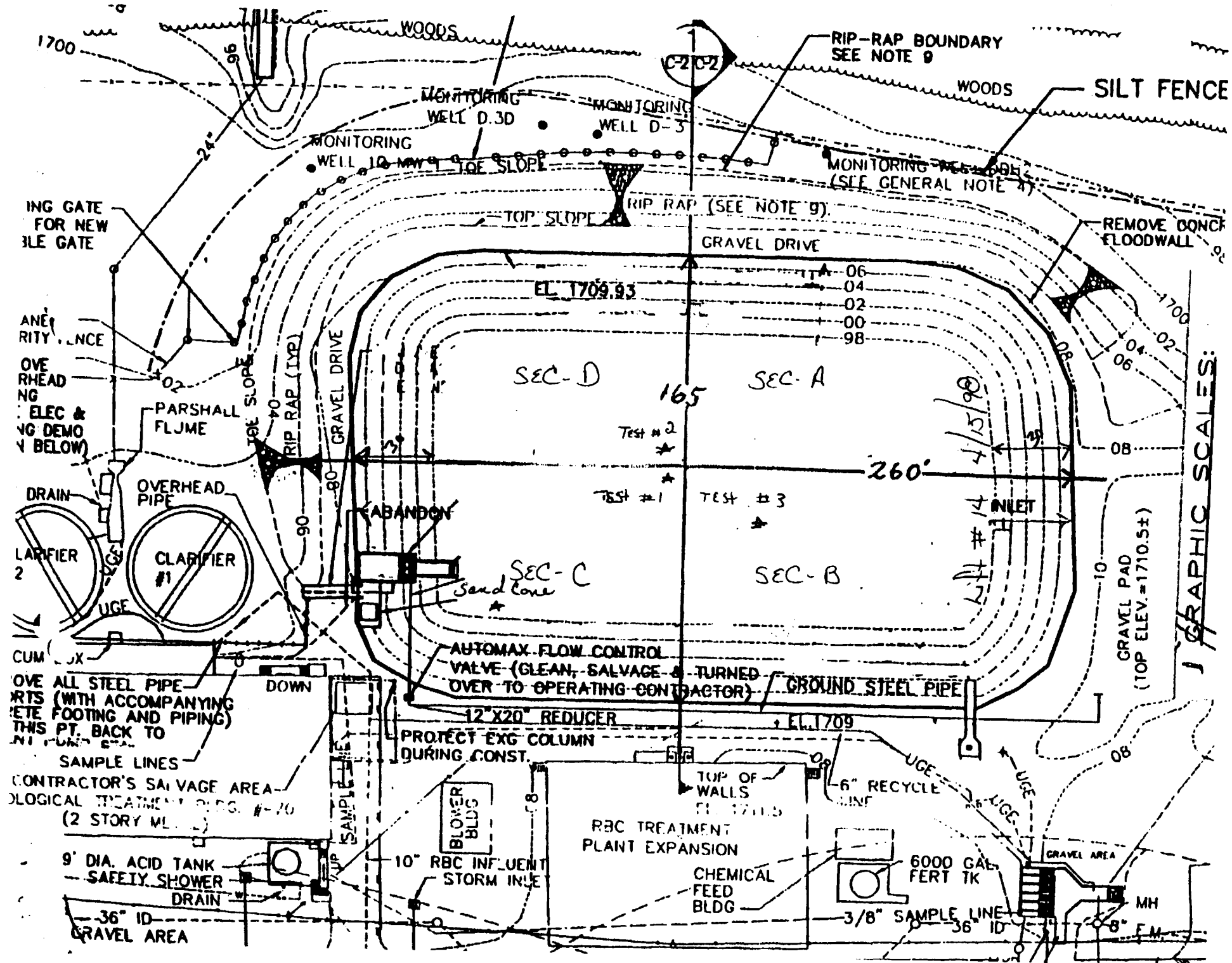
Date: 4-15-98

Client: Ciminelli SERVICES

Record No.:

Test No.	Test Location	Elev.	Field Moisture Content (%)	Field Dry Density (pcf)	Percent of Maximum Dry Density		Field Test Type	Proctor No.
					Act.	Spec.		
1	25' S.W. Top of slope SEC-C	- 8"	109.3	14.7	92.0	90%	NG 8.6" depth	
2	40' N.W. Top of slope SEC-D	- 0	103.7	14.1	90.8			
3	40' S.E. Top of slope SEC-B	- 0	109.4	13.8	93.0			
4	10' S.W. from CORNER slope SEC-C	- 0	TO BE DETERMINED		4-16-98		SC	
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								

Proctor No.	Max. Dry Density (pcf)	Optimum Moisture (%)	Soil Class.	Lab Test Type	Remarks:	Key:
	117.6	13.9	Dark Brown Sandy Clay			
	114.1				Lift # 14 Froehling & Robertson, Inc. Technician: P. Conner	SC - Sand Cone (ASTM D1556)
						NG - Nuclear Gauge (ASTM D2922 & D3017)
						DC - Drive Cylinder (ASTM D2937)
						STD. - (ASTM D698)
						MOD. - (ASTM D1557)





FIELD DENSITY SUMMARY SHEETS

Project: RAAP. BIO Plant

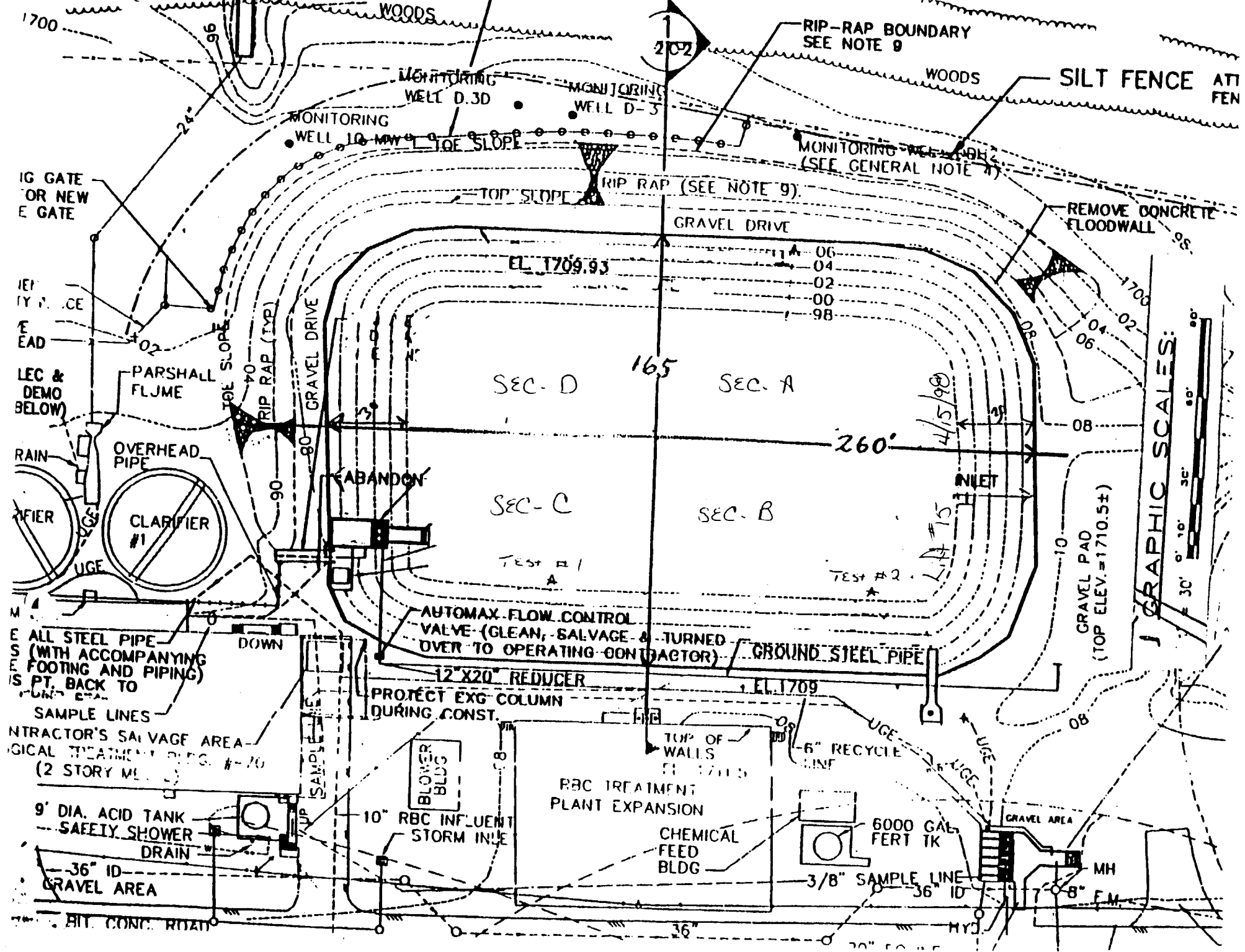
Date: 4/15/98

Client: Cimminell. SERVICES

Record No.:

Test No.	Test Location	Elev.	Field Moisture Content (%)	Field Dry Density (pcf)	Percent of Maximum Dry Density		Field Test Type	Proctor No.
					Act.	Spec.		
1	10' S.W. of slope sec. C	-0	15.8	107.3	91.2	90%	NG 4-6" depth	
2	10' S.E. of slope sec. B	-0	14.5	107.5	91.4	90%	"	
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								

Proctor No.	Max. Dry Density (pcf)	Optimum Moisture (%)	Soil Class.	Lab Test Type	Remarks: Lift #15	Key: SC - Sand Cone (ASTM D1556) NG - Nuclear Gauge (ASTM D2922 & D3017) DC - Drive Cylinder (ASTM D2937) STD. - (ASTM D698) MOD. - (ASTM D1557)
	117.6	13.9	Dark Brown			
					Froehling & Robertson, Inc. Technician:	



Q U A L I T Y A S S U R A N C E R E P O R T

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

104

Tuesday

14 April 1998

Concur with the contractor's report for this period?

☒ Yes ☐ No*

Was any QC testing/inspection observed or were any specific QA
evaluations or verifications performed?

☒ No ☐ Yes*

Were any instructions given to or information received from the Contractor?

☒ No ☐ Yes*

Did anything develop on the work which might lead to a change order
or contract claim?

☒ No ☐ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.


MARK A. BISHOP

24 Apr 98
DATE


SUPV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

CONTRACTORS NAME: Ciminelli Services Corp.

Date 4-14-98 Report No. 106 Contract No. DAC(A)
65-98-C-0015 Project Name and Location of work:EQ Basin ClosureWeather: [Clear] [~~P~~Cloudy] [Cloudy] [Rain: inches]
[Temp. min. 75 max.] Other Weather Conditions

1. Contractor (C) or Sub-contractor (S), and Area of Responsibility:

a. ()

Ciminelli - import & place fill b. ()Hodges - hauling c. ()F&R - soil testing d. ()

e. ()

2. Equipment Data. (Indicate items of construction equipment, other than hand tools, at the job site and whether or not used):

Excavator - usedLoader - usedRoller - used

3. Work Performed Today (Indicate identity of Contractor and Sub-contractors, location, and description of work:

13th, 14th, 15th lifts - Ciminellihauling fill - Hodgessoil testing - F&R

4. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken):

a. Preparatory

Phase: N/A

b. Initial

Phase: N/A

c. Follow-up

Phase: N/A

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

See test report

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

N/A

7. Job Safety (Include deficiencies and corrective action taken:

NO deficiencies

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

See Equip & Manpower Report

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

Backfill - in spec

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

N/A

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED

BBG/LLa

CONTRACTOR'S QC SYSTEM MANAGER

DATE 4-17-98

[illegible]

TEST REPORT

CONTRACTOR'S NAME: Ciminelli Services Corp.

STRUCTURE OR
BUILDING

EQ Basin Closure

CONTRACT NO: DACA65-98-C-0015

DESCRIPTION OF ITEM, SYSTEM OR PART OF SYSTEM
TESTED:

Lift 12

DESCRIPTION OF
TEST:

see attached

NAME AND TITLE OF PERSON IN CHARGE OF PERFORMING TESTS FOR CONTRACTOR:

NAME

Penny Conner

TITLE

Field Tech

SIGNATURE

see attached

I HEREBY CERTIFY THAT THE ABOVE DESCRIBED ITEM, SYSTEM OR PART OF SYSTEM HAS
BEEN TESTED AS INDICATED ABOVE AND FOUND TO BE ENTIRELY SATISFACTORY AS
REQUIRED IN THE CONTRACT SPECIFICATIONS.

SIGNATURE OF CONTRACTOR QUALITY CONTROL INSPECTOR

B. Sullivan

DATE

4-15-98

REMARKS:



FROEHLING ROBERTSON, INC.
GEOTECHNICAL • ENVIRONMENTAL • MATERIALS
ENGINEERS • LABORATORIES
"OVER ONE HUNDRED YEARS OF SERVICE"

DAILY REPORT

Project Name: RARP- B/O Plant F & R Job No.: ☒
Client's Name: Pinixelli Services Date: 4-14-98
Inspection of: Basin Enclosure Back-fill Technician: A. Conner

This report and the attached data sheet(s) constitute a summary of observations and tests performed by F&R's engineering technician. The statements made herein do not constitute a certification. Approval of data for final report can only be made by F&R's engineers and cannot be conveyed on this form. Interpretations based on this data are the responsibility of others.
THIS IS A FIELD COPY AND IS SUBJECT TO REVIEW AND REVISION.

Contractor placed 8" lift at Basin Enclosure.
Compaction was done by a vibratory roller.
Lift # 12 Completed.

Technician observed above mentioned.
Performed Nuclear Density Tests and Sand Cone.
Obtained sample of soil to be taken back to lab for
gradation and atterberg limits.



FIELD DENSITY SUMMARY SHEETS

Project: RAAP B10 Plant

Date: 4/14/98

Client: Liminelli SERVICES

Record No.:

Test No.	Test Location	Elev.	Field Moisture Content (%)	Field Dry Density (pcf)	Percent of Maximum Dry Density		Field Test Type	Proctor No.
					Act.	Spec.		
1	20' N.W. From top of slope ^{SEC D}	-1 1/2	11.7	111.6	91.7	90	NG 8-6" Depth	
2	10' S.W. From Corner slope ^{SEC C}	-2	11.1	121.0	99.4		"	
3	12' S.W. From Corner slope ^{SEC C}	-2	12.7	121.0	99.4		SC	
4	25' N.E. From Top of slope ^{SEC A}	-0	11.3	121.5	99.8		NG	
5	10' S.E. From Corner slope ^{SEC B}	-0	11.6	111.9	91.9	↓	"	
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								

Proctor No.	Max. Dry Density (pcf)	Optimum Moisture (%)	Soil Class.	Lab Test Type	Remarks: <u>Lift #12</u>	Key: SC - Sand Cone (ASTM D1556) NG - Nuclear Gauge (ASTM D2922 & D3017) DC - Drive Cylinder (ASTM D2937) STD. - (ASTM D698) MOD. - (ASTM D1557)
	121.7	11.4	Yellow Tan			

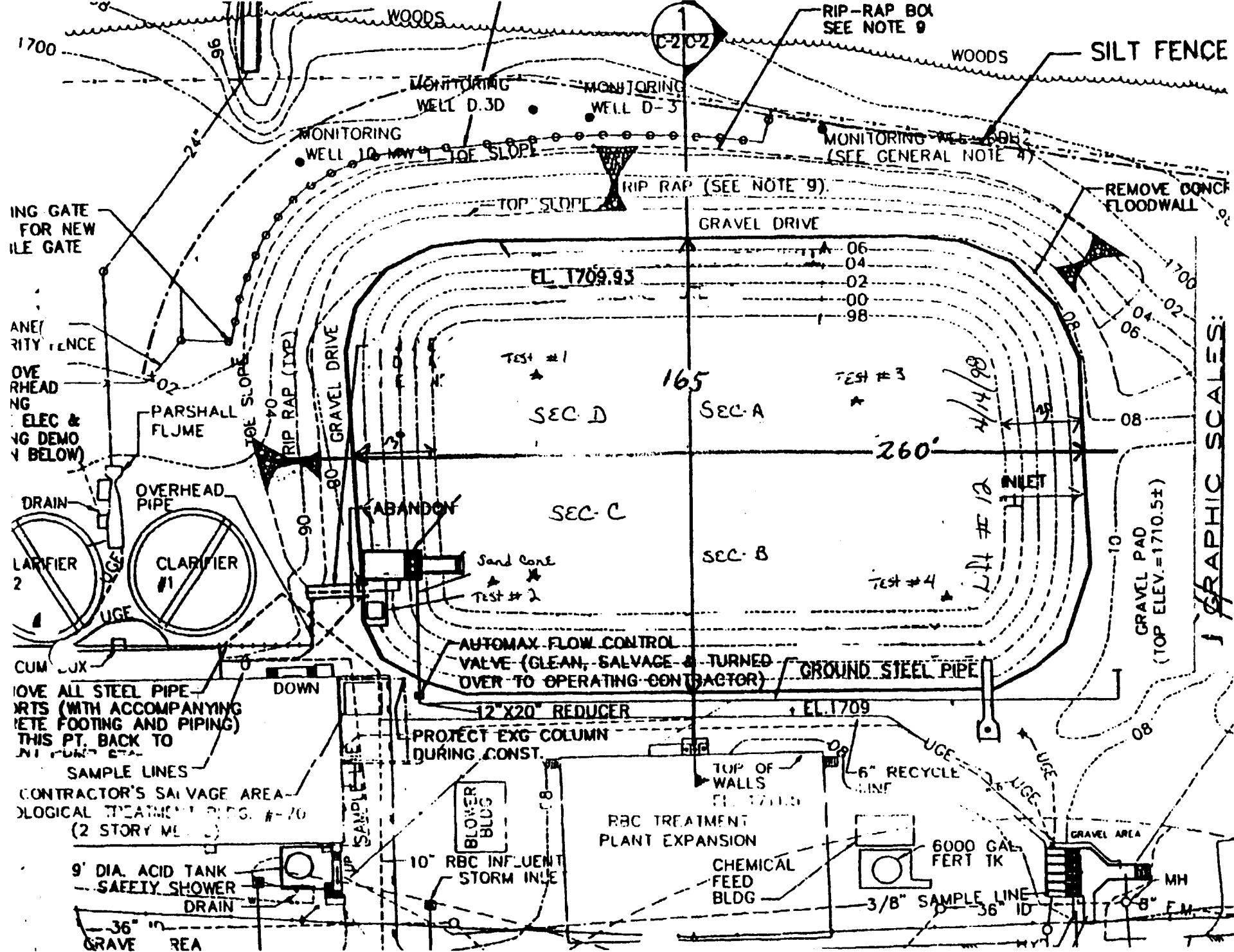
ROEHLING & ROBERTSON, INC.

Daily Field Compaction Tests

Made for: Liminelli SERVICES Date 4/14/08
 Project: RAAP- BIO Plant
 Location: 12' SW FROM CORNER SLOPE SEC-C LIFT # 12

A. Wet Weight, Soil + Bucket, lbs.	5.75				
B. Weight Bucket, lbs.	1.15				
C. Weight Wet Soil, lbs. (A-B)	4.6				
D. Initial Weight, lbs. Jar + Sand	16.08				
E. Final Weight, lbs. Jar + Sand	8.86				
F. Sand used, lbs. (D-E)	7.22				
G. Sand in Cone and Plate, lbs.	3.90				
H. Sand used in Hole (F-G)	3.32				
I. Weight of Sand (lbs./cu. ft.)	98.9				
J. Vol. of Hole (H/I) cu. ft.	.0337				
K. Cup + Soil Wet	5.75				
L. Cup + Soil Dry	5.23				
M. Moisture Lost (K-L)	.52				
N. Cup + Soil Dry	5.23				
O. Cup	1.15				
P. Dry Soil (N-O)	4.08				
Q. Percent Moisture (M/P) 100	12.7				
R. Dry Soil, lbs. $C/(1 - Q/100)$	4.08				
S. Dry Soil, pc ³ (R/J)	121.0				
T. Maximum Density (From Curve)	121.7				
U. Percent Density (S/T) 100	99.4				

P. Conner (Technician)



QUALITY ASSURANCE REPORT

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

103

Monday

13 April 1997

Concur with the contractor's report for this period?

☒ Yes ☐ No*

Was any QC testing/inspection observed or were any specific QA
evaluations or verifications performed?

☒ No ☐ Yes*

Were any instructions given to or information received from the Contractor?

☒ No ☐ Yes*

Did anything develop on the work which might lead to a change order
or contract claim?

☒ No ☐ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.


MARK A. BISHOP

17 Apr 98
DATE


SUPERV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

CONTRACTORS NAME: Ciminelli Services Corp.

Date 4-13-88 Report No. 102-105 Contract No. DAC(A)
65-98-C-0015 Project Name and Location of work:EQ Basin ClosureWeather: [~~Clear~~] [P. Cloudy] [Cloudy] [Rain: inches]
[Temp. min. 70 max.] Other Weather Conditions

1. Contractor (C) or Sub-contractor (S), and Area of Responsibility:

a. ()

Ciminelli - import & place fill b. ()
F&R - Soil Testing c. ()
Hodge - hauling

d. ()

e. ()

2. Equipment Data. (Indicate items of construction equipment, other than hand tools, at the job site and whether or not used):

Excavator - used
Roller - used
Dozer - used

3. Work Performed Today (Indicate identity of Contractor and Sub-contractors, location, and description of work:

Lift 10 and 11 - Ciminelli
soil test - F&R
hauling - Hodge

4. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken):

a. Preparatory

Phase: N/A

b. Initial

Phase: N/A

c. Follow-up

Phase: N/A

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

See test report

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

N/A

7. Job Safety (Include deficiencies and corrective action taken:

NO deficiencies

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

See Manpower and Equip. Report

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

Packed in spec

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

N/A

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED

BBG

CONTRACTOR'S QC SYSTEM MANAGER

DATE 4/13/98

[illegible]

TEST REPORT

CONTRACTOR'S NAME: Ciminelli Services Corp.

STRUCTURE OR
BUILDING

EQ Basin

CONTRACT NO: DACA65-98-C-0015

DESCRIPTION OF ITEM, SYSTEM OR PART OF SYSTEM
TESTED:

9th, 10th, 11th, lifts

DESCRIPTION OF
TEST:

See attached

NAME AND TITLE OF PERSON IN CHARGE OF PERFORMING TESTS FOR CONTRACTOR:

NAME

Penny Connor

TITLE

Field Tech

SIGNATURE See attached

I HEREBY CERTIFY THAT THE ABOVE DESCRIBED ITEM, SYSTEM OR PART OF SYSTEM HAS BEEN TESTED AS INDICATED ABOVE AND FOUND TO BE ENTIRELY SATISFACTORY AS REQUIRED IN THE CONTRACT SPECIFICATIONS.

SIGNATURE OF CONTRACTOR QUALITY CONTROL INSPECTOR

J. G. Schuman

DATE

4-14-98

REMARKS:

Still waiting for official classification see attached letter



FROEHLING & ROBERTSON, INC.
GEOTECHNICAL • ENVIRONMENTAL • MATERIALS
ENGINEERS • LABORATORIES
"OVER ONE HUNDRED YEARS OF SERVICE"

DAILY REPORT

Project Name: RAAP-BIG Plant F & R Job No.:
Client's Name: Liminelli SERVICES Date: 4/13/98
Inspection of: Basin Enclosure Technician: P. Conner

This report and the attached data sheet(s) constitute a summary of observations and tests performed by F&R's engineering technician. The statements made herein do not constitute a certification. Approval of data for final report can only be made by F&R's engineers and cannot be conveyed on this form. Interpretations based on this data are the responsibility of others.

THIS IS A FIELD COPY AND IS SUBJECT TO REVIEW AND REVISION.

Contractor placed 8" lift at Basin Enclosure
Placement was done by a "John Deere" Digger, Compaction
done by Vibratory roller
Lift # 10 : 11 Completed

Technician observed the above mentioned
- Performed Nuclear Density Tests and Sand Cone Test.
Obtained sample from Sand Cone to be taken back
to lab to perform gradation - Alderberg limited.

FROEHLING & ROBERTSON, INC.

Daily Field Compaction Tests

Made for: Ciminelli Services Date 4-13-98
 Project: RAAP- Bio-Plant Basin Enclosure
 Location: 45' North of Top slope 10th Lilt

A. Wet Weight, Soil + Bucket, lbs.	5.71				
B. Weight Bucket, lbs.	1.15				
C. Weight Wet Soil, lbs. (A-B)	4.56				
D. Initial Weight, lbs. Jar + Sand	15.84				
E. Final Weight, lbs. Jar + Sand	8.46				
F. Sand used, lbs. (D-E)	7.38				
G. Sand in Cone and Plate, lbs.	3.90				
H. Sand used in Hole (F-G)	3.48				
I. Weight of Sand (lbs./cu. ft.)	98.3				
J. Vol. of Hole (H/I) cu. ft.	.0035				
K. Cup + Soil Wet	5.71				
L. Cup + Soil Dry	5.18				
M. Moisture Lost (K-L)	.53				
N. Cup + Soil Dry	5.18				
O. Cup	1.15				
P. Dry Soil (N-O)	4.03				
Q. Percent Moisture (M/P) 100	13.1				
R. Dry Soil, lbs. $C/(1 - Q/100)$	4.03				
S. Dry Soil, pcf (R/J)	115.1				
T. Maximum Density (From Curve)	118.5				
U. Percent Density (S/T) 100	97.1				

P. Conner (Technician)



FIELD DENSITY SUMMARY SHEETS

Project: RAAP. Bio Plant
Client: Cimminelli SERVICES

Date: 4-13-98

Record No.:

Test No.	Test Location	Elev.	Field Moisture Content (%)	Field Dry Density (pcf)	Percent of Maximum Dry Density		Field Test Type	Proctor No.
					Act.	Spec.		
1	12' N.W. From top of slope sec-D	-1 1/2	12.7	112.2	94.6	90%	NG 8.6" depth	65969C
2	32' N.W. From top of slope sec-D	-1 1/2	11.7	116.4	98.2			
3	10' S.W. From bottom slope sec-C	-3	12.7	117.2	98.9		↓	
4								
5	45' N. From top of slope sec-A-B	-1	13.1	118.5	97.1		SC	
6								
7	30' E. From top slope sec-A	-1	12.4	110.1	92.9		NG	
8	40' S.E. From top slope sec-B	-1	12.3	110.5	93.2	↓		
9								
10								
11								
12								
13								
14								
15								

Proctor No.	Max. Dry Density (pcf)	Optimum Moisture (%)	Soil Class.	Lab Test Type
65969C	118.5	12.2	yellow Tan	

Remarks: L-1 + #10

Froehling & Robertson, Inc.

Technician: P. Conner

Key:

SC - Sand Cone (ASTM D1556)

NG - Nuclear Gauge (ASTM D2922 & D3017)

DC - Drive Cylinder (ASTM D2937)

STD. - (ASTM D698)

MOD. - (ASTM D1557)



FIELD DENSITY SUMMARY SHEETS

Project: RAAP. BIO Plant

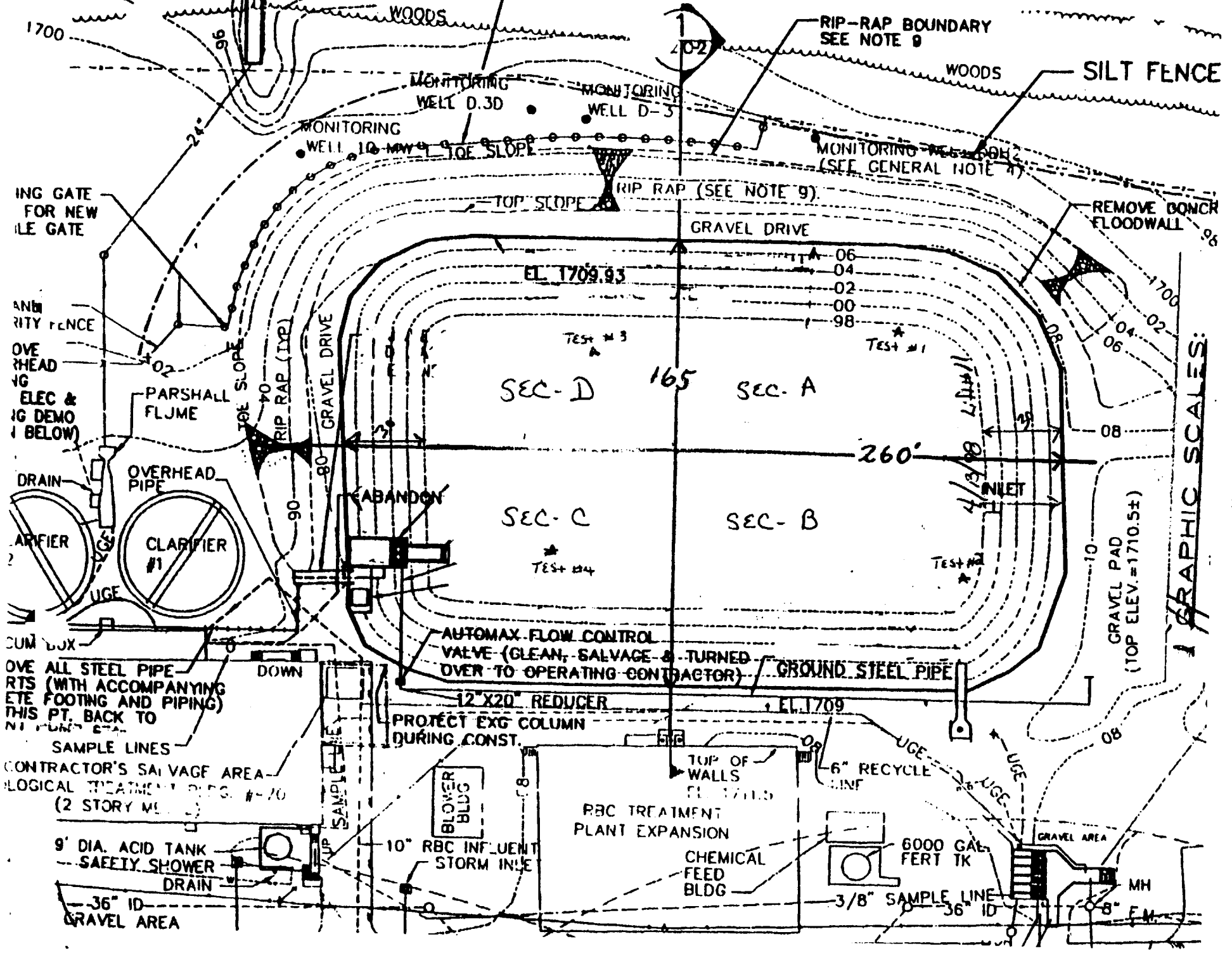
Date: 4/13/98

Client: Cimminelli Services

Record No.:

Test No.	Test Location	Elev.	Field Moisture Content (%)	Field Dry Density (pcf)	Percent of Maximum Dry Density		Field Test Type	Proctor No.
					Act.	Spec.		
1	10' N.E. From Top Slope Sec. A	-0	12.8	119.2	97.9	90.8	NG 8.6" depth	
2	10' S.E. From Top Slope Sec. B	-0	11.0	113.2	93.0	↓	↓	
3	30' N.W. From Top Slope Sec. C	-2	10.7	120.2	98.7	↓	↓	
4	40' S.W. From Corner Slope Sec. D	-1	12.1	118.1	97.0	↓	↓	
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								

Proctor No.	Max. Dry Density (pcf)	Optimum Moisture (%)	Soil Class.	Lab Test Type	Remarks: Lift # 11 Froehling & Robertson, Inc. Technician:	Key: SC - Sand Cone (ASTM D1556) NG - Nuclear Gauge (ASTM D2922 & D3017) DC - Drive Cylinder (ASTM D2937) STD. - (ASTM D698) MOD. - (ASTM D1557)
	121.7	11.4	Test Result			



GRAPHIC SCALES:

QUALITY ASSURANCE REPORT

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

99

Thursday

09 April 1998

Concur with the contractor's report for this period?

☒ Yes ___ No*

Was any QC testing/inspection observed or were any specific QA
evaluations or verifications performed?

☒ No ___ Yes*

Were any instructions given to or information received from the Contractor?

☒ No ___ Yes*

Did anything develop on the work which might lead to a change order
or contract claim?

☒ No ___ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.


MARK A. BISHOP

12 Apr 98
DATE


SUPERV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

CONTRACTORS NAME: Ciminelli Services Corp.

Date 4-9-98 Report No. 101 Contract No. DAC(A)
65-98-C-0015 Project Name and Location of work:EQ Basin ClosureWeather: [Clear] [P.Cloudy] [Cloudy] [Rain: 5 inches]
[Temp. _____ min. _____ max.] Other Weather Conditions

1. Contractor (C) or Sub-contractor (S), and Area of Responsibility:

a. () Ciminelli - import fill & place b. ()
() c. ()
d. () e. ()

2. Equipment Data. (Indicate items of construction equipment, other than hand tools, at the job site and whether or not used):

Excavator - not used
Roller - not used
Grader - not used

3. Work Performed Today (Indicate identity of Contractor and Sub-contractors, location, and description of work:

~~None~~ rained out no fill imported - fill stock
piled @ pit, paper work completed

4. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken):

a. Preparatory

Phase: N/A

b. Initial

Phase: N/A

c. Follow-up

Phase: N/A

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

None - rained out

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

NONE

7. Job Safety (Include deficiencies and corrective action taken:

NO DEFICIENCIES

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

See equipment & Manpower report

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

N/A

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

N/A

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED

B. B. [Signature]

CONTRACTOR'S QC SYSTEM MANAGER

DATE 4-9-98

[illegible]



FROEHLING & ROBERTSON, INC.
GEOTECHNICAL • ENVIRONMENTAL • MATERIALS
ENGINEERS • LABORATORIES
"OVER ONE HUNDRED YEARS OF SERVICE"

DAILY REPORT

Project Name: RARP Bio Plant F & R Job No.:
Client's Name: Liminelli Services Date: 4/9/98
Inspection of: Basin enclosure Backfill Technician: P. Conner

This report and the attached data sheet(s) constitute a summary of observations and tests performed by F&R's engineering technician. The statements made herein do not constitute a certification. Approval of data for final report can only be made by F&R's engineers and cannot be conveyed on this form. Interpretations based on this data are the responsibility of others.
THIS IS A FIELD COPY AND IS SUBJECT TO REVIEW AND REVISION.

Contractor placed an 8" lift at Basin enclosure. Placement was done by a John Deere Dozer. Compaction done by Vibratory roller. 9th lift completed.

Technician performed Density Tests. Materials changed in color and percentage of rock. A sample was taken to lab so proctor could be matched up with Density readings.



FIELD DENSITY SUMMARY SHEETS

Project: RAAP - Bio Plant

Date: 4/7/8/98

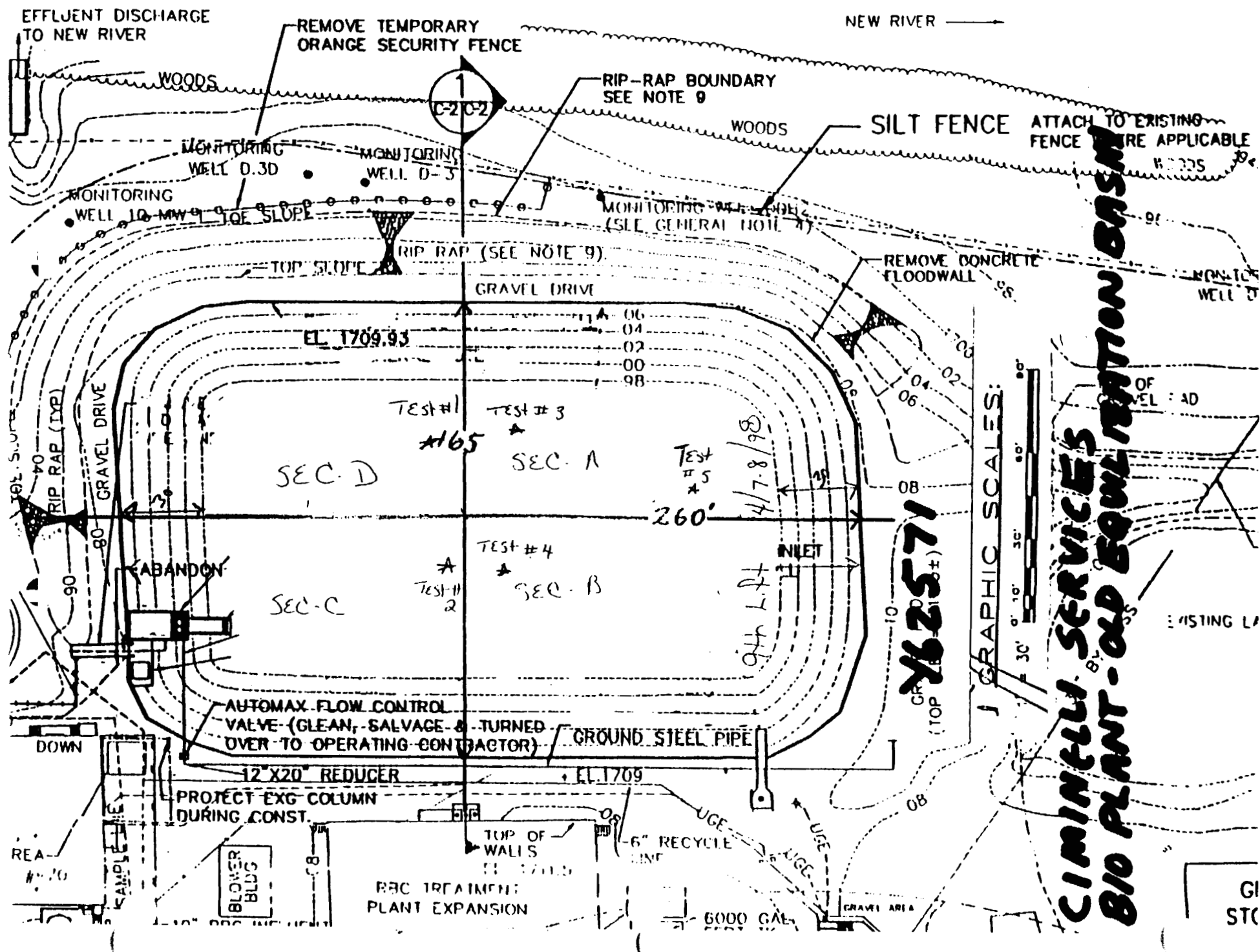
Client: Cimminelli SERVICES

Record No.:

Test No.	Test Location	Elev.	Field Moisture Content (%)	Field Dry Density (pcf)	Percent of Maximum Dry Density		Field Test Type	Proctor No.
					Act.	Spec.		
1	40' NW from Top of Slope SEC-D	-3	10.9	116.6	95.8	90%	NG 8'-6" Depth	
2	24' SW from Top of Slope SEC-C	-4	11.4	119.7	98.3			
3	32' NE from Top of Slope SEC-A	-2	12.0	114.8	94.3			
4	44' SE from bottom of Slope SEC-B	-4	10.7	122.9	100%		↓	
5	20' E from Top of Slope SEC-A	-2	12.2	112.0	92.0			
6								
7								
8								
9-								
10								
11								
12								
13								
14								
15								

Proctor No.	Max. Dry Density (pcf)	Optimum Moisture (%)	Soil Class.	Lab Test Type
	121.7	11.4	Dark Brown Silty Sand	

Remarks: 9th Lift Froehling & Robertson, Inc. Technician: P. Conner	Key: SC - Sand Cone (ASTM D1556) NG - Nuclear Gauge (ASTM D2922 & D3017) DC - Drive Cylinder (ASTM D2937) STD. - (ASTM D698) MOD. - (ASTM D1557)
---	--



**CIMINELLI SERVICES
BIO PLANT - OLD EQUIL TRATION BASIN**

QUALITY ASSURANCE REPORT

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

98

Wednesday

08 April 1998

Concur with the contractor's report for this period?

☒ Yes ☐ No*

Was any QC testing/inspection observed or were any specific QA
evaluations or verifications performed?

☒ No ☐ Yes*

Were any instructions given to or information received from the Contractor?

☒ No ☐ Yes*

Did anything develop on the work which might lead to a change order
or contract claim?

☒ No ☐ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.


MARK A. BISHOP

09 Apr 98
DATE


SUPV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

CONTRACTORS NAME: Ciminelli Services Corp.

Date 4-8-98 Report No. 100 Contract No. DAC(A)
65-98-C-0015 Project Name and Location of work:EQ Basin ClosureWeather: [Clear] [P.Cloudy] [Cloudy] [Rain: inches]
[Temp. min. 75 max.] Other Weather Conditions

1. Contractor (C) or Sub-contractor (S), and Area of Responsibility:

a. ()

)

()

d. ()

)

Ciminelli - import & place fillHedge - haulingF & R - soil testing

b. (

c.

e. (

2. Equipment Data. (Indicate items of construction equipment, other than hand tools, at the job site and whether or not used):

Excavator - usedRoller - usedDoser - used

3. Work Performed Today (Indicate identity of Contractor and Sub-contractors, location, and description of work:

Ciminelli - import & place fill, 1/2 of 10th 1stHedge - haul fillF & R - soil testing

4. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken):

a. Preparatory

Phase:

N/A

b. Initial

Phase:

N/A

c. Follow-up

Phase:

N/A

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

Field density tests - waiting for lab report

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

N/A

7. Job Safety (Include deficiencies and corrective action taken:

NO deficiencies

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

see equip & manpower report

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

Fill material - in spec

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

N/A

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED

B. B. E. L. A.

CONTRACTOR'S QC SYSTEM MANAGER

DATE 4-8-78

LABOR CLASSIFICATION	P R I M E		F I R		Hodge Trucking						EQUIPMENT DESCRIPTION	NO. HOURS	
	#	H R S	#	H R S	#	H R S	#	H R S	#	H R S		USED	IDLE
QC Mgr	1	12									Paver	8	4
Superintendent	1	12									Roller	4	8
Operator	1	13									Excavator off site	12	1
Laborer	1	12											
Field Tech			1	8									
					7	9							
					4	85							
					1	8							
										</			

QUALITY ASSURANCE REPORT

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

97

Tuesday

07 April 1998

Concur with the contractor's report for this period?

☒ Yes ☐ No*

Was any QC testing/inspection observed or were any specific QA
evaluations or verifications performed?

☒ No ☐ Yes*

Were any instructions given to or information received from the Contractor?

☒ No ☐ Yes*

Did anything develop on the work which might lead to a change order
or contract claim?

☒ No ☐ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.


MARK A. BISHOP

09 Apr 98
DATE


SUBV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

CONTRACTORS NAME: Ciminelli Services Corp.

Date 4-9-90 Report No. 99 Contract No. DAC(A)
65-98-C-0015 Project Name and Location of work:EQ Basin ClosureWeather: [Clear] [P. Cloudy] [Cloudy] [Rain: _____ inches]
[Temp. _____ min. 70 max.] Other Weather Conditions

1. Contractor (C) or Sub-contractor (S), and Area of Responsibility:

- a. () Ciminelli - Import Soil + phase b. ()
 Hodge - hauling c. ()
 F&R - Soil testing
d. () e. ()

2. Equipment Data. (Indicate items of construction equipment, other than hand tools, at the job site and whether or not used):

Excavator - used
Paver - used
Roller - used

3. Work Performed Today (Indicate identity of Contractor and Sub-contractors, location, and description of work):

Ciminelli - phase 7th, 8th, 1/2 of 9th 1st
Hodge - hauling
F&R - Soil testing

4. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken):

a. Preparatory

Phase: N/A

b. Initial

Phase: N/A

c. Follow-up

Phase: N/A

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

See Test Report

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

N/A

7. Job Safety (Include deficiencies and corrective action taken:

NO deficiencies

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

See equipment & Material Report

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

Fill Material - in spec

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

N/A

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED

B651/

CONTRACTOR'S QC SYSTEM MANAGER

DATE 4-7-78

[illegible]

TEST REPORT

CONTRACTOR'S NAME: Ciminelli Services Corp.

STRUCTURE OR
BUILDING

EQ Basin Closure

CONTRACT NO:

DACA65-98-C-0015

DESCRIPTION OF ITEM, SYSTEM OR PART OF SYSTEM
TESTED:6th, 7th, & 8th / 1stDESCRIPTION OF
TEST:

3 Nuclear gages, sand core

NAME AND TITLE OF PERSON IN CHARGE OF PERFORMING TESTS FOR CONTRACTOR:

NAME

Penny Conner

TITLE

Field Tech

SIGNATURE

see attached

I HEREBY CERTIFY THAT THE ABOVE DESCRIBED ITEM, SYSTEM OR PART OF SYSTEM HAS
BEEN TESTED AS INDICATED ABOVE AND FOUND TO BE ENTIRELY SATISFACTORY AS
REQUIRED IN THE CONTRACT SPECIFICATIONS.

SIGNATURE OF CONTRACTOR QUALITY CONTROL INSPECTOR

DB G. S. S. S.

DATE

4-7-88

REMARKS:

Still waiting for moisture density curve and
New classification - expect Thursday am



FROEHLING & ROBERTSON, INC.
GEOTECHNICAL • ENVIRONMENTAL • MATERIALS
ENGINEERS • LABORATORIES
"OVER ONE HUNDRED YEARS OF SERVICE"

DAILY REPORT

Project Name: RAAP Bio Plant F & R Job No.: ☒
Client's Name: Ciminelli Date: 4/7/98
Inspection of: Basin Closure Backfill Technician: P. Conner

This report and the attached data sheet(s) constitute a summary of observations and tests performed by F&R's engineering technician. The statements made herein do not constitute a certification. Approval of data for final report can only be made by F&R's engineers and cannot be conveyed on this form. Interpretations based on this data are the responsibility of others.
THIS IS A FIELD COPY AND IS SUBJECT TO REVIEW AND REVISION.

I. Contractor Activities

1. Contractor placed 8" lift from Borrow site. Placement was done by a dozer - Compaction done by a vibratory roller.
2. Contractor Completed lift #7 & #8, half of #9.

II. Technician Activity

1. Technician observed above mentioned.
2. Performed Nuclear Density Tests, and two Sand-Cone tests.
3. Obtained samples of soil from lift to be taken back to lab to perform gradations and other bearing l.m.t.s.



FIELD DENSITY SUMMARY SHEETS

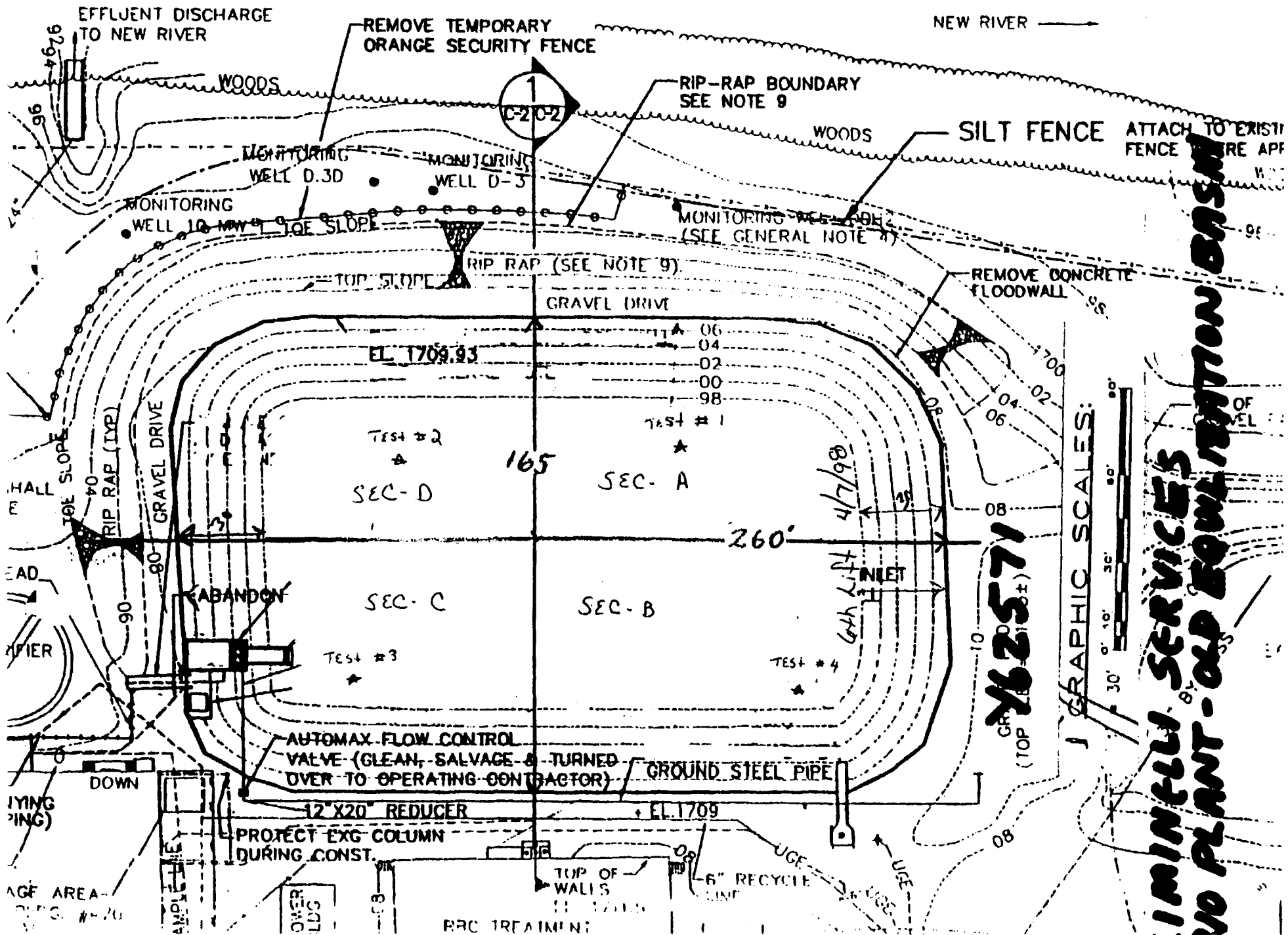
Project: RAA-Bio Plant
Client: Cimminelli SERVICES

Date: 4/7/98

Record No.:

Test No.	Test Location	Elev.	Field Moisture Content (%)	Field Dry Density (pcf)	Percent of Maximum Dry Density		Field Test Type	Proctor No.
					Act.	Spec.		
1	32' N.E. From top of slope SEC A - 14		13.8	111.6	91.7	90	NG 8-6" Depth	
2	40' N.E. From Top of slope SEC. D - 6		19.2	103.4 79.0				
3	40% Rock Correction		19.2	121.4	99.7			
4	30' S.W. From Corner of slope C - 6		13.6	111.6	91.7			
5	30' S.E. From corner SEC. B - 6		14.7	109.5	89.9	✓	✓	
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								

Proctor No.	Max. Dry Density (pcf)	Optimum Moisture (%)	Soil Class.	Lab Test Type	Remarks: 6th lift Completed	Key: SC - Sand Cone (ASTM D1556) NG - Nuclear Gauge (ASTM D2922 & D3017) DC - Drive Cylinder (ASTM D2937) STD. - (ASTM D698) MOD. - (ASTM D1557)
	121.7	11.4	Yellow Tan			
					Froehling & Robertson, Inc. Technician: P. Brown	



**MINTEL SERVICES
NO PLANT - OLD EQUIPMENT BASIN**



FIELD DENSITY SUMMARY SHEETS

Project: RAAP- Bio Plant

Date: 4/7/98

Client: Cimirelli Services

Record No.:

Test No.	Test Location	Elev.	Field Moisture Content (%)	Field Dry Density (pcf)	Percent of Maximum Dry Density		Field Test Type	Proctor No.
					Act.	Spec.		
1	36' S.E. From Corner slope SEC-B	-5	20.6	101.9	77.9	90%	NG 8-6" depth	
2	30% Rock Correction			116.9	96.0			
3	30' S.W. From Toe of slope SEC-C	-5	17.1	110.0	90.3			
4	20' from S.W. Corner SEC-D	-5	8.8	112.0	92.0		SC	
5	10' N.E. From top of slope SEC-A	-3	14.1	108.4	89.5		NG 8-6"	
6	30% Rock Correction			120.4	98.9			
7	25' N.W. From top of slope SEC-D	-3	12.8	111.0	91.2			
8								
9								
10								
11								
12								
13								
14								
15								

Proctor No.	Max. Dry Density (pcf)	Optimum Moisture (%)	Soil Class.	Lab Test Type	Remarks: 7th list completed Froehling & Robertson, Inc. Technician: P. Corneu	Key: SC - Sand Cone (ASTM D1556) NG - Nuclear Gauge (ASTM D2922 & D3017) DC - Drive Cylinder (ASTM D2937) STD. - (ASTM D698) MOD. - (ASTM D1557)
	121.7	11.4	yellow tan			

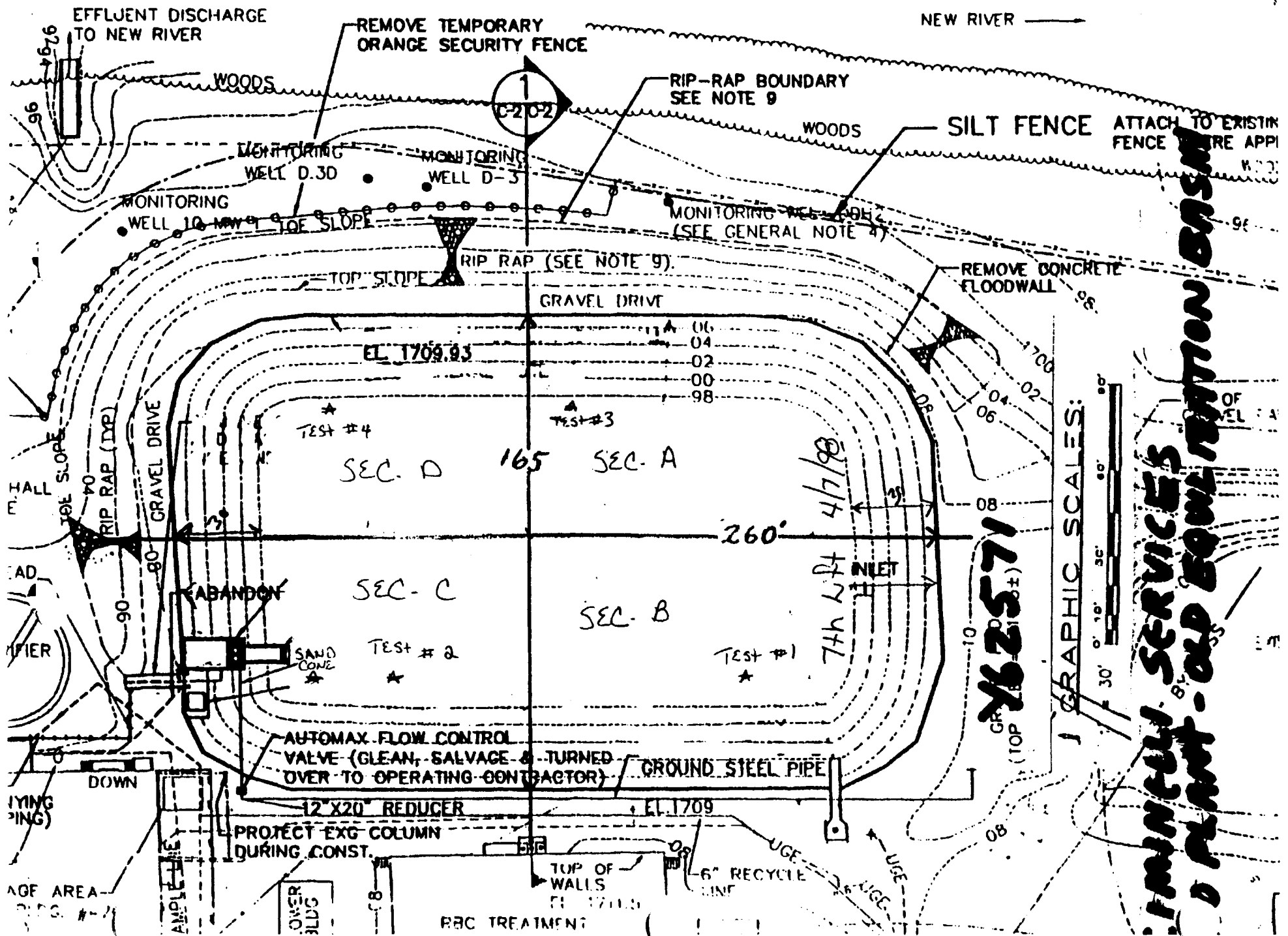
FROEHLING & ROBERTSON, INC.

Daily Field Compaction Tests

Made for: Ciminelli Services Date 4/7/93
 Project: BANF Bio Plant
 Location: Basin Entrance - 20' from S.W. Corner 7th Lift

A. Wet Weight, Soil + Bucket, lbs.	6.02			
B. Weight Bucket, lbs.	1.15			
C. Weight Wet Soil, lbs. (A-B)	4.87			
D. Initial Weight, lbs. Jar + Sand	15.98			
E. Final Weight, lbs. Jar + Sand	8.16			
F. Sand used, lbs. (D-E)	7.82			
G. Sand in Cone and Plate, lbs.	3.90			
H. Sand used in Hole (F-G)	3.92			
I. Weight of Sand (lbs./cu. ft.)	98.3			
J. Vol. of Hole (H/I) cu. ft.	.0399			
K. Cup + Soil Wet	6.02			
L. Cup + Soil Dry	5.59			
M. Moisture Lost (K-L)	.43			
N. Cup + Soil Dry	6.02			
O. Cup	1.15			
P. Dry Soil (N-O)	4.87			
Q. Percent Moisture (M/P) 100	8.82			
R. Dry Soil, lbs. $C/(1 + Q/100)$	4.47			
S. Dry Soil, pcf (R/J)	112.0			
T. Maximum Density (From Curve)	121.7			
U. Percent Density (S/T) 100	92.0			

P. Cornejo (Technician)



**IMMEDIATE SERVICES
D PLANT - OLD BOWL TREATMENT BASIN**



FIELD DENSITY SUMMARY SHEETS

Project: RAAP BIO-Plant
 Client: Ciminelli Services

Date: 4/7/98
 Record No.:

Test No.	Test Location	Elev.	Field Moisture Content (%)	Field Dry Density (pcf)	Percent of Maximum Dry Density		Field Test Type	Proctor No.
					Act.	Spec.		
1	30' N.E. from Top of slope SEC-D	-5	14.9	110.1	90.4	90.4	NG	
2								
3	40' from S.W. slope SEC-C	-5	10.7	124.3	102.1			
4								
5	36' from S.W. slope SEC-B	-4	11.7	118.8	97.6			
6								
7	10' from N.E. Canal SEC-A	-3	12.7	108.0	88.7			
8				124.7	102.4		✓	
9	15' from N.E. Canal SEC-A	-3	10.5	116.3	95.5		SC	
10								
11								
12								
13								
14								
15								

Proctor No.	Max. Dry Density (pcf)	Optimum Moisture (%)	Soil Class.	Lab Test Type	Remarks: 8th Lift Froehling & Robertson, Inc. Technician:	Key: SC - Sand Cone (ASTM D1556) NG - Nuclear Gauge (ASTM D2922 & D3017) DC - Drive Cylinder (ASTM D2937) STD. - (ASTM D698) MOD. - (ASTM D1557)
	121.7	11.4	Yellow Tan			

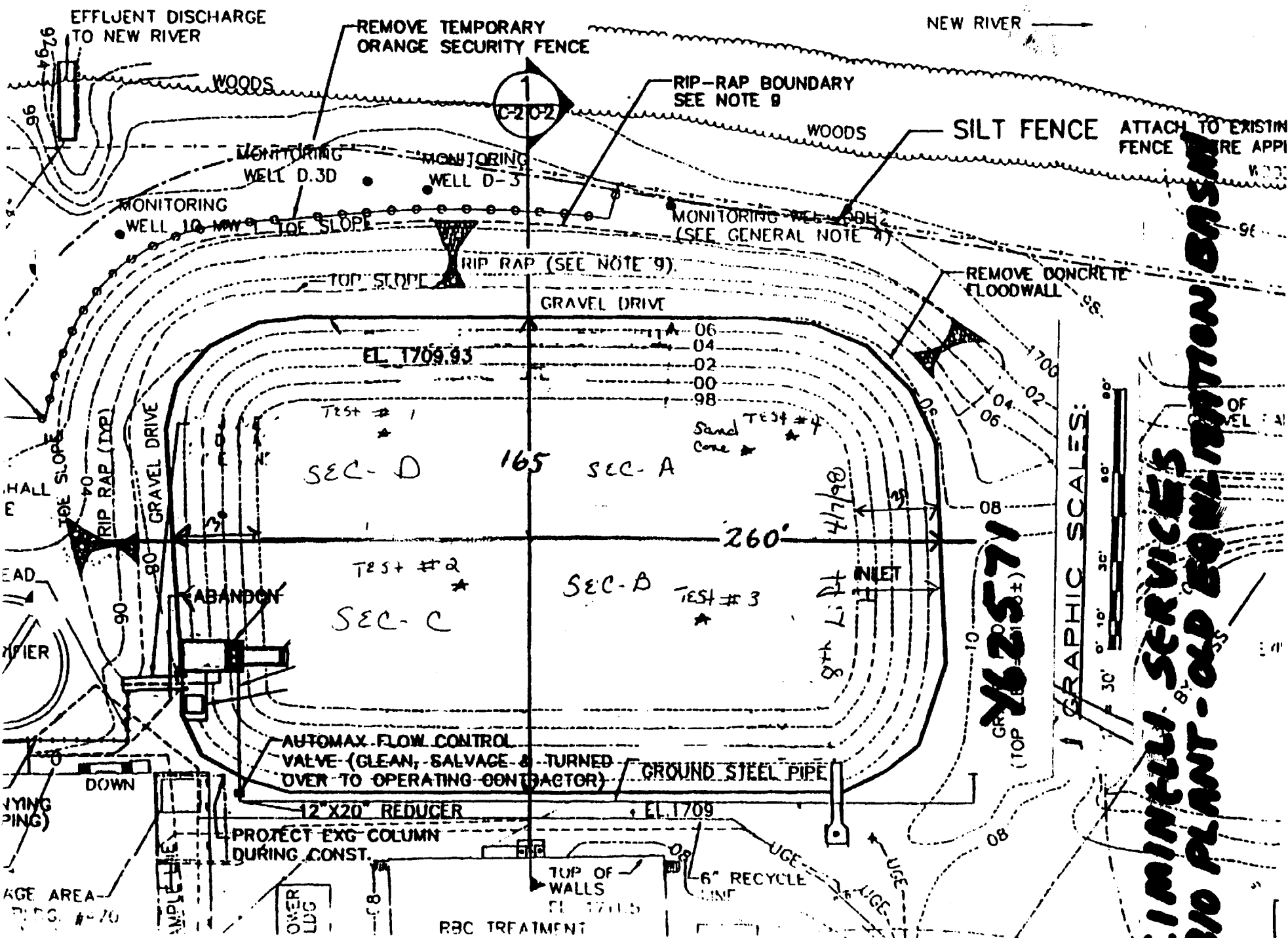
ROEHLING & ROBERTSON, INC.

Daily Field Compaction Tests

Made for: Cimarron Service Date 4/7/78
 Project: RAMP Bldg. Pl.
 Location: Bldg. Entrance - 15' from N.E. Corner Lot #8

A. Wet Weight, Soil + Bucket, lbs.	7.37				
B. Weight Bucket, lbs.	1.15				
C. Weight Wet Soil, lbs. (A-B)	6.22				
D. Initial Weight, lbs. Jar + Sand	15.72				
E. Final Weight, lbs. Jar + Sand	7.06				
F. Sand used, lbs. (D-E)	8.66				
G. Sand in Cone and Plate, lbs.	3.90				
H. Sand used in Hole (F-G)	4.76				
I. Weight of Sand (lbs./cu. ft.)	98.3				
J. Vol. of Hole (H/I) cu. ft.	.0484				
K. Cup + Soil Wet	7.37				
L. Cup + Soil Dry	6.78				
M. Moisture Lost (K-L)	.59				
N. Cup + Soil Dry	6.78				
O. Cup	1.15				
P. Dry Soil (N-O)	5.63				
Q. Percent Moisture (M/P) 100	10.5				
R. Dry Soil, lbs. $C/(1 + Q/100)$	5.63				
S. Dry Soil, pcf (R/J)	116.3				
T. Maximum Density (From Curve)	95.5				
U. Percent Density (S/T) 100	121.7				

P. Conner (Technician)



GRAPHIC SCALES:

MINI-SERVICES
NO PLANT - OLD BOWL MOUNTION BASIN

QUALITY ASSURANCE REPORT

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

96

Monday

06 April 1997

Concur with the contractor's report for this period?

☒ Yes ___ No*

Was any QC testing/inspection observed or were any specific QA
evaluations or verifications performed?

☒ No ___ Yes*

Were any instructions given to or information received from the Contractor?

☒ No ___ Yes*

Did anything develop on the work which might lead to a change order
or contract claim?

☒ No ___ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

Note REMARKS in CQC report. Questioned centered around proctor
being representative of material being used. Response and follow-up
by a quality control manager was good/noteworthy.

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.


MARK A. BISHOP

09 Apr 98

DATE


SUPV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

CONTRACTORS NAME: Ciminelli Services Corp.

Date 4-6-98 Report No. 95-98 Contract No. DAC(A)
65-98-C-0015 Project Name and Location of work:EQ Basin ClosureWeather: [Clear] [P. Cloudy] [Cloudy] [Rain: inches]
[Temp. min. 70 max.] Other Weather Conditions

1. Contractor (C) or Sub-contractor (S), and Area of Responsibility:

a. ()

Ciminelli - loading trucks, placing fill, compacting b. ()

c. ()

Hodge - hauling

d. ()

F & R - Soil testing e. ()

2. Equipment Data. (Indicate items of construction equipment, other than hand tools, at the job site and whether or not used):

Excavator - used off siteRoller - usedDoser - used

3. Work Performed Today (Indicate identity of Contractor and Sub-contractors, location, and description of work:

Ciminelli - Placed 5th and 6th liftsHodge - import fillF & R - Soil tests

4. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken):

a. Preparatory

Phase: N/A

b. Initial

Phase: N/A

c. Follow-up

Phase: N/A

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

See test report

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

N/A

7. Job Safety (Include deficiencies and corrective action taken:

NO deficiencies

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

See equip & Man Power report

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

Fill material - see below

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

At approx 2:30 pm Mark Bishop questioned the classification of the fill material and the location of the density tests. Cimirelli believes that the fill material is acceptable, but is waiting for lab verification on Wed. morning. → over

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED

TGS

CONTRACTOR'S QC SYSTEM MANAGER

Ciminelli does acknowledge some of the void that Mark Bishop witnessed on the 5th lift and will make every attempt to spread the material more uniformly. Also at about 3:00 pm Jody Blackburn witnessed that some of the chunks in question were indeed being broken ~~with~~ while placed. Also a laborer will be on site for the remainder of the backfilling operation to remove any rock that does not break into acceptable size. Material classification is expected Wed am and will be submitted as soon as available. By taking these steps test location should not be an issue. Tomorrow's (Tuesday's) site visit by Jody Blackburn or Mark Bishop should confirm or deny the effectiveness of the impending actions.

CONSTRUCTION MANPOWER AND EQUIPMENT REPORT

CONTRACT NO. DACA65-98-C-0015

DATE 4-6-98

LABOR CLASSIFICATION	P R I M E		F & R		Hodge Trucking						EQUIPMENT DESCRIPTION	NO. HOURS	
	#	H R S	#	H R S	#	H R S	#	H R S	#	H R S		USED	IDLE
QC Mgr	1	12									Dzer	8	4
Superintendent	1	12									Roller	6	6
Operator	1	12									Excavator - off site	12	0
Soil Tech			1	35									
Trucker						7	8						
Trucker						4	85						
Trucker						4	9						
TOTALS													
NO. OF EMPLOYEES (SUBTOTALS)	3		1		15							19	
NO. OF HOURS (SUBTOTALS)		36		35		126						165.5	
PREVIOUS TOTAL HOURS													
TOTAL HOURS THROUGH THIS DATE													
													2160.5

TEST REPORT

CONTRACTOR'S NAME: Ciminelli Services Corp.

STRUCTURE OR
BUILDINGEQ Basin ClosureCONTRACT NO: DACA65-98-C-0015DESCRIPTION OF ITEM, SYSTEM OR PART OF SYSTEM
TESTED: _____5th 8" 1.25DESCRIPTION OF
TEST: _____See attached

NAME AND TITLE OF PERSON IN CHARGE OF PERFORMING TESTS FOR CONTRACTOR:

NAME

Bruce Perry Conner

TITLE

Field Tech

SIGNATURE

See attached

I HEREBY CERTIFY THAT THE ABOVE DESCRIBED ITEM, SYSTEM OR PART OF SYSTEM HAS BEEN TESTED AS INDICATED ABOVE AND FOUND TO BE ENTIRELY SATISFACTORY AS REQUIRED IN THE CONTRACT SPECIFICATIONS.

SIGNATURE OF CONTRACTOR QUALITY CONTROL INSPECTOR

BGS

DATE

4-6-98

REMARKS: _____



FROEHLING & ROBERTSON, INC.
GEOTECHNICAL • ENVIRONMENTAL • MATERIALS
ENGINEERS • LABORATORIES
"OVER ONE HUNDRED YEARS OF SERVICE"

DAILY REPORT

Project Name: RAPP Bio Plant F & R Job No.: ☒
Client's Name: Cimexelli Services Date: 4/6/98
Inspection of: Basin Enclosure Technician: P. Conner

This report and the attached data sheet(s) constitute a summary of observations and tests performed by F&R's engineering technician. The statements made herein do not constitute a certification. Approval of data for final report can only be made by F&R's engineers and cannot be conveyed on this form. Interpretations based on this data are the responsibility of others.
THIS IS A FIELD COPY AND IS SUBJECT TO REVIEW AND REVISION.

I Contractor Activity

- ① Contractor placing fill at an 8" lift at Basin Enclosure. Placement was done by a crane. Compaction was done by a vibratory roller.
- ② Fill came from borrow area (behind Wilson on Rt. 460). Fill is different than a given proctor. Fill contains gray soil with approximately 50% of rock.
- ③ Fifth Lift Completed.

II Technician Activity

1. Technician batched 3-point proctor on borrow material in lab.
2. Observed the above mentioned
3. Performed Nuclear Density Tests on 5th lift and also performed Sand Cone.
4. Sample of Sand Cone was gathered and taken back to lab for Atterberg limits to be performed.



FIELD DENSITY SUMMARY SHEETS

Project: **RAMP - Bio Plant**

Date: **4/6/98**

Client: **Ciminelli Services**

Record No.:

Test No.	Test Location	Elev.	Field Moisture Content (%)	Field Dry Density (pcf)	Percent of Maximum Dry Density		Field Test Type	Proctor No.
					Act.	Spec.		
1	30' NE. from top of slope sec-A	-7	14.4	108.6	83.0	95%	NG	65926
2	40% Correction		14.4	109.6	99.6			
3	25' S.E. from Top of slope sec-A	-7	18.8	104.1	79.5			
4	40% Correction		18.8	119.1	91.0			
5	25' S.W. from Top of slope sec-C	-7	10.5	118.3	90.4			
6	15' N.W. from Top of slope sec-D	-7	12.7	113.4	86.6			
7	40% Rock Correction		12.7	131.4	100			
8								
9	30' S.W. from Top of slope sec-D	-7	Proctor 110				SC	
10			Available					
11								
12								
13								
14								
15								

Proctor No.	Max. Dry Density (pcf)	Optimum Moisture (%)	Soil Class.	Lab Test Type	Remarks:	Key:
65926	130.8	8.9	yellow silty clay		5th Lift Material is different than given previous Material is gray with large pieces not yellow Brown clay.	SC - Sand Cone (ASTM D1556)
					Froehling & Robertson, Inc.	NG - Nuclear Gauge (ASTM D2922 & D3017)
					Technician: P. Conner	DC - Drive Cylinder (ASTM D2937)
						STD. - (ASTM D698)
						MOD. - (ASTM D1557)

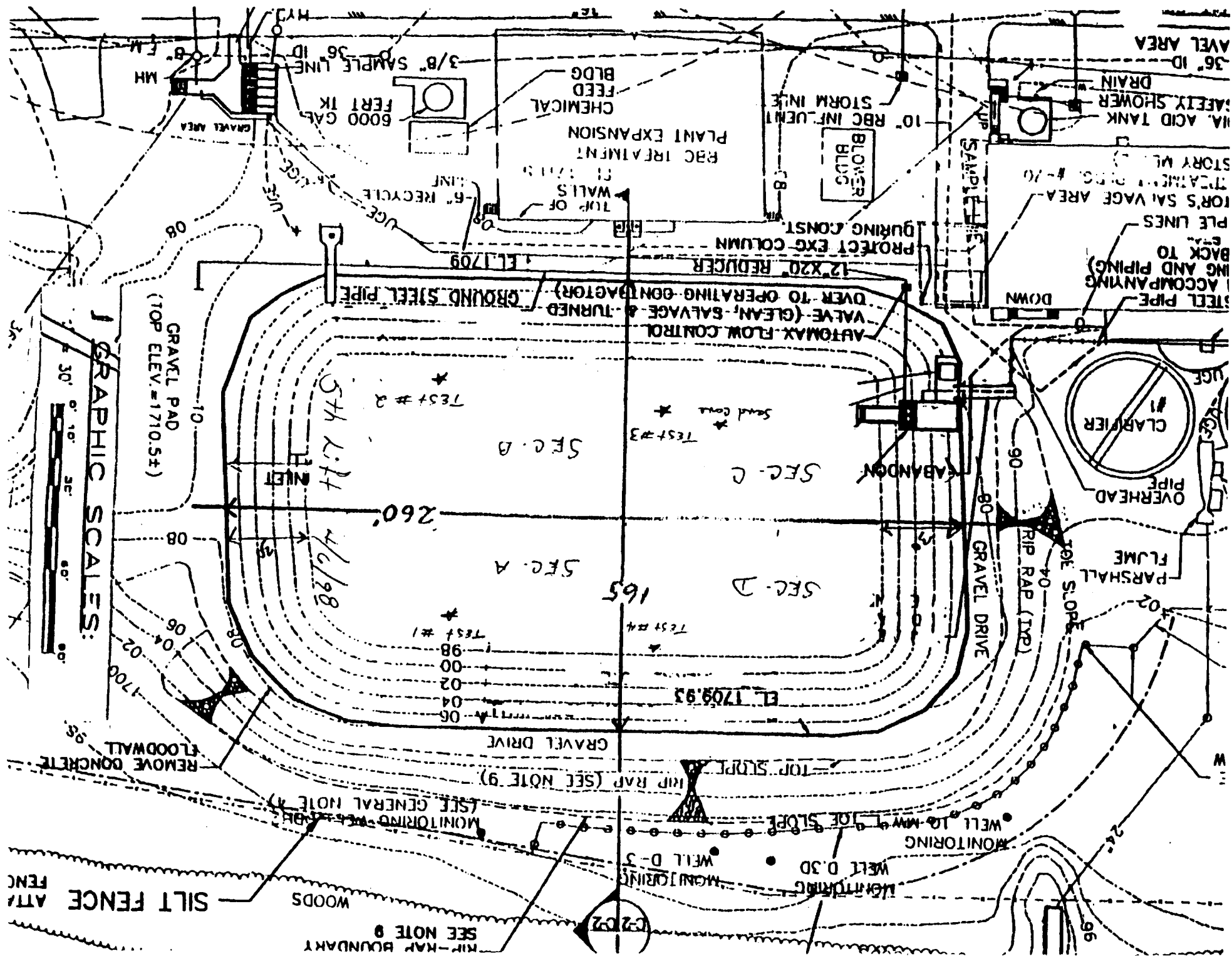
ROEHLING & ROBERTSON, INC.

Daily Field Compaction Tests

Made for: Cummins Engine Date 4/6/98
 Project: RAA-2-10-100
 Location: Box 100 (Gray Brown w/ Rock)

A. Wet Weight, Soil + Bucket, lbs.	6.88			
B. Weight Bucket, lbs.	1.15			
C. Weight Wet Soil, lbs. (A-B)	5.73			
D. Initial Weight, lbs. Jar + Sand	16.13			
E. Final Weight, lbs. Jar + Sand	8.62			
F. Sand used, lbs. (D-E)	7.51			
G. Sand in Cone and Plate, lbs.	9.00			
H. Sand used in Hole (F-G)	3.61			
I. Weight of Sand (lbs./cu. ft.)	99.5			
J. Vol. of Hole (H/I) cu. ft.	0.36			
K. Cup - Soil Wet	6.88			
L. Cup - Soil Dry	6.48			
M. Moisture Lost (K-L)	.40			
N. Cup + Soil Dry	12.43			
O. Cup	1.15			
P. Dry Soil (N-O)	5.33			
Q. Percent Moisture (M/P) 100	7.5			
R. Dry Soil, lbs. $C/(1 - Q/100)$	5.33			
S. Dry Soil, pc ³ (R/J)	145.2			
T. Maximum Density (From Curve)	PROCTOR NOT AVAILABLE AT THIS TIME			
U. Percent Density (S/T) 100				

P. Cox (Technician)



FROEHLING & ROBERTSON, I. A.

Daily Field Compaction Tests

Made for: Ciminelli Services Date 4/2/98
 Project: RAMP- BIO Plant
 Location: Basin Enclosure - 15' from NW. Corner, Lot #3
(Clay)

A. Wet Weight, Soil + Bucket, lbs.	5.55			
B. Weight Bucket, lbs.	1.13			
C. Weight Wet Soil, lbs. (A-B)	4.42			
D. Initial Weight, lbs. Jar + Sand	16.35			
E. Final Weight, lbs. Jar + Sand	8.95			
F. Sand used, lbs. (D-E)	7.4			
G. Sand in Cone and Plate, lbs.	3.90			
H. Sand used in Hole (F-G)	3.5			
I. Weight of Sand (lbs./cu. ft.)	98.3			
J. Vol. of Hole (H/I) cu. ft.	.0356			
K. Cup + Soil Wet	5.26			
L. Cup + Soil Dry	4.651			
M. Moisture Lost (K-L)	.609			
N. Cup + Soil Dry	4.651			
O. Cup	.84			
P. Dry Soil (N-O)	3.811			
Q. Percent Moisture (M/P) 100	16.02			
R. Dry Soil, lbs. $C/(1 - Q/100)$	3.811			
S. Dry Soil, pcf (R/J)	107.05			
T. Maximum Density (From Curve)	117.6			
U. Percent Density (S/T) 100	91.0			

P. Coxner (Technician)

QUALITY ASSURANCE REPORT

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

92

Thursday

02 April 1998

Concur with the contractor's report for this period?

☒ Yes ___ No*

Was any QC testing/inspection observed or were any specific QA
evaluations or verifications performed?

☒ No ___ Yes*

Were any instructions given to or information received from the Contractor?

☒ No ___ Yes*

Did anything develop on the work which might lead to a change order

or contract claim?

☒ No ___ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.


MARK A. BISHOP

07 Apr 98
DATE


SUPV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

CONTRACTORS NAME: Ciminelli Services Corp.

Date 4-2-98 Report No. 94 Contract No. DAC(A)
65-98-C-0015 Project Name and Location of work:EQ Basin ClosureWeather: [~~C~~Clear] [P.Cloudy] [Cloudy] [Rain: inches]
[Temp. min. 75 max.] Other Weather Conditions

1. Contractor (C) or Sub-contractor (S), and Area of Responsibility:

a. ()

Ciminelli - backfill b. ()
Hodge - hauling fill c. ()
F&R - Soil Testing d. ()

e. ()

2. Equipment Data. (Indicate items of construction equipment, other than hand tools, at the job site and whether or not used):

Dzer - used
Excavator - used
Roller - used

3. Work Performed Today (Indicate identity of Contractor and Sub-contractors, location, and description of work:

All contractors involved with Importing fill, backfilling

4. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken):

a. Preparatory

Phase: N/A

b. Initial

Phase: N/A

c. Follow-up

Phase: N/A

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

See test report

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

N/A

7. Job Safety (Include deficiencies and corrective action taken:

No deficiencies

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

See equip & manpower report

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

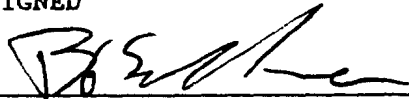
Backfill - in spec

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

N/A

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED



CONTRACTOR'S QC SYSTEM MANAGER

DATE 4-2-98

[illegible]

TEST REPORT

CONTRACTOR'S NAME: Ciminelli Services Corp.

STRUCTURE OR BUILDING EQ Basin Closure

CONTRACT NO: DACA65-98-C-0015

DESCRIPTION OF ITEM, SYSTEM OR PART OF SYSTEM TESTED: _____

3rd + 4th lift

DESCRIPTION OF TEST: _____

see attached

NAME AND TITLE OF PERSON IN CHARGE OF PERFORMING TESTS FOR CONTRACTOR:

NAME Penny Conner

TITLE Field Tech

SIGNATURE see attached

I HEREBY CERTIFY THAT THE ABOVE DESCRIBED ITEM, SYSTEM OR PART OF SYSTEM HAS BEEN TESTED AS INDICATED ABOVE AND FOUND TO BE ENTIRELY SATISFACTORY AS REQUIRED IN THE CONTRACT SPECIFICATIONS.

SIGNATURE OF CONTRACTOR QUALITY CONTROL INSPECTOR

BG [Signature]

DATE 4-2-98

REMARKS: _____



FROEHLING & ROBERTSON, INC.
GEOTECHNICAL • ENVIRONMENTAL • MATERIALS
ENGINEERS • LABORATORIES
"OVER ONE HUNDRED YEARS OF SERVICE"

DAILY REPORT

Project Name: RAAP Bio-Plant F & R Job No.:
Client's Name: Cimirelli Services Date: 4/2/98
Inspection of: Equalization Basin - Backfill Technician: P. Cox

This report and the attached data sheet(s) constitute a summary of observations and tests performed by F&R's engineering technician. The statements made herein do not constitute a certification. Approval of data for final report can only be made by F&R's engineers and cannot be conveyed on this form. Interpretations based on this data are the responsibility of others.
THIS IS A FIELD COPY AND IS SUBJECT TO REVIEW AND REVISION.

I. Contractor Activity

1. Contractor placed remaining backfill at west end area from on-site borrow fill. Lift # 3 is completed.
2. Contractor placed backfill with different material for the 4th lift. Placement was done by a dozer, - (compaction done by a vibratory roller). 4th lift has been completed.

II. Technician Activity

1. Observed the above mentioned.
2. Performed a Sand Cone at North west end on 3rd lift.
3. Performed Nuclear Densities on both 3rd & 4th lift.
4. Nuclear tests performed on 4th lift had trouble passing. Proctor did not match with the material. Technician did a rock correction of 30%. This was done by sieving soil through a 3/4 sieve and comparing the plus and minus. ~~Reference~~ Reference of a "Normograph" was also used for Rock Correction to determine compaction.
5. A soil sample was obtained and taken back to lab for a proctor.



FIELD DENSITY SUMMARY SHEETS

Project: *RAAP-BIO Plant*

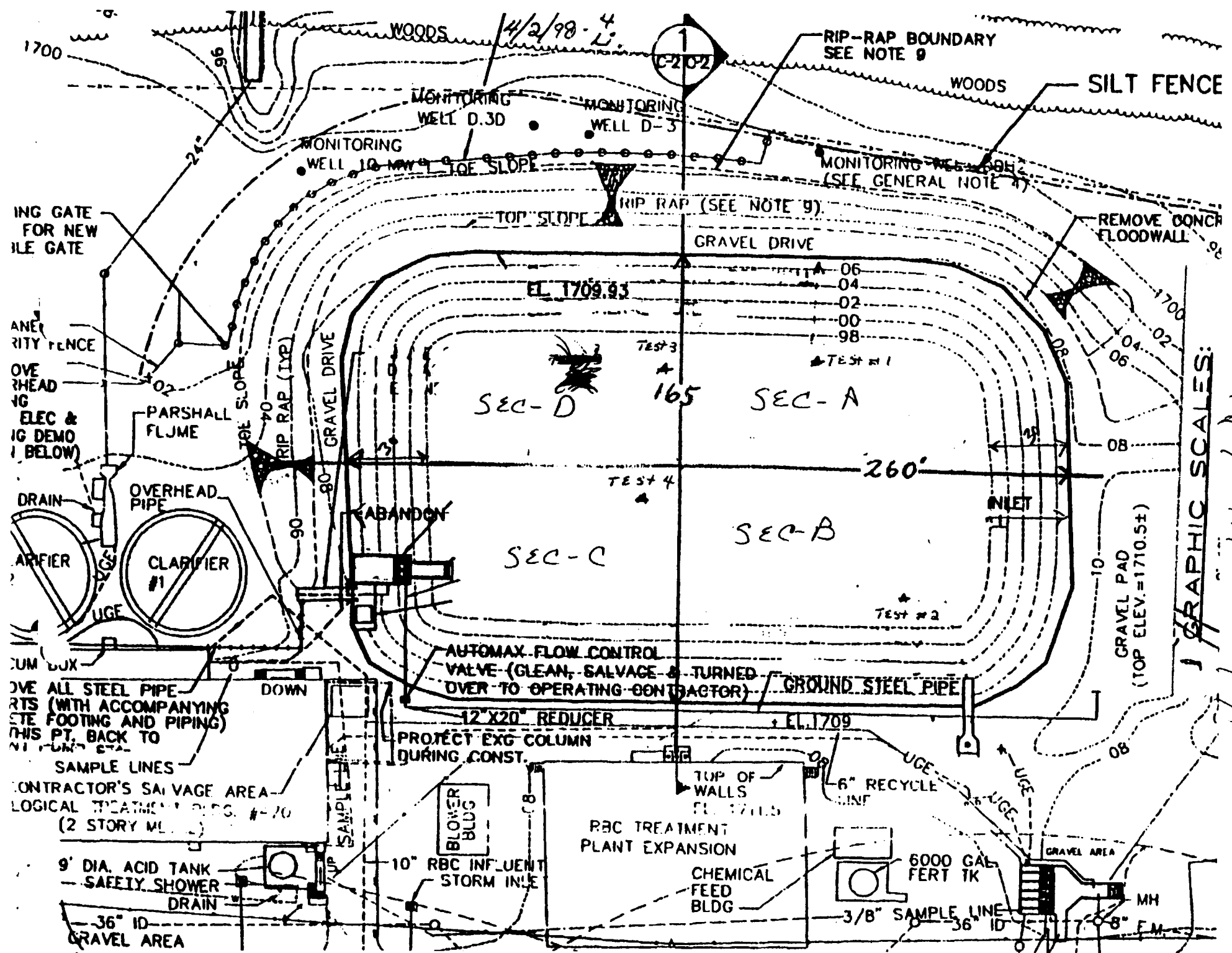
Date: *4/2/98*

Client: *Ciminelli SERVICES*

Record No.:

Test No.	Test Location	Elev.	Field Moisture Content (%)	Field Dry Density (pcf)	Percent of Maximum Dry Density		Field Test Type	Proctor No.
					Act.	Spec.		
1	<i>20' From N.W. CORNER SEC-D</i>	<i>-8</i>	<i>19.3</i>	<i>106.2</i>	<i>90.3</i>	<i>90%</i>	<i>NG</i> <i>8-6" Depth</i>	<i>65925</i>
2	<i>25' From S.W. CORNER SEC-C</i>	<i>-8</i>	<i>15.5</i>	<i>115.6</i>	<i>98.2</i>	<i>90%</i>	<i>8-6" Depth</i>	<i>65925</i>
3								
4	<i>15' From N.W. CORNER SEC-D</i>	<i>-8</i>					<i>SC</i>	
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								

Proctor No.	Max. Dry Density (pcf)	Optimum Moisture (%)	Soil Class.	Lab Test Type	Remarks: <i>Remaining half of 3rd 1/2 ft. West End</i> Froehling & Robertson, Inc. Technician:	Key: SC - Sand Cone (ASTM D1556) NG - Nuclear Gauge (ASTM D2922 & D3017) DC - Drive Cylinder (ASTM D2937) STD. - (ASTM D698) MOD. - (ASTM D1557)
<i>65925</i>	<i>117.6</i>	<i>13.9</i>	<i>Oak Beam</i>			
			<i>Sandy clay</i>			



GRAPHIC SCALES:

4/2/99 - 4th 1st

QUALITY ASSURANCE REPORT

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

91

Wednesday

01 April 1998

Concur with the contractor's report for this period?

☒ Yes ☐ No*

Was any QC testing/inspection observed or were any specific QA
evaluations or verifications performed?

☒ No ☐ Yes*

Were any instructions given to or information received from the Contractor?

☒ No ☐ Yes*

Did anything develop on the work which might lead to a change order
or contract claim?

☒ No ☐ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.


MARK A. BISHOP

07 Apr 98
DATE


SUPV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

CONTRACTORS NAME: Ciminelli Services Corp.

Date 4-1-98 Report No. 93 Contract No. DAC(A)
65-98-C-0015 Project Name and Location of work:FO Basin ClosureWeather: [Clear] [P. ~~Cloudy~~] [Cloudy] [Rain: .5 inches]
[Temp. min. 70 max.] Other Weather Conditions

1. Contractor (C) or Sub-contractor (S), and Area of Responsibility:

a. ()

)

Ciminelli - Remove Dam, backfill

b. (

c.

()

d. ()

e. (

)

2. Equipment Data. (Indicate items of construction equipment, other than hand tools, at the job site and whether or not used):

Digger - usedRoller - usedExcavator - left site today

3. Work Performed Today (Indicate identity of Contractor and Sub-contractors, location, and description of work:

Ciminelli - remove dam, backfill

4. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken):

a. Preparatory

Phase: N/A

b. Initial

Phase: N/A

c. Follow-up

Phase: N/A

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

N/A

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

N/A

7. Job Safety (Include deficiencies and corrective action taken:

N/A Deficiencies

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

See Equip + Manpower report

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

N/A

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

N/A Earthmoving until 1pm due to
Soil conditions

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED

[Signature]

CONTRACTOR'S QC SYSTEM MANAGER

DATE 4-1-98

[illegible]

QUALITY ASSURANCE REPORT

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

90

Tuesday

31 March 1998

Concur with the contractor's report for this period?

☒ Yes ☐ No*

Was any QC testing/inspection observed or were any specific QA
evaluations or verifications performed?

☒ No ☐ Yes*

Were any instructions given to or information received from the Contractor?

☒ No ☐ Yes*

Did anything develop on the work which might lead to a change order
or contract claim?


☒ No ☐ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.


MARK A. BISHOP

07 Apr 98
DATE


SUPERV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

CONTRACTORS NAME: Ciminelli Services Corp.

Date 3-31-98 Report No. 92 Contract No. DAC(A)
65-98-C-0015 Project Name and Location of work:EQ Basin ClosureWeather: [~~CLEAR~~] [P. Cloudy] [Cloudy] [Rain: inches]
[Temp. min. 85 max.] Other Weather Conditions

1. Contractor (C) or Sub-contractor (S), and Area of Responsibility:

a. ()

C- Ciminelli - remove berm / Buckfill b. ()S- Gray & Pape - Arch Monitoring c. ()S- F&R - Soil testing e. ()

2. Equipment Data. (Indicate items of construction equipment, other than hand tools, at the job site and whether or not used):

Excavator - used
Loader - used
Roller - used

3. Work Performed Today (Indicate identity of Contractor and Sub-contractors, location, and description of work:

Ciminelli - Placed 2nd lift and portion of 3rd
Gray & Pape - Completed Arch Monitoring
F&R - Soil testing

4. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken):

a. Preparatory

Phase: N/A

b. Initial

Phase: N/A

c. Follow-up

Phase: N/A

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

See test report for 3-31-78

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

N/A

7. Job Safety (Include deficiencies and corrective action taken:

No deficiencies

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

See Equip + Manpower Reports

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

N/A

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

N/A

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED



CONTRACTOR'S QC SYSTEM MANAGER

DATE 3-31-94

[illegible]

TEST REPORT

CONTRACTOR'S NAME: Ciminelli Services Corp.

STRUCTURE OR
BUILDING

EQ Basin Closure

CONTRACT NO: DACA65-98-C-0015

DESCRIPTION OF ITEM, SYSTEM OR PART OF SYSTEM
TESTED:

Soil Tests

DESCRIPTION OF
TEST:

Nuclear Gauge

NAME AND TITLE OF PERSON IN CHARGE OF PERFORMING TESTS FOR CONTRACTOR:

NAME

Penny Conner

TITLE

Field Tech

SIGNATURE

See attached

I HEREBY CERTIFY THAT THE ABOVE DESCRIBED ITEM, SYSTEM OR PART OF SYSTEM HAS
BEEN TESTED AS INDICATED ABOVE AND FOUND TO BE ENTIRELY SATISFACTORY AS
REQUIRED IN THE CONTRACT SPECIFICATIONS.

SIGNATURE OF CONTRACTOR QUALITY CONTROL INSPECTOR

BGS

DATE

4-1-98

REMARKS:

samples collected for sand cone, Atterberg limits,
and gradation analysis.



1881

FROEHLING • ROBERTSON, INC.
 GEOTECHNICAL • ENVIRONMENTAL • MATERIALS
 ENGINEERS • LABORATORIES
 "OVER ONE HUNDRED YEARS OF SERVICE"

DAILY REPORT

Project Name: RAAP BIO-PlantF & R Job No.: Client's Name: Cimixelli, AmericanDate: 3/31/98Inspection of: Rocky M. Basin EnclosureTechnician: P. Conner

This report and the attached data sheet(s) constitute a summary of observations and tests performed by F&R's engineering technician. The statements made herein do not constitute a certification. Approval of data for final report can only be made by F&R's engineers and cannot be conveyed on this form. Interpretations based on this data are the responsibility of others.

THIS IS A FIELD COPY AND IS SUBJECT TO REVIEW AND REVISION.

I. Contractor Activity

1. Contractor placed an 8" lift of Equalization Basin. Soil came from on-site borrow pit. Placement was done by a John Deere Loader - Compaction done by large vibratory roller. 2nd lift has been completed.
2. 3rd lift was placed at East end.

II. Technician Activity

1. Technician observed above mentioned. Performed Density Tests. F&R Engineer was on site and reviewed the Rock Correction. A sample of soil was taken back to lab for Atterberg limits test and gradation analysis.



FIELD DENSITY SUMMARY SHEETS

Project: RAAP. Bio Plant
Client: Ciminelli Services

Date: 3/31/98

Record No.:

Test No.	Test Location	Elev.	Field Moisture Content (%)	Field Dry Density (pcf)	Percent of Maximum Dry Density		Field Test Type	Proctor No.
					Act.	Spec.		
1	15' N. E. From Toe of slope sec A	-9	20.6	106.0	90.1	90%	NG 8.6" Depth	65925
2	60' S. E. From Toe of slope sec B	-9	21.1	104.6	88.9			
3	Test #2 + 4 Rock Correction at 72			108.6	92.3			
4	10' N. W. From Toe of slope sec C	-9	17.3	111.0	94.3			
5	8' N. W. From Toe of slope sec D	-9	17.2	107.3	91.2	↓	↓	↓
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								

Proctor No.	Max. Dry Density (pcf)	Optimum Moisture (%)	Soil Class.	Lab Test Type	Remarks:	Key:
65925	117.6	13.9	Dark Brown sandy clay		Tests were taken at Equalizer Basin	SC - Sand Cone (ASTM D1556)
					Tests were taken on 2nd 2:1 ft.	NG - Nuclear Gauge (ASTM D2922 & D3017)
					Froehling & Robertson, Inc.	DC - Drive Cylinder (ASTM D2937)
					Technician: P. Conner	STD. - (ASTM D698)
						MOD. - (ASTM D1557)

8/27/08
0.00, 0.00

N

E

★
TEST # 4

SEC - L

SEC - A

★
TEST # 1

★ + H (over) (over) Done.

★
TEST # 2

SEC - B

SEC - C

★
TEST # 3

W

S



FIELD DENSITY SUMMARY SHEETS

Project: RAAP. Bio Plant

Date: 3/31/98

Client: Cimino Services

Record No.:

Test No.	Test Location	Elev.	Field Moisture Content (%)	Field Dry Density (pcf)	Percent of Maximum Dry Density		Field Test Type	Proctor No.
					Act.	Spec.		
1	20' N.E. from Top of slope sec A	-8	19.4	107.6	91.4	90.2	NG 8.6" Depth	65925
2	30' SE from Top of slope sec B	-8	22.7	103.2	88.2	↓	↓	↓
3	TEST #2 - *4 Rock Correction at 72" Sec-C			107.2	91.1	↓	↓	↓
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								

Proctor No.	Max. Dry Density (pcf)	Optimum Moisture (%)	Soil Class.	Lab Test Type	Remarks:	Key:
65925	117.6	13.9	OK Remedy		Tests were taken at Equalization Basins 3rd lift East End only	SC - Sand Cone (ASTM D1556) NG - Nuclear Gauge (ASTM D2922 & D3017) DC - Drive Cylinder (ASTM D2937) STD. - (ASTM D698) MOD. - (ASTM D1557)

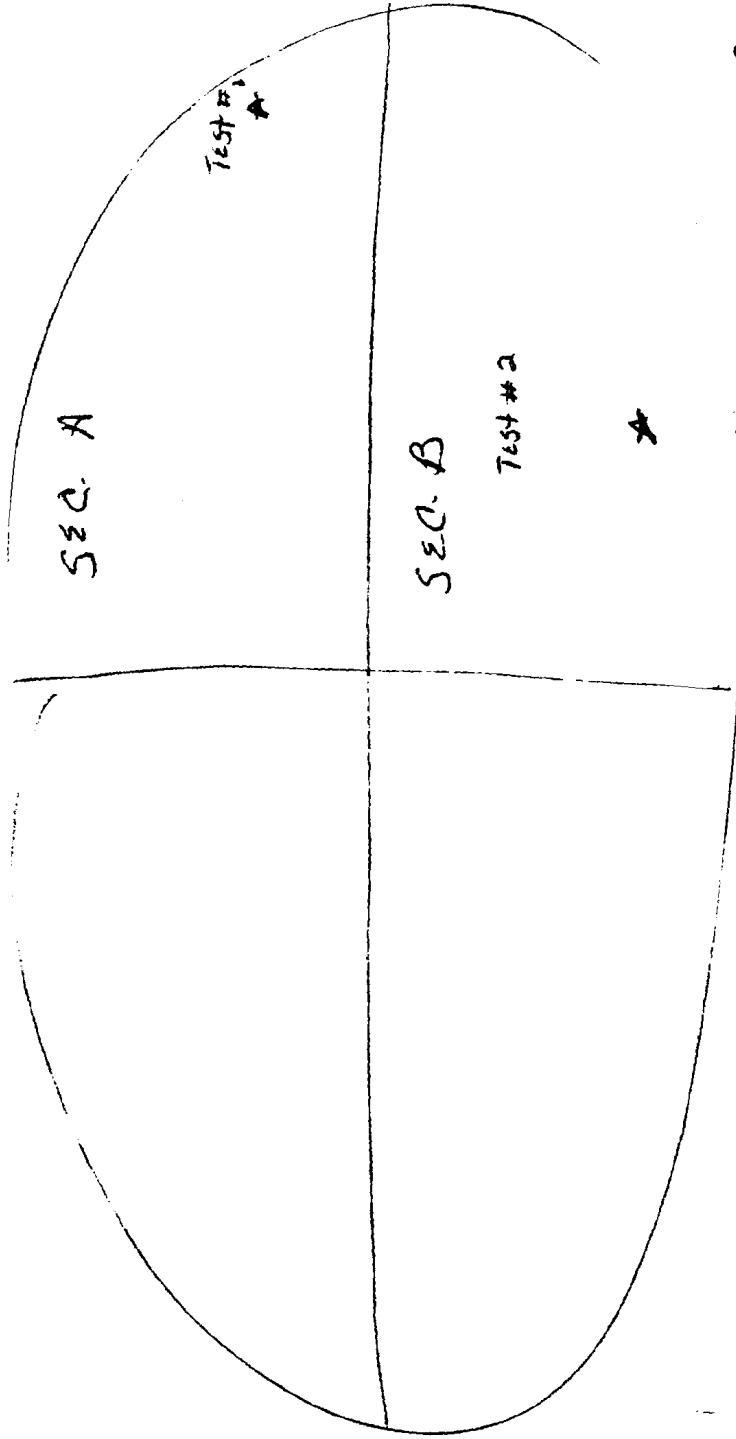
Froehling & Robertson, Inc.

Technician: P. Conner

3/31/98

1/2 of 3rd 2. Rt

E



S

N

W

QUALITY ASSURANCE REPORT

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

89

Monday

30 March 1997

Concur with the contractor's report for this period?

☒ Yes ☐ No*

Was any QC testing/inspection observed or were any specific QA
evaluations or verifications performed?

☒ No ☐ Yes*

Were any instructions given to or information received from the Contractor?

☒ No ☐ Yes*

Did anything develop on the work which might lead to a change order
or contract claim?

☒ No ☐ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

Attended preparatory inspection on backfilling operations.

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.

Mark A. Bishop
MARK A. BISHOP

01 Apr 98
DATE

[Signature]
SUPV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

4 Nuclear Gauge test performed all satisfactory

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

N/A

7. Job Safety (Include deficiencies and corrective action taken:

No deficiencies

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

Excavator - used
Vibratory roller - used
Dzer - used

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

Vibratory roller

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

N/A

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED

BG Sullivan

CONTRACTOR'S QC SYSTEM MANAGER

DATE 8-28-92

[illegible]

DATE 3-29-58

[illegible]

CONSTRUCTION MANPOWER AND EQUIPMENT REPORT

CONTRACT NO. DACA65-98-C-0015

DATE 3-30-98

[illegible]

PREPARATORY PHASE CHECKLIST

CONTRACTOR'S NAME Ciminelli Services Corp.

Contract No.: DACA65-98-C-0015

Date Preparatory Held: 3-30-98

Title: Remove Berm, Backfill

Spec Section: B2210

Drawing No(s): C-3

Definable Feature of Work: Remove Berm, Backfill

A. PERSONNEL PRESENT:

Name	Position	Company
1. Mark Bishop	Field Eng.	Army Corps of Eng
2. Penny Conner	Field Tech	for F & R
3. Ed Sullivan	Superintendent	Ciminelli
4. Brandon Schlemmer	QC Mgr	"
5.		
6.		
7.		
8.		

(List additional personnel on reverse side)

B. DRAWINGS AND SPECS:

I. Has each spec paragraph, contract drawing, and shop drawing been studied? YES ☒ NO ☐II. Do all parties have up-to-date drawings and specifications? YES ☒ NO ☐

C. SHOP DRAWINGS INVOLVED:

Transmittal/Item	Code	Contractor or Gov't Approval
1. N/A		
2.		
3.		
4.		

previously submitted

G. EQUIPMENT Requiring Operational Check:

1. Excavator
2. Dozer
3. Roller
4. _____

H. WORKMANSHIP: Have procedures for accomplishing work been reviewed with appropriate people? YES ☒ NO _____

I. PREVIOUS WORK: Has all preliminary work been accomplished in accordance with contract requirements and is this feature of work ready to start? YES ☒ NO _____

Explain any problems: _____

J. HI-LIGHTING SPECIFIC ITEMS: Hi-light specific items noted during the Preparatory Phase inspection. ie, (Med. Voltage cable shall be hi-pot tested).

K. OTHER COMMENTS: _____



Quality Control Representative
Signature

TEST REPORT

CONTRACTOR'S NAME: Ciminelli Services Corp.

STRUCTURE OR
BUILDINGEQ Basin ClosureCONTRACT NO: DACA65-98-C-0015DESCRIPTION OF ITEM, SYSTEM OR PART OF SYSTEM
TESTED: _____Lift #1DESCRIPTION OF
TEST: _____Nuclear Gauge

NAME AND TITLE OF PERSON IN CHARGE OF PERFORMING TESTS FOR CONTRACTOR:

NAME

Perry Connor

TITLE

Field Technician

SIGNATURE

see attachedI HEREBY CERTIFY THAT THE ABOVE DESCRIBED ITEM, SYSTEM OR PART OF SYSTEM HAS
BEEN TESTED AS INDICATED ABOVE AND FOUND TO BE ENTIRELY SATISFACTORY AS
REQUIRED IN THE CONTRACT SPECIFICATIONS.

SIGNATURE OF CONTRACTOR QUALITY CONTROL INSPECTOR

[Signature]

DATE

3-31-98

REMARKS: _____



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ENGINEERS • LABORATORIES
"OVER ONE HUNDRED YEARS OF SERVICE"

DAILY REPORT

Project Name: RANP- Bio Plant F & R Job No.:
Client's Name: Viminelli Services Date: 3/30/99
Inspection of: Back Fill Technician: P. Conner

This report and the attached data sheet(s) constitute a summary of observations and tests performed by F&R's engineering technician. The statements made herein do not constitute a certification. Approval of data for final report can only be made by F&R's engineers and cannot be conveyed on this form. Interpretations based on this data are the responsibility of others.
THIS IS A FIELD COPY AND IS SUBJECT TO REVIEW AND REVISION.

I Contractor Activity

1. Contractor placed a 8" lift at Equalization Basin. Soil came from on-site borrow pit. Placement was done by a John Deere Dozer. Compaction was done by "Ingersoll Rand" vibratory roller. One lift completed.

II. Technician Activity

1. Technician observed the above mentioned.
2. Performed Density Test - and obtained a sample of soil from each lift. Soil sample taken to shop for "4" Correction.



FIELD DENSITY SUMMARY SHEETS

Project: *RAAP Bio-Plant*

Date: *3/30/98*

Client: *Liminelli Services*

Record No.:

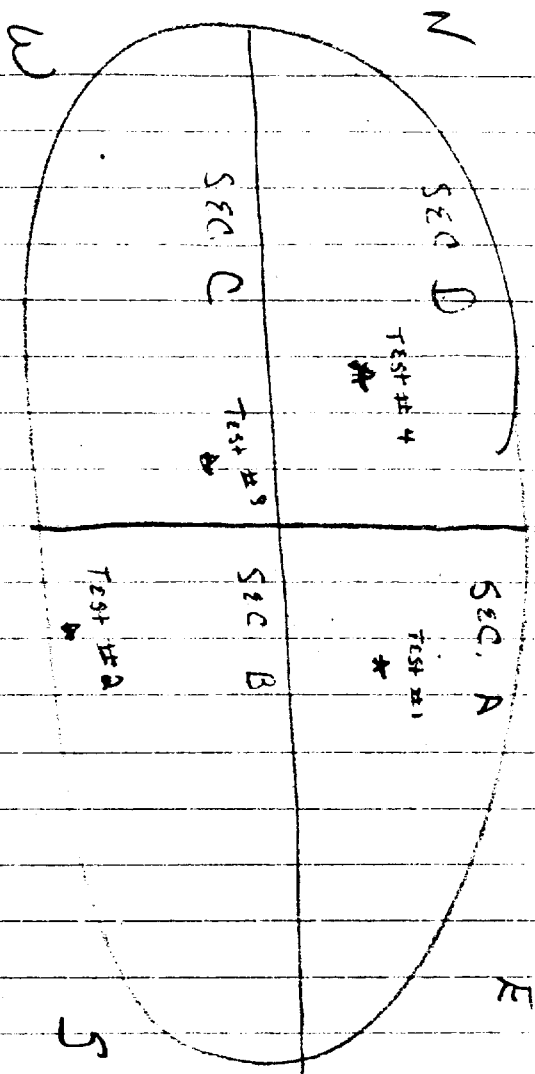
Test No.	Test Location	Elev.	Field Moisture Content (%)	Field Dry Density (pcf)	Percent of Maximum Dry Density		Field Test Type	Proctor No.
					Act.	Spec.		
1	<i>22' N.E. from toe of slope sec-A</i>	<i>-10'</i>	<i>17.5</i>	<i>111.5</i>	<i>94.8</i>	<i>90%</i>	<i>8.6</i> <i>Depth</i>	<i>65925</i>
2	<i>10' S.E. from toe of slope sec-B</i>	<i>-10'</i>	<i>18.5</i>	<i>112.7</i>	<i>95.7</i>	<i>90%</i>	<i>↓</i>	<i>↓</i>
3	<i>25' S.E. from toe of slope sec-C</i>	<i>-10'</i>	<i>17.9</i>	<i>109.1</i>	<i>92.7</i>	<i>90%</i>	<i>↓</i>	<i>↓</i>
4	<i>20' N.E. from toe of slope sec-D</i>	<i>-10'</i>	<i>17.3</i>	<i>111.3</i>	<i>94.6</i>	<i>90%</i>	<i>↓</i>	<i>↓</i>
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								

Proctor No.	Max. Dry Density (pcf)	Optimum Moisture (%)	Soil Class.	Lab Test Type	Remarks:	Key:
<i>65925</i>	<i>117.6</i>	<i>13.9</i>	<i>Dark Brown sandy clay</i>		<i>Tests made at Equalization Basin.</i>	SC - Sand Cone (ASTM D1556)
						NG - Nuclear Gauge (ASTM D2922 & D3017)
						DC - Drive Cylinder (ASTM D2937)
						STD. - (ASTM D698)
						MOD. - (ASTM D1557)

Froehling & Robertson, Inc.

Technician: *P. Coxner*

3-30-98



QUALITY ASSURANCE REPORT

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

86

Friday

27 March 1998

Concur with the contractor's report for this period?

☒ Yes ☐ No*

Was any QC testing/inspection observed or were any specific QA
evaluations or verifications performed?

☒ No ☐ Yes*

Were any instructions given to or information received from the Contractor?

☒ No ☐ Yes*

Did anything develop on the work which might lead to a change order
or contract claim?

☒ No ☐ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

RAAP, OPCON and VA DEQ conducted an inspection associated with
RAAP's closure plan/permit with DEQ. Inspection is irrelevant to
this contract.

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.


MARK A. BISHOP

01 Apr 98
DATE


SUPERV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

CONTRACTORS NAME: Ciminelli Services Corp.

Date 3-27-98 Report No. 88 Contract No. DAC(A)
65-98-C-0015 Project Name and Location of work:FR Basin ClosureWeather: [~~Clear~~] [P.Cloudy] [Cloudy] [Rain: inches]
[Temp. min. 78 max.] Other Weather Conditions

1. Contractor (C) or Sub-contractor (S), and Area of Responsibility:

- a. () C - Ciminelli - Basin prep for Inspection b. ()
() S - Gray & Pape - Arch. Investigation c. ()
d. () e. ()
()

2. Equipment Data. (Indicate items of construction equipment, other than hand tools, at the job site and whether or not used):

N/A dozer - used
excavator - used

3. Work Performed Today (Indicate identity of Contractor and Sub-contractors, location, and description of work:

Ciminelli - basin prep for inspection / prep for backfill
Gray & Pape - Arch. monitoring

4. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken):

a. Preparatory

Phase: N/A

b. Initial

Phase: N/A

c. Follow-up

Phase: N/A

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

N/A

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

N/A

7. Job Safety (Include deficiencies and corrective action taken:

NO deficiencies

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

See Equip & Manpower report

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

N/A

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

N/A

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED

BGS

CONTRACTOR'S QC SYSTEM MANAGER

DATE 3-27-98

[illegible]

QUALITY ASSURANCE REPORT

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

85

Thursday

26 March 1998

Concur with the contractor's report for this period?

☒ Yes ☐ No*

Was any QC testing/inspection observed or were any specific QA
evaluations or verifications performed?

☒ No ☐ Yes*

Were any instructions given to or information received from the Contractor?

☒ No ☐ Yes*

Did anything develop on the work which might lead to a change order
or contract claim?

☒ No ☐ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

In am today, Area Engr. and undersigned met w/ Ciminelli at their request. Archeological monitor has asked permission to perform some digs to investigate. Raised no objections provided progress on not impacted.

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.

Mark A. Bishop
MARK A. BISHOP

30 MAR 98
DATE

[Signature]
SUPV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

CONTRACTORS NAME: Ciminelli Services Corp.

Date 3-26-78 Report No. 87 Contract No. DAC(A)
65-98-C-0015 Project Name and Location of work:EQ Basin ClosureWeather: [~~Clear~~] [P. Cloudy] [Cloudy] [Rain: inches]
[Temp. min. 75 max.] Other Weather Conditions

1. Contractor (C) or Sub-contractor (S), and Area of Responsibility:

a. () Contractor - Ciminelli - Liner Removal / Prep for DEQ b. ()
() Sub - Gray & Pape - Arch Monitoring c. ()
() Sub - Hodge - Trucking d. ()
e. ()

2. Equipment Data. (Indicate items of construction equipment, other than hand tools, at the job site and whether or not used):

Excavator - used
Dumper - used

3. Work Performed Today (Indicate identity of Contractor and Sub-contractors, location, and description of work:

Ciminelli - Liner Removal / Basin Prep for Inspection
Gray & Pape - CSAM
Hodge - Hauling

4. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken):

a. Preparatory

Phase: N/A

b. Initial

Phase: N/A

c. Follow-up

Phase: N/A

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

N/A

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

N/A

7. Job Safety (Include deficiencies and corrective action taken:

NO deficiencies

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

See Equip & Material Report

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

N/A

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

Meeting @ 8:00 am granted CSAM additional time

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED

BG Sullivan

CONTRACTOR'S QC SYSTEM MANAGER

DATE 3-26-98

LABOR CLASSIFICATION	PRIME		<i>Craig & Papp</i>		<i>Hodge Trucking</i>						EQUIPMENT DESCRIPTION	NO. HOURS	
	#	HRS	#	HRS	#	HRS	#	HRS	#	HRS		USED	IDLE
<i>OK Mgr</i>	1	10									<i>Excavator</i>	5	5
<i>Superintendent</i>	1	10									<i>Doker</i>	5	5
<i>Operator</i>	1	10											
<i>Laborer</i>	1	10											
<i>CSAM</i>			1	10									
<i>Trucker</i>					1	3.5							
TOTALS													
NO. OF EMPLOYEES (SUBTOTALS)	4		1		1							6	
NO. OF HOURS (SUBTOTALS)		40		10		3.5						53.5	
PREVIOUS TOTAL HOURS												1710.5	
TOTAL HOURS THROUGH THIS DATE												1764	

QUALITY ASSURANCE REPORT

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

83

Tuesday

24 March 1998

Concur with the contractor's report for this period?

☐ Yes ☐ No*

Was any QC testing/inspection observed or were any specific QA
evaluations or verifications performed?

☐ No ☐ Yes*

Were any instructions given to or information received from the Contractor?

☐ No ☐ Yes*

Did anything develop on the work which might lead to a change order

or contract claim?

☐ No ☐ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

No work Monday, 23 March 1998 (82). Contractor planned to
work Tuesday - Friday

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.


MARK A. BISHOP

27MAR98
DATE


SUPV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

CONTRACTORS NAME: Ciminelli Services Corp.

Date 3-24-98 Report No. 81-85 Contract No. DAC(A)
65-98-C-0015 Project Name and Location of work:
EQ Basin Closure

Weather: [Clear] [P~~re~~Cloudy] [Cloudy] [Rain: inches]
[Temp. min. 45 max.] Other Weather Conditions

1. Contractor (C) or Sub-contractor (S), and Area of Responsibility:

- a. () Contractor - Ciminelli - liner removal and disposal b. ()
 S - Gray & Pope - Arch monitoring c. ()
 S - Hodge Trucking - hauling
d. () e. ()

2. Equipment Data. (Indicate items of construction equipment, other than hand tools, at the job site and whether or not used):

Excavator - used
dozer - used

3. Work Performed Today (Indicate identity of Contractor and Sub-contractors, location, and description of work:

Ciminelli - liner removal disposal
Gray & Pope - Arch monitoring
Hodge Trucking - hauling liner

4. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken):

a. Preparatory

Phase: N/A

b. Initial

Phase: N/A

c. Follow-up

Phase: N/A

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

N/A

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

N/A

7. Job Safety (Include deficiencies and corrective action taken:

No deficiencies

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

see equip. + manpower report

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

N/A

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

N/A

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED



CONTRACTOR'S QC SYSTEM MANAGER

DATE 3-24-98

[illegible]

QUALITY ASSURANCE REPORT

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

84

Wednesday

25 March 1998

Concur with the contractor's report for this period?

☒ Yes ☐ No*

Was any QC testing/inspection observed or were any specific QA
evaluations or verifications performed?

☒ No ☐ Yes*

Were any instructions given to or information received from the Contractor?

☒ No ☐ Yes*

Did anything develop on the work which might lead to a change order
or contract claim?

☒ No ☐ Yes*

Safety Observations and General Comments/Remarks:


(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.


MARK A. BISHOP

27 MAR 98
DATE


SUPV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

CONTRACTORS NAME: Ciminelli Services Corp.

Date 3-25-98 Report No. 86 Contract No. DAC(A)
65-98-C-0015 Project Name and Location of work:EQ Basin ClosureWeather: [Clear] [~~P. Cloudy~~] [Cloudy] [Rain: _____ inches]
[Temp. _____ min. 45 max.] Other Weather Conditions _____

1. Contractor (C) or Sub-contractor (S), and Area of Responsibility:

a. () Contractor - Ciminelli - liner removal & disposal b. ()
() Gray & Pipe - Arch. monitoring c. ()
() Heavy Trucking - hauling
d. () _____ e. ()
() _____

2. Equipment Data. (Indicate items of construction equipment, other than hand tools, at the job site and whether or not used):

Excavator - used
Dumper - used

3. Work Performed Today (Indicate identity of Contractor and Sub-contractors, location, and description of work):

Ciminelli - removal/disposal of liner
Gray & Pipe - CSAM
Heavy Trucking - hauling

4. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken):

a. Preparatory

Phase: N/A

b. Initial

Phase: N/A

c. Follow-up

Phase: N/A

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

N/A

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

N/A

7. Job Safety (Include deficiencies and corrective action taken:

No deficiencies

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

See equip & manpower report

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

N/A

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

Meeting 3-26-98 @ BHM to discuss CSAM Progress

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED



CONTRACTOR'S QC SYSTEM MANAGER

CONSTRUCTION MANPOWER AND EQUIPMENT REPORT

CONTRACT NO. DACA65-98-C-0015

DATE 3-25-98

[illegible]

QUALITY ASSURANCE REPORT

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

78

Thursday

19 March 1998

Concur with the contractor's report for this period?

☒ Yes ☐ No*

Was any QC testing/inspection observed or were any specific QA
evaluations or verifications performed?

☒ No ☐ Yes*

Were any instructions given to or information received from the Contractor?

☒ No ☐ Yes*

Did anything develop on the work which might lead to a change order
or contract claim?

☒ No ☐ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.


MARK A. BISHOP

27 MAR 98
DATE


SUPV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

CONTRACTORS NAME: Ciminelli Services Corp.

Date 3-19-98 Report No. 80 Contract No. DAC(A)
65-98-C-0015 Project Name and Location of work:EQ Basin ClosureWeather: [Clear] [~~P. Cloudy~~] [Cloudy] [Rain: inches]
[Temp. min. 65 max.] Other Weather Conditions

1. Contractor (C) or Sub-contractor (S), and Area of Responsibility:

- a. () Ciminelli - Liner removal / disposal b. ()
c. ()
d. () Gray & Pape - Arch Monitoring
e. ()
f. () Hodge Trucking - Hauling

2. Equipment Data. (Indicate items of construction equipment, other than hand tools, at the job site and whether or not used):

Excavator - used
Dozer - used

3. Work Performed Today (Indicate identity of Contractor and Sub-contractors, location, and description of work:

Ciminelli - Continued removal of liner in Arch area / disposal
Gray & Pape - CSAM
Hodge Trucking - Hauling

4. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken):

a. Preparatory

Phase: N/A

b. Initial

Phase: N/A

c. Follow-up

Phase: N/A

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

N/A

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

N/A

7. Job Safety (Include deficiencies and corrective action taken:

No deficiencies

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

See equipment & Manpower report

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

N/A

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

Waiting for response from Corp to RFI stating Cimicelli is exceeding liner quantities for disposal

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED



CONTRACTOR'S QC SYSTEM MANAGER

CONSTRUCTION MANPOWER AND EQUIPMENT REPORT

CONTRACT NO. DACA65-98-C-0015

DATE 3-19-98

LABOR CLASSIFICATION	P R I M E		C r a y & P a p e		H o d g e T r a c k i n g						EQUIPMENT DESCRIPTION	NO. HOURS	
	#	HRS	#	HRS	#	HRS	#	HRS	#	HRS		USED	IDLE
QC Mgr	1	10									Excavator	8	2
Superintendent	1	10									Dozer	4	4
Operator	1	10											
Laborer	1	10											
CSAM			1	10									
Trucker					6	10.5							
Trucker					9	10							
Trucker					1	9.5							
Trucker					1	7.5							
TOTALS													
NO. OF EMPLOYEES (SUBTOTALS)	4		1		17							22	
NO. OF HOURS (SUBTOTALS)		40		10		170						220	
PREVIOUS TOTAL HOURS											1111		
TOTAL HOURS THROUGH THIS DATE											1331		

Q U A L I T Y A S S U R A N C E R E P O R T

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

78

Thursday

19 March 1998

Concur with the contractor's report for this period?

☒ Yes ☐ No*

Was any QC testing/inspection observed or were any specific QA
evaluations or verifications performed?

☒ No ☐ Yes*

Were any instructions given to or information received from the Contractor?

☒ No ☐ Yes*

Did anything develop on the work which might lead to a change order
or contract claim?

☒ No ☐ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.


MARK A. BISHOP

27 MAR 98
DATE


SUPV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

CONTRACTORS NAME: Ciminelli Services Corp.

Date 3-19-98 Report No. 80 Contract No. DAC(A)
65-98-C-0015 Project Name and Location of work:EA Basin ClosureWeather: [Clear] [P. Cloudy] [Cloudy] [Rain: inches]
[Temp. min. 65 max.] Other Weather Conditions

1. Contractor (C) or Sub-contractor (S), and Area of Responsibility:

- a. () Ciminelli - Liner removal / disposal b. ()
c. ()
d. () Gray & Pape - Arch Monitoring
e. ()
Hodge Trucking - Hauling

2. Equipment Data. (Indicate items of construction equipment, other than hand tools, at the job site and whether or not used):

Excavator - used
Dozer - used

3. Work Performed Today (Indicate identity of Contractor and Sub-contractors, location, and description of work:

Ciminelli - Continued removal of liner in Arch area / disposal
Gray & Pape - CSAM
Hodge Trucking - Hauling

4. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken):

a. Preparatory

Phase: N/A

b. Initial

Phase: N/A

c. Follow-up

Phase: N/A

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

N/A

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

N/A

7. Job Safety (Include deficiencies and corrective action taken:

No deficiencies

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

See equipment & Manpower report

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:


N/A

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

Waiting for response from Corp to RFI stating Cimicelli is exceeding liner quantities for disposal

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED



CONTRACTOR'S QC SYSTEM MANAGER

DATE 3-19-98

[illegible]

QUALITY ASSURANCE REPORT

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

77

Wednesday

18 March 1998

Concur with the contractor's report for this period?

☒ Yes ☐ No*

Was any QC testing/inspection observed or were any specific QA
evaluations or verifications performed?

☒ No ☐ Yes*

Were any instructions given to or information received from the Contractor?

☒ No ☐ Yes*

Did anything develop on the work which might lead to a change order
or contract claim?

☒ No ☐ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

During afternoon site, observed use of jackhammer. Discussed with
B. Schlemmer that this activity not covered in AHA for concrete
removal. Reviewed safety precautions required and informed
Schlemmer to implement.

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.

Mark A. Bishop
MARK A. BISHOP

20 MAR 1998
DATE

[Signature]
SUPV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

CONTRACTORS NAME: Ciminelli Services Corp.

Date 3-18-98 Report No. 77 Contract No. DAC(A)
65-98-C-0015 Project Name and Location of work:FR Basin ClosureWeather: [Clear] [P.Cloudy] (Cloudy) (Rain) inches]
[Temp. 44 min. 44 max.] Other Weather Conditions

1. Contractor (C) or Sub-contractor (S), and Area of Responsibility:

a. ()

b. ()
c. ()
d. () Contractor - Ciminelli - River Removal
Sub - Gray + Pope - CSAM

e. ()

2. Equipment Data. (Indicate items of construction equipment, other than hand tools, at the job site and whether or not used):

Digger - used
Excavator - used

3. Work Performed Today (Indicate identity of Contractor and Sub-contractors, location, and description of work:

Ciminelli - Removal of River / Flood wall in Arch Area
Gray + Pope - Arch Monitoring

4. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken):

a. Preparatory

Phase: N/A

b. Initial

Phase: N/A

c. Follow-up

Phase: N/A

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

N/A

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

Mark Bishop - use of Jackhammer requires additional safety protection. see below #7

7. Job Safety (Include deficiencies and corrective action taken:

Jack hammer - requires Arch protection and clipped + lashed bases in addition to hearing protection. items will be in place 3-19-58

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

see equipment & Manpower report

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

N/A

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

Possible delay in DEQ inspection - will advise

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED

BFS

CONTRACTOR'S QC SYSTEM MANAGER

CONSTRUCTION MANPOWER AND EQUIPMENT REPORT

CONTRACT NO. DACA65-98-C-0015

DATE 3-18-98

[illegible]

QUALITY ASSURANCE REPORT

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

76

Tuesday

17 March 1998

Concur with the contractor's report for this period?

☒ Yes ☐ No*

Was any QC testing/inspection observed or were any specific QA
evaluations or verifications performed?

☒ No ☐ Yes*

Were any instructions given to or information received from the Contractor?

☒ No ☐ Yes*

Did anything develop on the work which might lead to a change order
or contract claim?

☒ No ☐ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

See contract files for weather information on the date(s) covered by this report.

The Government/Quality Assurance Report is complete and accurate to the best of my knowledge.


MARK A. BISHOP

20 MAR 98
DATE


SUPV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

CONTRACTORS NAME: Ciminelli Services Corp.

Date 3-17-78 Report No. 78 Contract No. DAC(A)
65-98-C-0015 Project Name and Location of work:EQ Basin ClosureWeather: [Clear] [P. Cloudy] [~~Cloudy~~] [~~Rain~~: 2.5 inches]
[Temp. 38 min. 38 max.] Other Weather Conditions

1. Contractor (C) or Sub-contractor (S), and Area of Responsibility:

- a. () Contractor - Ciminelli - liner & concrete removal b. ()
c. ()
d. () Sub - Hodge Trucking - hauling
e. ()

2. Equipment Data. (Indicate items of construction equipment, other than hand tools, at the job site and whether or not used):

Excavator
Dumper

3. Work Performed Today (Indicate identity of Contractor and Sub-contractors, location, and description of work:

Ciminelli - liner removal
Hodge - hauling

4. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken):

a. Preparatory
Phase:N/Ab. Initial
Phase:N/Ac. Follow-up
Phase:N/A

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

N/A

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

N/A

7. Job Safety (Include deficiencies and corrective action taken:

NO Deficiencies

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

see equip report

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

N/A

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

N/A

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED

BGS/L

CONTRACTOR'S QC SYSTEM MANAGER

DATE 3-17-78

[illegible]

QUALITY ASSURANCE REPORT

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

75

Monday

16 March 1997

Concur with the contractor's report for this period?

☒ Yes ☐ No*

Was any QC testing/inspection observed or were any specific QA
evaluations or verifications performed?

☒ No ☐ Yes*

Were any instructions given to or information received from the Contractor?

☒ No ☐ Yes*

Did anything develop on the work which might lead to a change order
or contract claim?

☒ No ☐ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.


MARK A. BISHOP

20 MAR 98
DATE


SUPV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

CONTRACTORS NAME: Ciminelli Services Corp.

Date 3-16-98 Report No. 77 Contract No. DAC(A)
65-98-C-0015 Project Name and Location of work:EQ Basin ClosureWeather: [Clear] [P. ~~Dr~~oudy] [Cloudy] [Rain: inches]
[Temp. min. 35 max.] Other Weather Conditions

1. Contractor (C) or Sub-contractor (S), and Area of Responsibility:

a. ()

C - Ciminelli - removal of soil/cement liner b. ()

S - Hodge Trucking - hauling c. ()

d. () e. ()

2. Equipment Data. (Indicate items of construction equipment, other than hand tools, at the job site and whether or not used):

Excavator - used
dozer - used

3. Work Performed Today (Indicate identity of Contractor and Sub-contractors, location, and description of work:

Continued removal and hauling soil/cement liner

4. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken):

a. Preparatory

Phase: N/A

b. Initial

Phase: N/A

c. Follow-up

Phase: N/A

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

N/A

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

N/A

7. Job Safety (Include deficiencies and corrective action taken:

NO deficiencies

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

See Manpower + equip report

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

N/A

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

N/A

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED

D. G. Smith

CONTRACTOR'S QC SYSTEM MANAGER

CONSTRUCTION MANPOWER AND EQUIPMENT REPORT

CONTRACT NO. DACA65-98-C-0015

DATE 3-16-98

[illegible]

QUALITY ASSURANCE REPORT

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

71

Thursday

12 March 1998

Concur with the contractor's report for this period?

☒ Yes ☐ No*

Was any QC testing/inspection observed or were any specific QA
evaluations or verifications performed?

☒ No ☐ Yes*

Were any instructions given to or information received from the Contractor?

☒ No ☐ Yes*

Did anything develop on the work which might lead to a change order
or contract claim?

☒ No ☐ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.


MARK A. BISHOP

20 MAR 98
DATE


SUPV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

CONTRACTORS NAME: Ciminelli Services Corp.

Date 3-12-98 Report No. 73 Contract No. DAC(A)
65-98-C-0015 Project Name and Location of work:EQ Basin ClosureWeather: [Clear] [~~P~~Cloudy] [Cloudy] [Rain: inches]
[Temp. min. 32 max.] Other Weather Conditions

1. Contractor (C) or Sub-contractor (S), and Area of Responsibility:

- a. () C - Ciminelli - soil/cement liner removal b. ()
) S - Hodge Trucking - hauling c. ()
()
d. ()
e. ()
)

2. Equipment Data. (Indicate items of construction equipment, other than hand tools, at the job site and whether or not used):

Excavator - used
dozer - used

3. Work Performed Today (Indicate identity of Contractor and Sub-contractors, location, and description of work:

Continued removal and hauling of basin liner

4. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken):

a. Preparatory

Phase: N/A

b. Initial

Phase: N/A

c. Follow-up

Phase: N/A

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

N/A

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

N/A

7. Job Safety (Include deficiencies and corrective action taken:

NO deficiencies

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

See manpower + equip report

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

N/A

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

N/A

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED



CONTRACTOR'S QC SYSTEM MANAGER

DATE 3-12-78

* Note last report incorrectly dated.
should be 3-11-98

QUALITY ASSURANCE REPORT

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

70

Wednesday

11 March 1998

Concur with the contractor's report for this period?

☐ Yes ☐ No*

Was any QC testing/inspection observed or were any specific QA
evaluations or verifications performed?

☐ No ☐ Yes*

Were any instructions given to or information received from the Contractor?

☐ No ☐ Yes*

Did anything develop on the work which might lead to a change order
or contract claim?

☐ No ☐ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

NO SITE VISITS ON ANNUAL LEAVE

Guy Rhodes attended initial inspection on liner removal.

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.


MARK A. BISHOP

14 MAR 98
DATE


SUPV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

CONTRACTORS NAME: Ciminelli Services Corp.

Date 3-11-98 Report No. 72 Contract No. DAC(A)
65-98-C-0015 Project Name and Location of work:EQ Basin ClosureWeather: [Clear] [~~Cloudy~~] [Cloudy] [Rain: inches]
[Temp. min. 28 max.] Other Weather Conditions
Windy

1. Contractor (C) or Sub-contractor (S), and Area of Responsibility:

- a. () Contractor - Ciminelli - Site demolition b. ()
() Sub - Hodge Trucking - hauling debris c. ()
d. ()
e. ()

2. Equipment Data. (Indicate items of construction equipment, other than hand tools, at the job site and whether or not used):

Excavator - used See manpower & equipment
digger - used report for hrs
dump trucks - used

3. Work Performed Today (Indicate identity of Contractor and Sub-contractors, location, and description of work:

Ciminelli - Site demolition / removal of soil ^{Cement} ~~substrate~~ liner
Hodge Trucking - hauling debris

4. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken):

a. Preparatory

Phase: N/A

b. Initial

Phase: on removal of concrete flood wall
and soil / Cement liner - satisfactory - Guy Rhodes
present

c. Follow-up

Phase: N/A

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

N/A

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

N/A

7. Job Safety (Include deficiencies and corrective action taken:

NO deficiencies

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

See equipment data sheet

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

N/A

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

One dump truck broke down
4.5 hr. delay while loading trucks

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED

BGS/ha

CONTRACTOR'S QC SYSTEM MANAGER

CONSTRUCTION MANPOWER AND EQUIPMENT REPORT

CONTRACT NO. DACA65-98-C-0015

DATE 3-10-98

[illegible]

INITIAL PHASE CHECKLIST

CONTRACTOR'S NAME: Ciminelli Services Corp.

Contract No.: DACA65-98-C-0015 Date Initial Held: 3-11-98Title: ER Basin Closure Spec Section: 02072 & 35.1.2 + 35.1.3

Drawing No(s) : _____

Definable Feature of Work: Removal of concrete Flood Wall
and Removal of soil/cement liner

A. PERSONNEL PRESENT:

Name	Position	Company
1. <u>Brandon Schlemmer</u>	<u>QC Mgr</u>	<u>Ciminelli Services</u>
2. <u>Guy Rhoads</u>	<u>Field Eng.</u>	<u>Army Corps of Eng</u>
3. _____	_____	_____
4. _____	_____	_____
5. _____	_____	_____
6. _____	_____	_____

B. MATERIALS being used are in strict accordance with the contract plans and specifications? YES ☒ NO _____If not, explain: _____

C. WORKMANSHIP:

I. Procedures and/or work methods witnessed are in strict compliance with the requirement of the contract specifications? YES X NO _____

If not, explain: _____

II. Workmanship is acceptable? YES X NO _____

State area where improvement is needed: _____

D. SAFETY violations and corrective action taken: No violation

E. COMMENTS: Guy Rhodes very please with progress


Quality Control Representative
Signature

QUALITY ASSURANCE REPORT

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

69

Tuesday

10 March 1998

Concur with the contractor's report for this period?

☐ Yes ☐ No*

Was any QC testing/inspection observed or were any specific QA
evaluations or verifications performed?

☐ No ☐ Yes*

Were any instructions given to or information received from the Contractor?

☐ No ☐ Yes*

Did anything develop on the work which might lead to a change order
or contract claim?

☐ No ☐ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

NO SITE VISITS ON ANNUAL LEAVE

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.


MARK A. BISHOP

14 APR 98
DATE


SUPV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

CONTRACTORS NAME: Ciminelli Services Corp.

Date 3-10-78 Report No. 71 Contract No. DAC(A)
65-98-C-0015 Project Name and Location of work:EQ Basin ClosureWeather: [Clear] [~~P. Cloudy~~] [Cloudy] [Rain: inches]
[Temp. min. 35 max.] Other Weather Conditions
Flurries

1. Contractor (C) or Sub-contractor (S), and Area of Responsibility:

a. () Contractor - Ciminelli - site demolition b. ()
c. () Sub - Gen City - Scrap metal
d. ()
e. ()

2. Equipment Data. (Indicate items of construction equipment, other than hand tools, at the job site and whether or not used):

Excavator - used 8 hrs

3. Work Performed Today (Indicate identity of Contractor and Sub-contractors, location, and description of work):

Soil/cement liner pulled down and stockpiled for
loading. Stayed out of Auth. area
Gen City hauled last load of scrap metal

4. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken):

a. Preparatory

Phase: N/A

b. Initial

Phase: N/A

c. Follow-up

Phase: N/A

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

Visual confirmation that remainder of piping was clean
confirmed by Crystal Compton + Guy Rhoads

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

N/A

7. Job Safety (Include deficiencies and corrective action taken:

NO deficiencies

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

Excavator used 8 hrs

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

N/A

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

N/A

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED

B. B. L.

CONTRACTOR'S QC SYSTEM MANAGER

CONSTRUCTION MANPOWER AND EQUIPMENT REPORT

CONTRACT NO. DACA65-98-C-0015

DATE 3-10-78

[illegible]

QUALITY ASSURANCE REPORT

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

68

Monday

09 March 1997

Concur with the contractor's report for this period?

☐ Yes ☐ No*

Was any QC testing/inspection observed or were any specific QA
evaluations or verifications performed?

☐ No ☐ Yes*

Were any instructions given to or information received from the Contractor?

☐ No ☐ Yes*

Did anything develop on the work which might lead to a change order
or contract claim?

☐ No ☐ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

NO SITE VISITS. ON ANNUAL LEAVE

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.


MARK A. BISHOP

14 MAR 98
DATE


SUPERV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

CONTRACTORS NAME: Ciminelli Services Corp.

Date 3-7-98 Report No. 67-70 Contract No. DAC(A)
65-98-C-0015 Project Name and Location of work:EQ Basin ClosureWeather: [Clear] [~~P~~Cloudy] [Cloudy] [Rain: inches]
[Temp. min. 58 max.] Other Weather Conditions

1. Contractor (C) or Sub-contractor (S), and Area of Responsibility:

a. () Contractor - Ciminelli - Site Demolition b. ()
c. ()
d. () e. ()

2. Equipment Data. (Indicate items of construction equipment, other than hand tools, at the job site and whether or not used):

Excavator - used 8 hrs

3. Work Performed Today (Indicate identity of Contractor and Sub-contractors, location, and description of work:

Ciminelli - continued demolition on ~~flap~~ floodwall - and
soil/sediment liner - also completed demolition of steel
pipings

4. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken):

a. Preparatory

Phase: N/A

b. Initial

Phase: N/A

c. Follow-up

Phase: N/A

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

N/A

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

N/A

7. Job Safety (Include deficiencies and corrective action taken:

No deficiencies

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

Excavator - used 8 hrs

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

N/A

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

Removed extra piping and support structure per instructions - waiting for approval of C-Sum

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED



CONTRACTOR'S QC SYSTEM MANAGER

CONSTRUCTION MANPOWER AND EQUIPMENT REPORT

CONTRACT NO. DACA65-68-C-0015

DATE 3-9-98

[illegible]

QUALITY ASSURANCE REPORT

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

64

Thursday

05 March 1998

Concur with the contractor's report for this period?

☒ Yes ☐ No*

Was any QC testing/inspection observed or were any specific QA
evaluations or verifications performed?

☒ No ☐ Yes*

Were any instructions given to or information received from the Contractor?

☒ No ☐ Yes*

Did anything develop on the work which might lead to a change order
or contract claim?

☒ No ☐ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.


MARK A. BISHOP

14 MAR 98
DATE


SUFV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

Visual Confirmation By Alliant Tech Systems that
Pipe is satisfactorily clean

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

N/A

7. Job Safety (Include deficiencies and corrective action taken:

No deficiencies

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

Excavator - used 8 hrs

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

N/A

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

N/A

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED

BGS/ha

CONTRACTOR'S QC SYSTEM MANAGER

CONSTRUCTION MANPOWER AND EQUIPMENT REPORT

CONTRACT NO. DACA65-98-C-0015

DATE 3-5-78

[illegible]

INITIAL PHASE CHECKLIST

CONTRACTOR'S NAME: Ciminelli Services Corp.

Contract No.: DACA65-98-C-0015 Date Initial Held: 3-5-98Title: EQ Basin Closure Spec Section: 2072 & 3.5.1.4

Drawing No(s): _____

Definable Feature of Work: Demolition of Steel Piping

A. PERSONNEL PRESENT:

Name	Position	Company
1. <u>Brandon Schlemmer</u>	<u>QC Mgr</u>	<u>Ciminelli</u>
2. <u>Ed Sullivan</u>	<u>Superintendent</u>	<u>"</u>
3. <u>Mark Bishop</u>	<u>Field Eng</u>	<u>Army Corps of Eng.</u>
4. <u>Crystal Compton</u>	<u>Field Eng</u>	<u>Alliant Tech Systems</u>
5. _____	_____	_____
6. _____	_____	_____

B. MATERIALS being used are in strict accordance with the contract plans and specifications? YES X NO _____

If not, explain: _____

C. WORKMANSHIP:

I. Procedures and/or work methods witnessed are in strict compliance with the requirement of the contract specifications? YES Y NO _____

If not, explain: _____

II. Workmanship is acceptable? YES Y NO _____

State area where improvement is needed: _____

D. SAFETY violations and corrective action taken: no violations

E. COMMENTS: Preparatory stated that pressure washer was not present. Pressure washer is now on site and being used.

Quality Control Representative
Signature

QUALITY ASSURANCE REPORT

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

63

Wednesday

04 March 1998

Concur with the contractor's report for this period?

☒ Yes ☐ No*

Was any QC testing/inspection observed or were any specific QA evaluations or verifications performed?

☒ No ☐ Yes*

Were any instructions given to or information received from the Contractor?

☒ No ☐ Yes*

Did anything develop on the work which might lead to a change order or contract claim?

☒ No ☐ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

Am meeting with RAAP, OPLON & Ciminelli to discuss sludge cleaning
procedures. See submittal rec'd 09 Feb 98 and ~~submittal~~ Trans.
No. 3 for details. Preparatory for pipe removal held in afternoon.

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.

Mark A. Bishop
MARK A. BISHOP

4 MAR 98
DATE

3
SUPV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

N/A

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

N/A

7. Job Safety (Include deficiencies and corrective action taken:

NO deficiencies

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

excavator - used

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

N/A

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

Procedure for demolition of steel pipe finally agreed upon. It is a deviation from specifications. See work plan for revised procedure.

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED

BGSella

CONTRACTOR'S QC SYSTEM MANAGER

Also Note: Report date 3-3-98 should be #64
not #63. BGS

CONSTRUCTION MANPOWER AND EQUIPMENT REPORT

CONTRACT NO. DACA65-98-C-0015

DATE 3-4-98

[illegible]

PREPARATORY PHASE CHECKLIST

CONTRACTOR'S NAME Ciminelli Services Corp.

Contract No.: DACA65-98-C-0015

Date Preparatory Held: 3-4-98

Title: EQ Basin Closure

Spec Section: 2072 & 3.5.1.4

Drawing No(s):

Definable Feature of Work: demolition of steel pipe

A. PERSONNEL PRESENT:

Name	Position	Company
1. Brandon Schlemmer		Ciminelli
2. Ed Sullivan		"
3. Mark Bishop		Army Corps of Eng.
4. Guy Rhodes		"
5.		
6.		
7.		
8.		

(List additional personnel on reverse side)

B. DRAWINGS AND SPECS:

- I. Has each spec paragraph, contract drawing, and shop drawing been studied? YES ☒ NO ☐
- II. Do all parties have up-to-date drawings and specifications? YES ☒ NO ☐

C. SHOP DRAWINGS INVOLVED:

Transmittal/Item	Code	Contractor or Gov't Approval
1. N/A		
2.		
3.		
4.		

D. MATERIALS:

I. Are all materials on hand? YES _____ NO XII. Have all materials been checked for contract compliance against approved shop drawings? YES X NO _____

III. Items not on hand or not in accordance with transmittals (if not on hand, check during initial phase):

1. Pressure washer
2. _____
3. _____
4. _____

E. TESTS required in accordance with contract requirements:

Test/Paragraph

Frequency

- | | |
|--------------------------------|------------------------------|
| 1. <u>Visual Inspection by</u> | <u>Before pipe can leave</u> |
| <u>Jerry Redder</u> | <u>Site</u> |
| 3. _____ | _____ |
| 4. _____ | _____ |
| 5. _____ | _____ |
| 6. _____ | _____ |

F. ACCIDENT PREVENTION: Has Hazard Analysis been completed?

YES X NO _____

If yes, attach a copy, if no, explain:

Previously submitted

G. EQUIPMENT Requiring Operational Check:

1. Excavator
2. Chop Saw
3. _____
4. _____

H. WORKMANSHIP: Have procedures for accomplishing work been reviewed with appropriate people? YES ☒ NO _____

I. PREVIOUS WORK: Has all preliminary work been accomplished in accordance with contract requirements and is this feature of work ready to start? YES ☒ NO _____

Explain any problems: _____

J. HI-LIGHTING SPECIFIC ITEMS: Hi-light specific items noted during the Preparatory Phase inspection. ie, (Med. Voltage cable shall be hi-pot tested).

K. OTHER COMMENTS: _____

BG S. [Signature]
Quality Control Representative
Signature

QUALITY ASSURANCE REPORT

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

62

Tuesday

03 March 1998

Concur with the contractor's report for this period?

☐ Yes ☒ No*

Was any QC testing/inspection observed or were any specific QA
evaluations or verifications performed?

☒ No ☐ Yes*

Were any instructions given to or information received from the Contractor?

☐ No ☒ Yes*

Did anything develop on the work which might lead to a change order
or contract claim?

☒ No ☐ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

*During mid afternoon site visit, observed dem. work on sludge line.
Instructed Ciminelli to stop this work until preparatory held and
procedures established for handling sludge residue.*

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.

Mark A. Bishop
MARK A. BISHOP

14 MAR 98
DATE

[Signature]
SUPERV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

CONTRACTORS NAME: Ciminelli Services Corp.

Date 3-3-98 Report No. 63 Contract No. DAC(A)
65-98-C-0015 Project Name and Location of work:
EQ Basin closure

Weather: [Clear] [P. Cloudy] [~~Cloudy~~] [Rain: inches]
[Temp: 72 min. 78 max.] Other Weather Conditions

1. Contractor (C) or Sub-contractor (S), and Area of Responsibility:

a. () Contractor - Ciminelli - site demolition b. ()
) c.
()
d. () e. ()
)

2. Equipment Data. (Indicate items of construction equipment, other than hand tools, at the job site and whether or not used):

Excavator - used

3. Work Performed Today (Indicate identity of Contractor and Sub-contractors, location, and description of work):

Ciminelli - demo effluent station, steam line, air line

4. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken):

a. Preparatory

Phase: N/A

b. Initial

Phase: N/A

c. Follow-up

Phase: N/A

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

N/A

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

Mark Bishop - 3-2-98 @ about 3 pm asked work to stop on a sludge line remove.

7. Job Safety (Include deficiencies and corrective action taken:

NO deficiencies

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

Excavator used

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

N/A

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

N/A

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED

BGS

CONTRACTOR'S QC SYSTEM MANAGER

DATE 3-3-98

[illegible]

QUALITY ASSURANCE REPORT

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

61

Monday

02 March 1997

Concur with the contractor's report for this period?

☒ Yes ☐ No*

Was any QC testing/inspection observed or were any specific QA
evaluations or verifications performed?

☒ No ☐ Yes*

Were any instructions given to or information received from the Contractor?

☒ No ☐ Yes*

Did anything develop on the work which might lead to a change order
or contract claim?

☒ No ☐ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.


MARK A. BISHOP

18 MAR 98
DATE


SUPV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

CONTRACTORS NAME: Ciminelli Services Corp.

Date 3-2-98 Report No. 60-63 Contract No. DAC(A)
65-98-C-0015 Project Name and Location of work:
EO Basin Closure

Weather: [Clear] [~~P~~ Cloudy] [Cloudy] [Rain: _____ inches]
[Temp. 50 min. _____ max.] Other Weather Conditions

1. Contractor (C) or Sub-contractor (S), and Area of Responsibility:

- a. () Contractor - Ciminelli - Site demolition b. ()
c. ()
d. ()
e. ()

2. Equipment Data. (Indicate items of construction equipment, other than hand tools, at the job site and whether or not used):

Excavator - used 2 hrs

3. Work Performed Today (Indicate identity of Contractor and Sub-contractors, location, and description of work):

Ciminelli - continued Electrical demolition, demolition of
Flux wall, denaturing basin

4. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken):

a. Preparatory

Phase: N/A

b. Initial

Phase: N/A

c. Follow-up

Phase: N/A

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

N/A

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

N/A

7. Job Safety (Include deficiencies and corrective action taken:

All workers wearing hard hats, safety glasses, and
Steel toe Boots

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

N/A

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

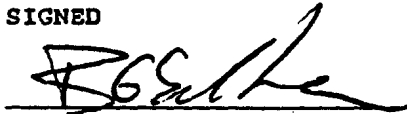
electrical work performed to code
to with code approved material

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

N/A

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED



CONTRACTOR'S QC SYSTEM MANAGER

DATE 2-20-98

[illegible]

QUALITY ASSURANCE REPORT

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

57

Thursday

26 February 1998

Concur with the contractor's report for this period?

☒ Yes ☐ No*

Was any QC testing/inspection observed or were any specific QA
evaluations or verifications performed?

☒ No ☐ Yes*

Were any instructions given to or information received from the Contractor?

☒ No ☐ Yes*

Did anything develop on the work which might lead to a change order
or contract claim?

☒ No ☐ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

Attended preparatory inspection for concrete demo. No specific comments.

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.

Mark A. Bishop
MARK A. BISHOP

27 FEB 98
DATE

[Signature]
SUBV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

N/A

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

N/A

7. Job Safety (Include deficiencies and corrective action taken:

N/A deficiencies

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

excavator used 8 hrs

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

N/A

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

Terry Redder from Alliant Tech to
ask his opinion on contents of 20" steel
pipe

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED

BBS/ken

CONTRACTOR'S QC SYSTEM MANAGER

DATE 2-26-98

[illegible]

PREPARATORY PHASE CHECKLIST

CONTRACTOR'S NAME Ciminelli Services Corp.Contract No.: DACA65-98-C-0015Date Preparatory Held: 2-26-98Title: EQ Basin ClosureSpec Section: 02072 3.5.1.2, 3.5.1.3

Drawing No(s): _____

Definable Feature of Work: Removal of Concrete Floodwall and
Soil/Cement Liner

A. PERSONNEL PRESENT:

Name	Position	Company
1. <u>Brandon Schlemmer</u>	<u></u>	<u>Ciminelli</u>
2. <u>Ed Sullivan</u>	<u></u>	<u>"</u>
3. <u>Mark Bishop</u>	<u></u>	<u>Army Corps Eng</u>
4. _____	_____	_____
5. _____	_____	_____
6. _____	_____	_____
7. _____	_____	_____
8. _____	_____	_____

(List additional personnel on reverse side)

B. DRAWINGS AND SPECS:

- I. Has each spec paragraph, contract drawing, and shop drawing been studied? YES X NO _____
- II. Do all parties have up-to-date drawings and specifications? YES X NO _____

C. SHOP DRAWINGS INVOLVED:

Transmittal/Item	Code	Contractor or Gov't Approval
1. <u>N/A</u>	_____	_____
2. _____	_____	_____
3. _____	_____	_____
4. _____	_____	_____

D. MATERIALS:

I. Are all materials on hand? YES ☒ NO ☐II. Have all materials been checked for contract compliance against approved shop drawings? YES ☒ NO ☐

III. Items not on hand or not in accordance with transmittals (if not on hand, check during initial phase):

1. N/A
2. _____
3. _____
4. _____

E. TESTS required in accordance with contract requirements:

Test/Paragraph

Frequency

- | | |
|---------------|-------|
| 1. <u>N/A</u> | _____ |
| 2. _____ | _____ |
| 3. _____ | _____ |
| 4. _____ | _____ |
| 5. _____ | _____ |
| 6. _____ | _____ |

F. ACCIDENT PREVENTION: Has Hazard Analysis been completed?

YES ☒ NO ☐

If yes, attach a copy, if no, explain:

G. EQUIPMENT Requiring Operational Check:

1. Link-Belt 4300
2. _____
3. _____
4. _____

H. WORKMANSHIP: Have procedures for accomplishing work been reviewed with appropriate people? YES X NO _____

I. PREVIOUS WORK: Has all preliminary work been accomplished in accordance with contract requirements and is this feature of work ready to start? YES X NO _____

Explain any problems: _____

N/A

J. HI-LIGHTING SPECIFIC ITEMS: Hi-light specific items noted during the Preparatory Phase inspection. ie, (Med. Voltage cable shall be hi-pot tested).

K. OTHER COMMENTS: _____

BGE
Quality Control Representative
Signature

ACTIVITY HAZARD ANALYSIS

ACTIVITY: Demolition of Floodwall and Liner

ANALYZED BY: Ed Sullivan DATE: 2-26-98

REVIEWED BY: Brandon Schlemmer DATE: 2-26-98

COMPANY: Ciminelli

COMPANY: Ciminelli

PRINCIPAL STEPS Identify steps involved & sequence of activities.	POTENTIAL HAZARDS Analyze each principal step for potential hazards.	RECOMMENDED CONTROLS Develop specific controls for each potential hazard.
breaking concrete wall and liner	heavy equipment hazards	NO other work to be done in area
loading dump trucks	falling debris	drivers not in truck while being loaded
hauling loads	traffic hazards	trucks will remain on haul route and follow R.A.T.' traffic rules - will not be over-loaded
→ other hazard -	slipping into bottom of layers	operator will not track perpendicular to side slope
<i>James E. Ciminelli</i>		
<i>Brandon Schlemmer</i>		

SHEET 2 OF 2

QUALITY ASSURANCE REPORT

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

56

Wednesday

25 February 1998

Concur with the contractor's report for this period?

☒ Yes ☐ No*

Was any QC testing/inspection observed or were any specific QA
evaluations or verifications performed?

☒ No ☐ Yes*

Were any instructions given to or information received from the Contractor?

☒ No ☐ Yes*

Did anything develop on the work which might lead to a change order
or contract claim?

☒ No ☐ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

Participated in an initial inspection on clearing & grubbing activity.

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.

Mark A. Bishop
MARK A. BISHOP

27 Feb 1998
DATE

[Signature]
SUPV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

CONTRACTORS NAME: Ciminelli Services Corp.

Date 2-25-98 Report No. 58 Contract No. DAC(A)
65-98-C-0015 Project Name and Location of work:

EC Basin closure

Weather: [Clear] [~~P. Cloudy~~] [Cloudy] [Rain: inches]
[Temp. 48 min. max.] Other Weather Conditions

1. Contractor (C) or Sub-contractor (S), and Area of Responsibility:

a. () contractor - Cimirelli - electric / demo - testing rip-rap b. ()
) _____ c. ()
 () subcontractor - Trench tracking - tracking
 d. () _____ e. ()
) _____

2. Equipment Data. (Indicate items of construction equipment, other than hand tools, at the job site and whether or not used):

Linkbelt 4300 - in use
two dump trucks - in use

3. Work Performed Today (Indicate identity of Contractor and Sub-contractors, location, and description of work:

Lincoln - continuing electric down
Jones - haulage

4. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken):

a. Preparatory

Phase: _____

b. Initial

Phase: Cleaning + grubbing - satisfactory

c. Follow-up

Phase: _____

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

N/A

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

7. Job Safety (Include deficiencies and corrective action taken:

NO deficiencies

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

See #2

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

N/A

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

N/A

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED



CONTRACTOR'S QC SYSTEM MANAGER

CONSTRUCTION MANPOWER AND EQUIPMENT REPORT

CONTRACT NO. DACA65-58-C-0015

DATE 2-25-98

[illegible]

INITIAL PHASE CHECKLIST

CONTRACTOR'S NAME: Ciminelli Services Corp.

Contract No.: DACA65-98-C-0015 Date Initial Held: 2-25-98Title: EA Basin Closure Spec Section: _____Drawing No(s): C-2, C-4, T-2Definable Feature of Work: Clearing + grubbing / silt fence + restage
of gravel and rip-rap

A. PERSONNEL PRESENT:

Name	Position	Company
1. <u>Brandon Schlemmer,</u>	<u>CQL Mgr,</u>	<u>Ciminelli</u>
2. <u>Marks Bishop,</u>	<u>Field Engineer,</u>	<u>Army Corps of Eng</u>
3. _____	_____	_____
4. _____	_____	_____
5. _____	_____	_____
6. _____	_____	_____

B. MATERIALS being used are in strict accordance with the contract plans and specifications? YES ☒ NO ☐If not, explain: _____

C. WORKMANSHIP:

I. Procedures and/or work methods witnessed are in strict compliance with the requirement of the contract specifications? YES ☒ NO

If not, explain: _____

II. Workmanship is acceptable? YES ☒ NO

State area where improvement is needed: _____

less dirt with rip-rap

D. SAFETY violations and corrective action taken: _____

No violation; No CA needed

E. COMMENTS: _____

BGSell
Quality Control Representative
Signature

QUALITY ASSURANCE REPORT

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

55

Tuesday

24 February 1998

Concur with the contractor's report for this period?

☒ Yes ☐ No*

Was any QC testing/inspection observed or were any specific QA evaluations or verifications performed?

☒ No ☐ Yes*

Were any instructions given to or information received from the Contractor?

☒ No ☒ Yes*

Did anything develop on the work which might lead to a change order or contract claim?

☒ No ☐ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

Attended preparatory inspection for electrical demolition. Following comments noted:

- Electrical demo had not been addressed in demo work plan submitted by Cimminelli. Discussed electrical demo in detail and agreed to allow limited work
- Some minor exterior circuits (not shown on drawing but visible during bid period site visits) discussed. Advised Cimminelli to expose power source prior to demo.

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.


MARK A. BISHOP

27 FEB 98
DATE


SUPV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

CONTRACTORS NAME: Ciminelli Services Corp.

Date 2-24-98 Report No. 447-57 Contract No. DAC(A)
65-98-C-0015 Project Name and Location of work:

For Basin Closure

Weather: [Clear] [P.Cloudy] [~~Cloudy~~] [Rain: inches]
[Temp. min. 45 max.] Other Weather Conditions

windy

1. Contractor (C) or Sub-contractor (S), and Area of Responsibility:

a. () Contractor - Ciminelli - Oversight, Cleaning & Grubbing b. ()
) Subcontractor - Current Electric - Electrical Demo c. ()
 ()
 d. ()
) e. ()

2. Equipment Data. (Indicate items of construction equipment, other than hand tools, at the job site and whether or not used):

Linkbelt 4300 excavator - not used

3. Work Performed Today (Indicate identity of Contractor and Sub-contractors, location, and description of work:

Current Electric - electrical demolition
Cimivelli - complete site force, denaturing in process

4. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken):

a. Preparatory

Phase: Electrical Demolition

b. Initial

Phase:

c. Follow-up

Phase:

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

N/A

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

2-24-98 @ 1500 hrs Mark Bishop requested hand digging of unidentified conduits around abandoned inlet channel

7. Job Safety (Include deficiencies and corrective action taken:

NO deficiencies

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

excavator not used

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

N/A

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

Electrical outlets discovered not on print. Extra investigation work by Current Electric to identify circuits involved. Also discrepancies on labeling of existing RD circuits.

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED

BGS/Le

CONTRACTOR'S QC SYSTEM MANAGER

DATE 2-24-98

[illegible]

PREPARATORY PHASE CHECKLIST

CONTRACTOR'S NAME Ciminelli Services Corp.Contract No.: DACA65-98-C-0015Date Preparatory Held: 2-24-98Title: EQ Basin Closure

Spec Section: _____

Drawing No(s): C-2Definable Feature of Work: Electrical Demolition

A. PERSONNEL PRESENT:

Name	Position	Company
1. <u>Mark Bishop</u>	<u>Army Corp Eng</u>	
2. <u>Brandon Schlemmer</u>	<u>Ciminelli</u>	
3. <u>Ed Sullivan</u>	<u>"</u>	
4. <u>Barton Laignel</u>	<u>Current Elec</u>	
5. <u>Frank Foster</u>	<u>"</u>	
6. <u>Jim Eastman</u>	<u>Ciminelli</u>	
7. <u>Berry Bravo</u>	<u>"</u>	
8. <u>Top Capt Lowday / Crystal Condon</u>	<u>Alliant</u>	

(List additional personnel on reverse side)

B. DRAWINGS AND SPECS:

I. Has each spec paragraph, contract drawing, and shop drawing been studied? YES X NO _____II. Do all parties have up-to-date drawings and specifications? YES X NO _____

C. SHOP DRAWINGS INVOLVED:

Transmittal/Item	Code	Contractor or Gov't Approval
1. <u>N/A</u>		
2. _____		
3. _____		
4. _____		

D. MATERIALS:

I. Are all materials on hand? YES X NO _____II. Have all materials been checked for contract compliance against approved shop drawings? YES N/A NO _____

III. Items not on hand or not in accordance with transmittals (if not on hand, check during initial phase):

1. N/A
2. _____
3. _____
4. _____

E. TESTS required in accordance with contract requirements:

Test/Paragraph

Frequency

- | | |
|---------------|-------|
| 1. <u>N/A</u> | _____ |
| 2. _____ | _____ |
| 3. _____ | _____ |
| 4. _____ | _____ |
| 5. _____ | _____ |
| 6. _____ | _____ |

F. ACCIDENT PREVENTION: Has Hazard Analysis been completed?

YES X NO _____

If yes, attach a copy, if no, explain:

G. EQUIPMENT Requiring Operational Check:

1. N/A
2. _____
3. _____
4. _____

H. WORKMANSHIP: Have procedures for accomplishing work been reviewed with appropriate people? YES ☒ NO _____

I. PREVIOUS WORK: Has all preliminary work been accomplished in accordance with contract requirements and is this feature of work ready to start? YES ☒ NO _____

Explain any problems: _____

J. HI-LIGHTING SPECIFIC ITEMS: Hi-light specific items noted during the Preparatory Phase inspection. ie, (Med. Voltage cable shall be hi-pot tested).

K. OTHER COMMENTS: _____

BGS/
Quality Control Representative
Signature

ACTIVITY HAZARD ANALYSIS

ACTIVITY: Electrical Demolition

ANALYZED BY: Brandi Schlenner DATE: 2-24-98

REVIEWED BY: B620Ka DATE: 2-27-98

COMPANY: Ciminelli

COMPANY: Ciminelli

[illegible]

SHEET 2 OF 2

QUALITY ASSURANCE REPORT

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

54

Monday

23 February 1998

Concur with the contractor's report for this period?

☒ Yes ☐ No*

Was any QC testing/inspection observed or were any specific QA
evaluations or verifications performed?

☒ No ☐ Yes*

Were any instructions given to or information received from the Contractor?

☒ No ☐ Yes*

Did anything develop on the work which might lead to a change order
or contract claim?

☒ No ☐ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

Discussions held regarding Environmental Protection Plan; see file for
details.

Attended preparatory inspection for clearing & grubbing

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.


MARK A. BISHOP

27 FEB 98
DATE


SUPERV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

CONTRACTORS NAME: Ciminelli Services Corp.

Date 2-23-98 Report No. 94-96 Contract No. DAC(A)
65-98-C-0015 Project Name and Location of work:Weather: [Clear] [P.Cloudy] [~~Cloudy~~] [~~Rain~~]: _____ inches)
[Temp. _____ min. 35 max.] Other Weather Conditions
Wet Snow

1. Contractor (C) or Sub-contractor (S), and Area of Responsibility:

a. () Contractor - Clearing & Grubbing (Silt fence) b. ()
() _____ c. ()
d. () _____ e. ()
() _____2. Equipment Data. (Indicate items of construction equipment, other than hand tools, at the job site and whether or not used):

_____3. Work Performed Today (Indicate identity of Contractor and Sub-contractors, location, and description of work):
Ciminelli - Silt fence installation

4. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken):

a. Preparatory
Phase: completed for clearing and grubbing

_____b. Initial
Phase: _____

_____c. Follow-up
Phase: _____

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

N/A

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

N/A

7. Job Safety (Include deficiencies and corrective action taken:

All safety procedure followed

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

N/A

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

N/A

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

N/A

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED

[Signature]

CONTRACTOR'S QC SYSTEM MANAGER

DATE 2-23-98

[illegible]

PREPARATORY PHASE CHECKLIST

CONTRACTOR'S NAME Ciminelli Services Corp.Contract No.: DACA65-98-C-0015Date Preparatory Held: 9-23-98Title: EQ Basin Closure

Spec Section: _____

Drawing No(s): C-2, C-7, + T-2Definable Feature of Work: Clearing & Grubbing (silt fence,
Rip-rap restaging, gravel restaging)

A. PERSONNEL PRESENT:

Name	Position	Company
1. <u>Brandon Schlemmer</u>	<u></u>	<u>Ciminelli</u>
2. <u>Ed Sullivan</u>	<u>II</u>	<u></u>
3. <u>Mark Bishop</u>	<u></u>	<u>Army Corps</u>
4. <u>Jim Eastman</u>	<u></u>	<u>Ciminelli</u>
5. <u>Barry Bravo</u>	<u></u>	<u>Ciminelli</u>
6. _____	_____	_____
7. _____	_____	_____
8. _____	_____	_____

(List additional personnel on reverse side)

B. DRAWINGS AND SPECS:

- I. Has each spec paragraph, contract drawing, and shop drawing been studied? YES X NO _____
- II. Do all parties have up-to-date drawings and specifications? YES X NO _____

C. SHOP DRAWINGS INVOLVED:

Transmittal/Item	Code	Contractor or Gov't Approval
1. <u>N/A</u>	_____	_____
2. _____	_____	_____
3. _____	_____	_____
4. _____	_____	_____

D. MATERIALS:

I. Are all materials on hand? YES X NO _____II. Have all materials been checked for contract compliance against approved shop drawings? YES X NO _____

III. Items not on hand or not in accordance with transmittals (if not on hand, check during initial phase):

1. N/A
2. _____
3. _____
4. _____

E. TESTS required in accordance with contract requirements:

Test/Paragraph

Frequency

- | | |
|---------------|-------|
| 1. <u>N/A</u> | _____ |
| 2. _____ | _____ |
| 3. _____ | _____ |
| 4. _____ | _____ |
| 5. _____ | _____ |
| 6. _____ | _____ |

F. ACCIDENT PREVENTION: Has Hazard Analysis been completed?

YES X NO X

If yes, attach a copy, if no, explain:

AAA not required for this
AAA turned in with Daily QC report 1-43.

G. EQUIPMENT Requiring Operational Check:

1. Link belt 4300
2. _____
3. _____
4. _____

H. WORKMANSHIP: Have procedures for accomplishing work been reviewed with appropriate people? YES ☒ NO ☐

I. PREVIOUS WORK: Has all preliminary work been accomplished in accordance with contract requirements and is this feature of work ready to start? YES ☒ NO ☐

Explain any problems: _____

J. HI-LIGHTING SPECIFIC ITEMS: Hi-light specific items noted during the Preparatory Phase inspection. ie, (Med. Voltage cable shall be hi-pot tested).

K. OTHER COMMENTS: silt fence will be staked 5' on center. Restaging area for Rip-rap may change.

BGS

Quality Control Representative
 Signature

ACTIVITY HAZARD ANALYSIS

ACTIVITY: Clearing + Grubbing - Silt Fence, Rip-rap, + gravel

ANALYZED BY: Brandon Schleimer DATE: 2-23-98

REVIEWED BY: Ed Sullivan DATE: 2-23-98

COMPANY: Ciminelli Services

COMPANY: Ciminelli Services

PRINCIPAL STEPS <small>Identify steps involved & sequence of activities.</small>	POTENTIAL HAZARDS <small>Analyze each principal step for potential hazards.</small>	RECOMMENDED CONTROLS <small>Develop specific controls for each potential hazard.</small>
<u>Installation of Silt Fence</u>	<u>personal injury to hands & eyes, etc</u>	<u>hard hats, safety glasses, gloves & steel toe shoes will be worn</u>
<u>Restage Rip-rap</u>	<u>working around heavy equip</u>	<u>1) No other work to be conducted in area</u> <u>2) site safety policies to be reviewed with trucking subcontractor</u>
<u>Restage Gravel</u>	<u>working around heavy equip</u>	<u>No other work done in area</u>

ACTIVITY HAZARD ANALYSIS

[illegible]

QUALITY ASSURANCE REPORT

BIO PLANT EQUALIZATION BASIN CLOSURE

Radford Army Ammunition Plant

Contract No. DACA65-98-C-0015

CIMINELLI SERVICES CORP.

Contr. Day:

51

Friday

20 February 1998

Concur with the contractor's report for this period?

☒ Yes ☐ No*

Was any QC testing/inspection observed or were any specific QA evaluations or verifications performed?

☒ No ☐ Yes*

Were any instructions given to or information received from the Contractor?

☒ No ☒ Yes*

Did anything develop on the work which might lead to a change order or contract claim?

☒ No ☐ Yes*

Safety Observations and General Comments/Remarks:

(Also includes explanation of answers to Items 1-4 above which are identified with an asterisk [*].)

No work activity (progress) through this date. This week, climaxing with installation of electrical service for trailer, ~~is~~ used to mobilize on-site.

Mutual Understanding Meeting held this date; see file for details.

Tentative plans arranged for PREPARATORY on preliminary site work (silt fence, ~~rip-rap~~ rip-rap removal) Monday AM.

See contract files for weather information on the date(s) covered by this report.

The Government Quality Assurance Report is complete and accurate to the best of my knowledge.


MARK A. BISHOP

23 FEB 98
DATE


SUPERV. INT

DATE

DAILY CONSTRUCTION QUALITY CONTROL REPORT

CONTRACTORS NAME: Ciminelli Services Corp.

Date 2-20-98 Report No. 1-53 Contract No. DAC(A)
65-98-C-0015 Project Name and Location of work:
EQ Basin Closure

Weather: [~~Clear~~] [P.Cloudy] [Cloudy] [Rain: inches]
[Temp. min. 45 max.] Other Weather Conditions

1. Contractor (C) or Sub-contractor (S), and Area of Responsibility:

- a. (C) Supervision b. ()
() S - electrical c. ()
d. () e. ()

2. Equipment Data. (Indicate items of construction equipment, other than hand tools, at the job site and whether or not used):

N/A

3. Work Performed Today (Indicate identity of Contractor and Sub-contractors, location, and description of work:

Sub-contractor - Current Electric - wire field office

4. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken):

a. Preparatory
Phase:

N/A

b. Initial
Phase:

N/A

c. Follow-up
Phase:

N/A

DAILY CONSTRUCTION QUALITY CONTROL REPORT

5. Tests performed as required by plans and specifications and the results:

N/A

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

Meeting to discuss 20" steel pipe on 3-3-78 @ 1 pm

7. Job Safety (Include deficiencies and corrective action taken:

NO deficiencies

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

excavator used 8 hrs

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

N/A

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

N/A

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED

BG S. L.

CONTRACTOR'S QC SYSTEM MANAGER

CONSTRUCTION MANPOWER AND EQUIPMENT REPORT

CONTRACT NO. DACA65-98-C-0015

DATE 3-2-98

[illegible]

Attachment 5
Final Site Investigation Tables

TABLE 3-1
Analytical Results and Critical Values for the Background Samples

CONSTITUENT	#1	#2	#3	#4	#5	#6	#7	#8	Critical Value
METHOD D2216 (%)									
Moisture Content	15	14	16	17	16	16	16	17	NC
VOLATILES									
METHOD 8021A (ug/kg)									
Benzene	<5.9	<5.8	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	NC
Bromomethane	<5.9	<5.8	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	NC
Carbon tetrachloride	<5.9	<5.8	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	NC
Chlorobenzene	<5.9	<5.8	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	NC
Chloroform	<5.9	<5.8	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	NC
Chloromethane	<5.9	<5.8	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	NC
trans-1,2-Dichloroethene	<5.9	<5.8	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	NC
Hexachlorobutadiene	<5.9	<5.8	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	NC
Methylene chloride (Dichloromethane)	<5.9	<5.8	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	NC
Naphthalene	<5.9	<5.8	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	NC
Tetrachloroethene	<5.9	<5.8	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	NC
Toluene	<5.9	<5.8	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	NC
1,2,4-Trichlorobenzene	<5.9	<5.8	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	NC
1,1,1-Trichloroethane	<5.9	<5.8	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	NC
1,1,2-Trichloroethane	<5.9	<5.8	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	NC
Trichloroethene	<5.9	<5.8	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	NC
Trichlorofluoromethane	<5.9	<5.8	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	NC
Vinyl chloride	<5.9	<5.8	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	NC
METHOD 8240B (ug/kg)									
Acrolein	<120	<120	<120	<120	<120	<120	<120	<120	NC
Carbon disulfide	<5.8	<5.8	<5.9	<6.1	<6.0	<6.0	<6.0	<6.1	NC
2-Butanone (MEK)	<29	<29	<29	<30	<30	<30	<30	<30	NC
SEMIVOLATILES									
METHOD 8070 (ug/kg)									
N-Nitrosodimethylamine	<100	<78	<80	<81	<80	<80	<80	<81	NC
METHOD 8090 (ug/kg)									
2,4-Dinitrotoluene	<12	2.4 J	<12	<12	<12	<12	<12	<12	NC
2,6-Dinitrotoluene	<12	<12	<12	<12	<12	<12	<12	<12	NC
METHOD 8110 (ug/kg)									
Bis(2-Chloroethoxy) methane	<35	<35	<36	<36	<36	<36	<36	<36	NC

Reporting limits and concentrations are presented on a dry weight basis.

J - Estimated value; constituents present below the reporting limit.

NC - Critical value not calculated; see Section 3.2.

TABLE 3-1
Analytical Results and Critical Values for the Background Samples

CONSTITUENT	#1	#2	#3	#4	#5	#6	#7	#8	Critical Value
Bis(2-Chloroethyl) ether	<35	<35	<36	<36	<36	<36	<36	<36	NC
Bis(2-Chloroisopropyl) ether	<35	<35	<36	<36	<36	<36	<36	<36	NC
METHOD 8121 (ug/kg)									
Hexachlorobenzene	<3.9	<3.8	<3.9	<4.0	<3.9	<3.9	<3.9	<4.0	NC
Hexachlorocyclopentadiene	<3.9	<3.8	<3.9	<4.0	<3.9	<3.9	<3.9	<4.0	NC
SEMIVOLATILES Continued									
Hexachloroethane	<3.9	<3.8	<3.9	<4.0	<3.9	<3.9	<3.9	<4.0	NC
METHOD 8161 (ug/kg)									
Pentachlorophenol	<20	<20	<20	<20	<20	<20	<20	<20	NC
METHOD 8270B (ug/kg)									
Bis(2-Ethylhexyl)phthalate	<390	<380	<390	<400	<390	<390	<390	<400	NC
Butylbenzylphthalate	<390	<380	<390	<400	<390	<390	<390	<400	NC
4-Chloro-3-methylphenol	<390	<380	<390	<400	<390	<390	<390	<400	NC
2-Chlorophenol	<390	<380	<390	<400	<390	<390	<390	<400	NC
Di-n-butylphthalate	<390	<380	<390	<400	<390	<390	<390	<400	NC
Di-n-octylphthalate	<390	<380	<390	<400	<390	<390	<390	<400	NC
Diethylphthalate	<390	<380	<390	<400	<390	<390	<390	<400	NC
2,4-Dimethylphenol	<390	<380	<390	<400	<390	<390	<390	<400	NC
Dimethylphthalate	<390	<380	<390	<400	<390	<390	<390	<400	NC
2-Methyl-4,6-dinitrophenol	<2000	<2000	<2000	<2000	<2000	<2000	<2000	<2000	NC
Phenol	<390	<380	<390	<400	<390	<390	<390	<400	NC
2,4,5-Trichlorophenol	<390	<380	<390	<400	<390	<390	<390	<400	NC
2,4,6-Trichlorophenol	<390	<380	<390	<400	<390	<390	<390	<400	NC
METHOD 8310 (ug/kg)									
Fluoranthene	<12	<12	<12	<12	<12	<12	<12	<12	6.0
Fluorene	<12	<12	<12	<12	<12	<12	<12	<12	NC
METHOD 8330 (ug/kg)									
Nitrobenzene	<290	<290	<300	<300	<300	<300	<300	<300	NC
PESTICIDES/PCBs									
METHOD 8080A (ug/kg)									
Aldrin	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	NC
Chlordane	<20	<20	<20	<20	<20	<20	<20	<20	NC
Dieldrin	<3.9	<3.8	<3.9	<4.0	<3.9	<3.9	<3.9	<4.0	NC

Reporting limits and concentrations are presented on a dry weight basis.

J - Estimated value; constituents present below the reporting limit.

NC - Critical value not calculated; see Section 3.2.

TABLE 3-1
Analytical Results and Critical Values for the Background Samples

CONSTITUENT	#1	#2	#3	#4	#5	#6	#7	#8	Critical Value
Endosulfan I	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	NC
Endosulfan II	<3.9	<3.8	<3.9	<4.0	<3.9	<3.9	<3.9	<4.0	NC
Endrin	<3.9	<3.8	<3.9	<4.0	<3.9	<3.9	<3.9	<4.0	NC
Heptachlor	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	NC
Heptachlor epoxide	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	NC
Methoxychlor	<20	<20	<20	<20	<20	<20	<20	<20	NC
Aroclor-1016	<39	<38	<39	<40	<39	<39	<39	<40	NC
Aroclor-1221	<79	<78	<80	<81	<80	<80	<80	<81	NC
Aroclor-1232	<39	<38	<39	<40	<39	<39	<39	<40	NC
PESTICIDES/PCBs Continued									
Aroclor-1242	<39	<38	<39	<40	<39	<39	<39	<40	NC
Aroclor-1248	<39	<38	<39	<40	<39	<39	<39	<40	NC
Aroclor-1254	<39	17 J	<39	<40	<39	<39	46	<40	NC
Aroclor-1260	<39	<38	<39	<40	<39	<39	<39	<40	NC
Toxaphene	<200	<200	<200	<200	<200	<200	<200	<200	NC
METALS									
METHOD 6020 (mg/kg)									
Arsenic	2	2.5	2.9	1.6	2.1	1.2	3.2	0.95	5.5
Barium	172	157	139	187	169	108	165	93	292
Beryllium	0.85	0.99	0.87	1.2	1.1	0.72	1.1	0.76	1.71
Cadmium	<0.24	<0.24	<0.24	<0.27	<0.24	<0.22	<0.24	<0.24	NC
Chromium	27.3	28.1	25.9	26	28.6	18.4	34.4	19.1	48.6
Lead	11.6	26.6	16.8	16.7	20.2	8.6	22	7.9	45.1
Nickel	15.2	14.3	13.9	17.2	17	11.8	20.5	11.7	28.1
Selenium	<0.24	<0.24	<0.24	<0.27	<0.24	<0.22	<0.24	<0.24	NC
Silver	<0.12	<0.12	<0.12	<0.13	<0.12	<0.11	<0.12	<0.12	NC
Thallium	0.29	0.23	0.22	<0.21	0.25	0.16	0.41	0.17	0.63
METHOD 7471A (mg/kg)									
Mercury	<0.12	<0.12	<0.12	<0.13	<0.12	<0.11	<0.12	<0.12	NC
METHOD 9010A (mg/kg)									
Cyanide, Total	<0.59	<0.60	<0.60	<0.67	<0.59	<0.55	<0.60	<0.60	NC
Chromium	27.3	28.1	25.9	26	28.6	18.4	34.4	19.1	NC
Lead	11.6	26.6	16.8	16.7	20.2	8.6	22	7.9	NC

Reporting limits and concentrations are presented on a dry weight basis.

J - Estimated value, constituents present below the reporting limit.

NC - Critical value not calculated, see Section 3.2

TABLE 3-1
Analytical Results and Critical Values for the Background Samples

CONSTITUENT	#1	#2	#3	#4	#5	#6	#7	#8	Critical Value
Nickel	15.2	14.3	13.9	17.2	17	11.8	20.5	11.7	NC
Selenium	<0.24	<0.24	<0.24	<0.27	<0.24	<0.22	<0.24	<0.24	NC
Silver	<0.12	<0.12	<0.12	<0.13	<0.12	<0.11	<0.12	<0.12	NC
Thallium	0.29	0.23	0.22	<0.21	0.25	0.16	0.41	0.17	NC
METHOD 7471A (mg/kg)									
Mercury	<0.12	<0.12	<0.12	<0.13	<0.12	<0.11	<0.12	<0.12	NC
METHOD 9010A (mg/kg)									
Cyanide, Total	<0.59	<0.60	<0.60	<0.67	<0.59	<0.55	<0.60	<0.60	NC

Reporting limits and concentrations are presented on a dry weight basis.

J - Estimated value; constituents present below the reporting limit.

NC - Critical value not calculated; see Section 3.2.

Table 3-2
Analytical Results and Critical Values for the Basin Subsoil Samples

ANALYTE	BASIN #1	BASIN #5	BASIN #6	BASIN #9	BASIN #10	BASIN #14	BASIN #15	Critical Value
METHOD D2218 (%)								
Percent Water	16	20	16	32	20	15	20	--
VOLATILES								
METHOD 8021A (ug/kg)								
Benzene	<6.0	<6.2	<5.9	<7.4	<6.3	<5.8	<6.2	NC
Carbon tetrachloride	<6.0	<6.2	<5.9	<7.4	<6.3	<5.8	<6.2	NC
Chlorobenzene	<6.0	<6.2	<5.9	<7.4	<6.3	<5.8	<6.2	NC
Chloroform	<6.0	<6.2	<5.9	<7.4	<6.3	<5.8	<6.2	NC
trans-1,2-Dichloroethylene	<6.0	<6.2	<5.9	<7.4	<6.3	<5.8	<6.2	NC
Hexachlorobutadiene	<6.0	<6.2	<5.9	<7.4	<6.3	<5.8	<6.2	NC
Bromomethane	<6.0	<6.2	<5.9	<7.4	<6.3	<5.8	<6.2	NC
Chloromethane	<6.0	<6.2	<5.9	<7.4	<6.3	<5.8	<6.2	NC
Methylene chloride (Dichloromethane)	<6.0	<6.2	<5.9	<7.4	<6.3	<5.8	<6.2	NC
Naphthalene	<6.0	<6.2	<5.9	<7.4	<6.3	<5.8	<6.2	NC
Tetrachloroethene	<6.0	<6.2	<5.9	<7.4	<6.3	<5.8	<6.2	NC
Toluene	<6.0	<6.2	<5.9	<7.4	<6.3	<5.8	<6.2	NC
1,2,4-Trichlorobenzene	<6.0	<6.2	<5.9	<7.4	<6.3	<5.8	<6.2	NC
1,1,1-Trichloroethane	<6.0	<6.2	<5.9	<7.4	<6.3	<5.8	<6.2	NC
1,1,2-Trichloroethane	<6.0	<6.2	<5.9	<7.4	<6.3	<5.8	<6.2	NC
Trichloroethylene	<6.0	<6.2	<5.9	<7.4	<6.3	<5.8	<6.2	NC
Trichlorofluoromethane	<6.0	<6.2	<5.9	<7.4	<6.3	<5.8	<6.2	NC
Vinyl chloride	<6.0	<6.2	<5.9	<7.4	<6.3	<5.8	<6.2	NC
METHOD 8240B (ug/kg)								
Acrolein	<120	<120	<120	<150	<120	<120	<120	NC
Carbon disulfide	<5.9	<6.2	<6.0	<7.3	<6.2	<5.9	<6.2	NC
2-Butanone (MEK)	<30	<31	<30	<36	<31	<30	<32	NC
SEMIVOLATILES								
METHOD 8079 (ug/kg)								
N-Nitrosodimethylamine	<80	<84	<80	<99	<84	<79	<84	NC
METHOD 8089 (ug/kg)								
2,4-Dinitrotoluene	<180 a	<11	<12	<15	<2500 b	<35 c	<12	NC
2,6-Dinitrotoluene	<180 a	<11	<12	<15	<2500 b	<35 c	<12	NC
METHOD 8121 (ug/kg)								
Hexachlorobenzene	<59 a	<3.7	<3.9	<4.9	<820 b	<12 c	<4.1	NC
Hexachlorocyclopentadiene	<59 a	<3.7	<3.9	<4.9	<820 b	<12 c	<4.1	NC

Table 3-2
Analytical Results and Critical Values for the Basin Subsoil Samples

ANALYTE	BASIN #1	BASIN #5	BASIN #6	BASIN #9	BASIN #10	BASIN #14	BASIN #15	Critical Value
Hexachloroethane METHOD 8161 (ug/kg)	<59 a	<3.7	<3.9	<4.9	<820 b	<12 c	<4.1	NC
Pentachlorophenol METHOD 8110 (ug/kg)	<20	<21	<20	<25	<21	<20	<21	NC
bis(2-Chloroethoxy) methane	<30	<30	<30	<44	<30	<30	<30	NC
bis(2-Chloroethyl) ether	<30	<30	<30	<44	<30	<30	<30	NC
bis(2-Chloroisopropyl) ether METHOD 8270B (ug/kg)	<30	<30	<30	<44	<30	<30	<30	NC
bis(2-Ethylhexyl)phthalate	<390	<410	<390	<490	<410	<390	<410	NC
Butylbenzylphthalate	<390	<410	<390	<490	<410	<390	<410	NC
4-Chloro-3-methylphenol	<390	<410	<390	<490	<410	<390	<410	NC
2-Chlorophenol	<390	<410	<390	<490	<410	<390	<410	NC
Di-n-butylphthalate	<390	<410	<390	<490	<410	<390	<410	NC
Diethylphthalate	<390	<410	<390	<490	<410	<390	<410	NC
2,4-Dimethylphenol	<390	<410	<390	<490	<410	<390	<410	NC
Dimethylphthalate	<390	<410	<390	<490	<410	<390	<410	NC
2-Methyl-4,6-dinitrophenol	<2000	<2100	<2000	<2500	<2100	<2000	<2100	NC
Di-n-octylphthalate	<390	<410	<390	<490	<410	<390	<410	NC
Phenol	<390	<410	<390	<490	<410	<390	<410	NC
2,4,5-Trichlorophenol	<390	<410	<390	<490	<410	<390	<410	NC
2,4,6-Trichlorophenol METHOD 8318 (ug/kg)	<390	<410	<390	<490	<410	<390	<410	NC
Fluoranthene	<12	<12	<12	330	<12	<12	<12	6.0
Fluorene METHOD 8330 (ug/kg)	<12	<12	<12	<12	<12	<12	<12	NC
Nitrobenzene	<320	<310	<300	<370	<310	<290	<310	NC
PESTICIDES/PCBs								
METHOD 8080A (ug/kg)								
Aldrin	<30 a	<1.9	<2.0	<2.5	<420 b	<6.0 c	<2.1	NC
Chlordane	<300 a	<19	<20	<25	<4200 b	<6.0 c	<21	NC
Dieldrin	<59 a	<3.7	<3.9	<4.9	<820 b	<12 c	<4.1	NC
Endosulfan I	<30 a	<1.9	<2.0	<2.5	<420 b	<6.0 c	<2.1	NC
Endosulfan II	<59 a	<3.7	<3.9	<4.9	<820 b	<12 c	<4.1	NC
Endrin	<59 a	<3.7	<3.9	<4.9	<820 b	<12 c	<4.1	NC
Heptachlor	<30 a	<1.9	<2.0	<2.5	<420 b	<6.0 c	<2.1	NC

Table 3-2
Analytical Results and Critical Values for the Basin Subsoil Samples

ANALYTE	BASIN #1	BASIN #5	BASIN #6	BASIN #9	BASIN #10	BASIN #14	BASIN #16	Critical Value
Heptachlor epoxide	<30 a	<1.9	<2.0	<2.5	<420 b	<6.0 c	<2.1	NC
Methoxychlor	<300 a	<19	<20	<25	<4200 b	<60 c	<21	NC
Aroclor-1016	<590 a	<37	<39	<49	<8200 b	<120 c	<41	NC
Aroclor-1221	<1200 a	<74	<80	<99	<17000 b	<240 c	<84	NC
Aroclor-1232	<590 a	<37	<39	<49	<8200 b	<120 c	<41	NC
Aroclor-1242	<590 a	<37	<39	<49	<8200 b	<120 c	<41	NC
Aroclor-1248	<590 a	<37	<39	<49	<8200 b	<120 c	<41	NC
Aroclor-1254	<590 a	<37	<39	<49	<8200 b	<120 c	<41	NC
Aroclor-1260	<590 a	<37	<39	<49	<8200 b	<120 c	<41	NC
Toxaphene	<3000 a	<190	<200	<250	<42000 b	<600 c	<210	NC
METALS								
METHOD 8020 (mg/kg)								
Arsenic	2.2	2.1	2.4	4.6	3	2.3	4.3	5.5
Barium	91.2	86	45	72.7	51.4	67.2	94.6	29.2
Beryllium	0.42	0.58	0.23	0.5	0.34	0.27	0.4	1.71
Cadmium	<0.23	<0.25	<0.23	<0.30	<0.25	<0.24	<0.24	NC
Chromium	21.9	25	14.8	33.4	22.5	16.5	37.1	48.6
Lead	12.5	12.1	6.7	11.9	14.8	12.9	26.2	45.1
Nickel	6.5	11.6	5.9	14.1	8.4	5.4	14	28.1
Selenium	<0.23	<0.49	<0.23	<0.30	<0.25	<0.24	<1.2	NC
Silver	<0.11	<0.12	<0.12	<0.15	<0.13	<0.12	<0.12	NC
Thallium	0.18	0.21	0.14	0.26	0.21	0.15	0.5	0.63
METHOD 7471A (mg/kg)								
Mercury	<0.11	<0.12	<0.12	<0.15	<0.13	<0.12	<0.12	NC
METHOD 9010A (mg/kg)								
Cyanide, Total	<0.57	<0.62	<0.58	<0.75	<0.63	<0.60	<0.61	NC

Reporting limits and concentrations are presented on a dry weight basis.

- a - Due to matrix interference, this sample was analyzed at a 15-fold dilution.
- b - Due to matrix interference, this sample was analyzed at a 200-fold dilution.
- c - Due to matrix interference, this sample was analyzed at a 3-fold dilution.

**TABLE 3-3
ANALYTICAL TCLP RESULTS**

ANALYTE	REGULATORY LEVEL	BL-01-01	WC-01-01	WC-02-01	WC-03-01	WC-04-01
METALS, TOTAL (MGL)						
Arsenic	5.0	0.00804	0.00299	0.00442	0.00497	0.00525
Barium	100.0	0.071	0.332	0.248	0.233	0.255
Cadmium	1.0	0.0002	0.0002	0.0002	0.0002	0.0002
Chromium	5.0	0.00263	0.017	0.0138	0.0201	0.0124
Lead	5.0	<0.00129	<0.00129	<0.00129	<0.00129	<0.00129
Mercury	0.2	<0.000039	<0.000039	<0.000039	<0.000039	<0.000039
Selenium	1.0	0.00715	0.00972	0.00992	0.00877	0.00933
Silver	5.0	<0.00187	<0.00187	<0.00187	<0.00187	<0.00187
VOLATILE ORGANICS (UG/L)						
Benzene	500	1.70 B	<0.940	<0.940	<0.940	<0.940
2-Butanone(MEK)	200,000	<5.78	<5.78	<5.78	<5.78	<5.78
Carbon tetrachloride	500	<2.26	<2.26	<2.26	<2.26	<2.26
Chlorobenzene	100,000	<1.38	<1.38	<1.38	<1.38	<1.38
Chloroform	6,000	<2.44	<2.44	<2.44	<2.44	<2.44
1,2-Dichloroethane	500	<2.50	<2.50	<2.50	<2.50	<2.50
1,1-Dichloroethene	700	<1.53	<1.53	<1.53	<1.53	<1.53
Tetrachloroethene	700	<3.34	<3.34	<3.34	<3.34	<3.34
Trichloroethene	500	<1.86	<1.86	<1.86	<1.86	<1.86
Vinyl chloride	200	<4.64	<4.64	<4.64	<4.64	<4.64
SEMI-VOLATILE ORGANICS (UG/L)						
1,4-Dichlorobenzene	7,500	<5.71	<5.71	<5.71	<4.86	<5.71
2,4-Dinitrotoluene	130	<3.47	<3.47	<3.47	<2.32	<3.47
Hexachlorobenzene	130	<2.55	<2.55	<2.55	<2.06	<2.55
Hexachlorobutadiene	500	<15.0	<15.0	<15.0	<14.5	<15.0
Hexachloroethane	3,000	<13.6	<13.6	<13.6	<17.1	<13.6
2-Methylphenol (o-cresol)	200,000	<2.46	<2.46	<2.46	<2.78	<2.46
4-Methylphenol/3-Methylphenol	200,000	<2.00	<2.00	<2.00	<2.59	<2.00
Nitrobenzene	2,000	<3.57	<3.57	<3.57	<4.14	<3.57
Pentachlorophenol	100,000	<4.11	<4.11	<4.11	<4.79	<4.11
Pyridine	5,000	<5.29	<5.29	<5.29	<24.6	<5.29
2,4,5-Trichlorophenol	400,000	<2.74	<2.74	<2.74	<2.17	<2.74
2,4,6-Trichlorophenol	2,000	<7.25	<7.25	<7.25	<3.41	<7.25
ORGANOCHLORINE PESTICIDES (UG/L)						
gamma-BHC(Lindane)	400	<0.0346	<0.0346	<0.0346	<0.0346	<0.0346
Chlordane	30	<0.338	<0.338	<0.338	<0.338	<0.338
Endrin	20	<0.0762	<0.0762	<0.0762	<0.0762	<0.0762
Heptachlor	8	<0.0462	<0.0462	<0.0462	<0.0462	<0.0462
Heptachlor epoxide	8	<0.0138	<0.0138	<0.0138	<0.0138	<0.0138
Methoxychlor	10,000	<0.448	<0.448	<0.448	<0.448	<0.448
Toxaphene	500	<0.923	<0.923	<0.923	<0.923	<0.923
PHENOXYACID HERBICIDES (UG/L)						
2,4-D	10,000	<1.06	<1.06	<1.06	<1.06	<1.06
2,4,5-TP (Silvex)	1,000	<0.1000	<0.1000	<0.1000	<0.1000	<0.1000

B - Benzene detected in laboratory blank at 1.22 ug/L.

Table 3-4**Statistics for Calculating the Critical Values**

Constituent	Mean, \bar{x}	Standard Deviations, s	Tolerance Factor, K	Upper Tolerance Limit, UTL
Arsenic	2.0563	0.7947	4.3539	5.5031
Barium	148.7500	32.9708	4.3539	292.3000
Beryllium	0.9488	0.1750	4.3539	1.7109
Chromium	25.9750	5.1933	4.3539	48.5860
Lead	16.3000	6.6132	4.3539	45.0929
Nickel	15.2000	2.9674	4.3539	28.1198
Thallium	0.2294	0.0931	4.3539	0.6345
Fluoranthene	6.0	0	4.3539	6.0

Attachment 6
DEQ Letter - 22 October 1997



COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

George Allen
Governor

Becky Norton Dunlop
Secretary of Natural Resources

Street address: 629 East Main Street, Richmond, Virginia 23219
Mailing address: P.O. Box 10009, Richmond, Virginia 23240
Fax (804) 698-4500 TDD (804) 698-4021
<http://www.deq.state.va.us>

Thomas L. Hopkins
Director

(804) 698-4000
1-800-592-5482

October 22, 1997

C.A. Jake
Environmental Manager, Alliant Techsystems Inc.
Radford Army Ammunition Plant
P.O. Box 1
Radford, VA 24141-0100

**RE: Radford Army Ammunition Plant (RAAP), EPA ID# VA12100207306
Equalization Basin/Background Data Approval**

Dear Ms. Jake:

RAAP's revision to the Site Investigation Evaluation report was received by the Department of Environmental Quality (DEQ) on April 3, 1997. Please forgive the delay in this response.

Based on the information provided, the background data, as presented in this report, is acceptable. By this letter, the DEQ approves the background data for the hazardous constituents of concern. Please note, however, that the compliance sampling and statistical comparisons, as presented in the report, are still under review and no decision regarding their acceptability has yet been made. Once this review is completed, a separate letter addressing any concerns or accepting the data presented will be sent to RAAP. If there are any questions regarding these comments or the background data review, please contact me at (804) 698-4206.

Sincerely,

Debra A. Miller
Environmental Engineer Senior

cc: Jerry Redder, Alliant Techsystems/RAAP
Lisa Ellis, DEQ
Claire Ballard, DEQ
Aziz Farahmand, DEQ-RRO

Attachment 7
DEQ Letter - 10 March 1998



COMMONWEALTH of VIRGINIA

James S. Gilmore, III
Governor

John Paul Woodley, Jr.
Secretary of Natural Resources

DEPARTMENT OF ENVIRONMENTAL QUALITY

Street address: 629 East Main Street, Richmond, Virginia 23219

Mailing address: P.O. Box 10009, Richmond, Virginia 23240

Fax (804) 698-4500 TDD (804) 698-4021

<http://www.deq.state.va.us>

Thomas L. Hopkins
Director

(804) 698-4000
1-800-592-5482

March 10, 1998

C.A. Jake
Alliant Techsystems Inc.
Environmental Manager
Radford Army Ammunition Plant
P.O. Box 1
Radford, VA 24141-0100

RE: Radford Army Ammunition Plant (RAAP)
EPA ID# VA1210020730
Equalization Basin Revised Sampling

Dear Ms. Jake:

Revised analytical results for the Equalization Basin's confirmatory sampling were received by the Department of Environmental Quality (DEQ) on December 17, 1997. The data submitted was for the resampling of Grids #1 and #10. RAAP decided to resample these grids because of the high practical quantitation limits (PQLs) achieved during the first round of sampling. These high PQLs were due to the dilution of the samples.

Based on the information submitted, use of the November 11, 1997, data for Grid #1 and Grid #10 is acceptable since the quantitation limits achieved with the resampling are within an appropriate range for background comparison. At this time, RAAP should complete the closure in accordance with their approved plan and, when completed, submit the required certifications and closure report, including the information necessary for background closure and risk-based closure of the unit. The following information shall be included in the closure report, at a minimum:

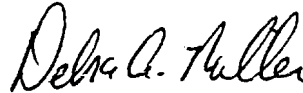
- a summary of all closure activities;
- a summary of results for background and unit sampling including the depth of samples for soil sampling results;
- the depth of excavation;
- results of all statistical calculations (i.e., for background closure demonstration) and an example calculation demonstrating compliance with relevant guidance;
- all risk assessment reports including calculations and conclusions;

- all sampling results as an appendix to this report (please note, this sample data is currently in-house at DEQ and will not need to be resubmitted);
- all applicable explanation/justification for the data used or conclusion reached during closure activities, including a summary of QA/QC findings;
- a synopsis on the proper disposal of waste generated during closure activities.


It is noted that much of this information has already been submitted. However, a detailed closure report which includes both the background and risk-based closure information should be submitted in support of the certifications and may reference previous submittals or repeat the information in the closure report, whichever is more convenient.

Once received, the certifications and closure report will be subject to DEQ review. Closure of the units will not occur until the DEQ has verified closure in accordance with this approved closure plan. If you should have any questions, concerning this matter, please contact me at (804) 698-4206.

Sincerely,



Debra A. Miller
Environmental Engineer Senior
Office of Waste Permitting

cc:  Jerry Redder, Alliant Techsystems-RAAP
Robert Greaves, EPA Region III
Glenn VonGonten, DEQ
Aziz Farahmand, DEQ/RRO-Compliance
CENTRAL HW FILES

Attachment 8
Risk Tables

On-site Resident (Adult) Exposure - Non-carcinogen

Ingestion of COPCs in On-site Soils

Radford Army Ammunition Plant

Radford, Virginia

Equations: Intake (mg/kg-day) =
$$\frac{CS \times IRS_a \times CF \times FI \times EF \times ED_a}{BW_a \times AT_n}$$

Hazard Quotient = Intake / Reference Dose (RfD-Chemical Specific)

Variable Abbreviation	Variable	REAMS Default Value	User Defined Value
CS	Chemical Concentration in Soil (mg/Kg)	~	0.333*
IRS _a	Ingestion Rate - Adult (mg/soil/day)	100	
CF	Conversion Factor (1.0E-06 kg/mg)	0.000001	
FI	Fraction Ingested from Contaminated Source Residential (unitless)	1.0	
EF	Exposure Frequency (days/year)	350	
ED _a	Exposure Duration (years)	30	
BW _a	Adult Body Weight (kg)	70	
AT _n	Averaging Time (period over which exposure is averaged - days)	10,950	

Notes:

* Maximum Detected Concentration

On-site Resident (Child) Exposure - Non-carcinogen

Ingestion of COPCs in On-site Soils

Radford Army Ammunition Plant

Radford, Virginia

Equations: Intake (mg/kg-day) =
$$\frac{CS \times IRS_c \times CF \times FI \times EF \times ED_c}{BW_c \times AT_n}$$

Hazard Quotient = Intake / Reference Dose (RfD-Chemical Specific)

Variable Abbreviation	Variable	REAMS Default Value	User Defined Value
CS	Chemical Concentration in Soil (mg/Kg)	~	0.333*
IRS _c	Ingestion Rate - Child (mg/soil/day)	200	
CF	Conversion Factor (1.0E-06 kg/mg)	0.000001	
FI	Fraction Ingested from Contaminated Source Residential (unitless)	1.0	
EF	Exposure Frequency (days/year)	350	
ED _c	Exposure Duration (years)	6	
BW _c	Child Body Weight (kg)	15	
AT _n	Averaging Time (period over which exposure is averaged - days)	2,190	

Notes:

* Maximum Detected Concentration

On-site Resident (Adult) Exposure - Non-carcinogen

Dermal Contact with COPCs in Soils

Radford Army Ammunition Plant

Radford, Virginia

Equations: Absorbed Dose (mg/kg-day) =
$$\frac{CS \times CF \times SA_a \times AF \times ABS \times EF \times ED_a}{BW_a \times AT_n}$$

Hazard Quotient = Intake / Reference Dose (RfD-Chemical Specific)

Variable Abbreviation	Variable	REAMS Default Value	User Defined Value
CS	Chemical Concentration in Soils (mg/Kg)	~	0.333*
CF	Volumetric Conversion Factor for Soil (1.0E-06 kg/mg)	0.000001	
SA _a	Skin Surface Area Available for Contact (Adult - cm2/event)	~	4,860 (Given)
AF	Soil Adherence Factor (mg/cm2)	~	1.45 (Given)
ABS	Chemical-specific Absorption Factor (unitless)	~	0.10**
EF	Exposure Frequency (days/year)	350	
ED _a	Exposure Duration (years)	30	
BW _a	Adult Body Weight (kg)	70	
AT _n	Averaging Time (period over which exposure is averaged - days)	10,950	

Notes:

* Maximum Soil Concentration

** Value from "Assessing Dermal Exposure From Soil" (USEPA, 1995)

On-site Resident (Child) Exposure - Non-carcinogen

Dermal Contact with COPCs in Soils

Radford Army Ammunition Plant

Radford, Virginia

Equations: Absorbed Dose (mg/kg-day) =
$$\frac{CS \times CF \times SA_c \times AF \times ABS \times EF \times ED_c}{BW_c \times AT_n}$$

Hazard Quotient = Intake / Reference Dose (RfD-Chemical Specific)

Variable Abbreviation	Variable	REAMS Default Value	User Defined Value
CS	Chemical Concentration in Soil (mg/Kg)	~	0.333*
CF	Volumetric Conversion Factor for Soil (1.0E-06 kg/mg)	0.000001	
SA _c	Skin Surface Area Available for Contact (Child - cm ² /event)	1,875	
AF	Soil Adherence Factor (mg/cm ²)	~	1.45 (Given)
ABS	Chemical-specific Absorption Factor (unitless)	~	0.10**
EF	Exposure Frequency (days/year)	350	
ED _c	Exposure Duration (years)	6	
BW _c	Adult Body Weight (kg)	15	
AT _n	Averaging Time (period over which exposure is averaged - days)	2,190	

Notes:

* Maximum Soil Concentration

** Value from "Assessing Dermal Exposure From Soil" (USEPA, 1995)

On-site Residential (Adult) Exposure - Non-carcinogen

Inhalation of COPCs from Soil Particles

Radford Army Ammunition Plant

Radford, Virginia

Equations: Intake (mg/kg-day) =
$$\frac{\text{PEF} \times \text{IRA}_a \times \text{ET} \times \text{EF} \times \text{ED}}{\text{BW}_a \times \text{AT}_n}$$

Hazard Quotient = Intake/Reference Dose (RfD-Chemical Specific)

Variable Abbreviation	Variable	REAMS Default Value	User Defined Value
PEF	Particulate Emission Factor in Air (kg/ m3)	1.47E-09	
IRA _a	Inhalation Rate (m3/hour)	0.833	
ET	Exposure Time (hours/ day)	24	
EF	Exposure Frequency (days/ year)	350	
ED	Exposure Duration (years)	30	
BW _a	Adult Body Weight (kg)	70	
AT _n	Averaging Time (period over which exposure is averaged - days)	10,950	

On-site Residential (Child) Exposure - Non-carcinogen

Inhalation of COPCs from Soil Particles

Radford Army Ammunition Plant

Radford, Virginia

Equations: Intake (mg/kg-day) =
$$\frac{\text{PEF} \times \text{IRA}_c \times \text{ET} \times \text{EF} \times \text{ED}}{\text{BW}_c \times \text{AT}_n}$$

Hazard Quotient = Intake/Reference Dose (RfD-Chemical Specific)

Variable Abbreviation	Variable	REAMS Default Value	User Defined Value
PEF	Particulate Emission Factor in Air (kg/m3)	1.47E-09	
IRA _c	Inhalation Rate (m3/hour)	0.5	
ET	Exposure Time (hours/day)	24	
EF	Exposure Frequency (days/year)	350	
ED	Exposure Duration (years)	6	
BW _c	Child Body Weight (kg)	15	
AT _n	Averaging Time (period over which exposure is averaged - days)	2,190	



**US Army Corps
of Engineers
Norfolk District**

IFB No. DACA65-97-B-0056

Bio Plant Equalization Basin Closure

Radford Army Ammunition Plant

Radford, Virginia

Construction Solicitation and Specifications

**Fill in SF-1442, Schedule,
Section 600 and Return w/Bond**

8 September 1997

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SOLICITATION, OFFER, AND AWARD (SF 1442)


SECTION	TITLE	PAGE NOS.
00010	SF 1442 AND BIDDING SCHEDULE	00010-1 TO 00010-3
00100	INSTRUCTIONS, CONDITIONS, AND NOTICE TO BIDDERS	00100-1 TO 00100-12
00600	REPRESENTATIONS AND CERTIFICATIONS AND OTHER STATEMENTS OF BIDDERS	00600-1 TO 00600-19
00700	CONTRACT CLAUSES	00700-1 TO 00700-126
00800	SPECIAL CONTRACT REQUIREMENTS	00800-1 TO 00800-7
DIVISION 1 GENERAL REQUIREMENTS		
DIVISION 2 SITE WORK		

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SECTION 00010

SOLICITATION, OFFER, AND AWARD (SF 1442)
AND
BIDDING SCHEDULE

TITLE	PAGE NOS.
-----	-----
Solicitation, Offer & Award (SF 1442)	00010-1
Bidding Schedule	00010-3

SOLICITATION, OFFER, AND AWARD (Construction, Alteration, or Repair)	1. SOLICITATION NO. DACA65-97-B-0056	2. TYPE OF SOLICITATION <input checked="" type="checkbox"/> SEALED BID (IFB) <input type="checkbox"/> NEGOTIATED (RFP)	3. DATE ISSUED 09/08/97	PAGE OF PAGES 1 of 318
	IMPORTANT - The "offer" section on the reverse must be fully completed by offeror.			
4. CONTRACT NO.	5. REQUISITION/PURCHASE REQUEST NO. EN-DM*-5194-0048	6. PROJECT NO. 5952941		
7. ISSUED BY U.S. ARMY ENGINEER DISTRICT, NORFOLK ATTN: CENAO-CT, BUILDING 36 803 FRONT STREET NORFOLK, VA 23510-1096	CODE CENAO-CT	8. ADDRESS OFFER TO CENAO-CT U.S. ARMY ENGINEER DISTRICT, NORFOLK ATTN: CENAO-CT, BUILDING 36 803 FRONT STREET NORFOLK, VA 23510-1096		
9. FOR INFORMATION CALL: 	A. NAME Marsha Flood S24	B. TELEPHONE NO. (Include area code) (NO COLLECT CALLS) (757) 441-7746		

SOLICITATION

NOTE: In sealed bid solicitations "offer" and "offeror" mean "bid" and "bidder".

10. THE GOVERNMENT REQUIRES PERFORMANCE OF THE WORK DESCRIBED IN THESE DOCUMENTS (Title, identifying no., date):

IFB No. DACA65-97-B-0056, Bio Plant Equalization Basin Closure, Radford
Army Ammunition Plant, Radford, Virginia

The project consists of clean closure of the Bio Plant Equalization Basin.
Work includes a) earthwork, b) demolition, removal and decontamination/
disposal of piping, pumps, soil cement liner and concrete, c) subsoil
testing to verify soil requiring removal, d) removal disposal of
contaminated soil and e) backfill and grading.

THIS IS AN UNRESTRICTED PROCUREMENT. SIC CODE 1629.

11. The Contractor shall begin performance within <u>10</u> calendar days and complete it within <u>SEE SECTION 00800</u> calendar days after receiving <input type="checkbox"/> award, <input checked="" type="checkbox"/> notice to proceed. This performance period is <input checked="" type="checkbox"/> mandatory, <input type="checkbox"/> negotiable. (See _____.)	
12A. THE CONTRACTOR MUST FURNISH ANY REQUIRED PERFORMANCE AND PAYMENT BONDS? <small>(If "YES," indicate within how many calendar days after award in Item 12B.)</small> <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	12B. CALENDAR DAYS 010
13. ADDITIONAL SOLICITATION REQUIREMENTS:	
A. Sealed offers in original and <u>1</u> copies to perform the work required are due at the place specified in Item 8 by <u>1400</u> (hour) local time <u>10/08/97</u> (date). If this is a sealed bid solicitation, offers must be publicly opened at that time. Sealed envelopes containing offers shall be marked to show the offeror's name and address, the solicitation number, and the date and time offers are due.	
B. An offer guarantee <input checked="" type="checkbox"/> is, <input type="checkbox"/> is not required.	
C. All offers are subject to the (1) work requirements, and (2) other provisions and clauses incorporated in the solicitation in full text or by reference.	
D. Offers providing less than <u>120</u> calendar days for Government acceptance after the date offers are due will not be considered and will be rejected.	

14. NAME AND ADDRESS OF OFFEROR (Include ZIP Code)				15. TELEPHONE NO. (Include area code)			
16. REMITTANCE ADDRESS (Include only if different than Item 14)							
CODE		FACILITY CODE					
17. The offeror agrees to perform the work required at the prices specified below in strict accordance with the terms of this solicitation, if this offer is accepted by the Government in writing within _____ calendar days after the date offers are due. (Insert any number equal to or greater than the minimum requirement stated in Item 13D. Failure to insert any number means the offeror accepts the minimum in Item 13D.)							
<div style="display: flex; align-items: center; justify-content: center;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-weight: bold; margin-right: 10px;">AMOUNTS</div> <div style="border-left: 1px solid black; width: 100%; height: 100%;"></div> </div>							
18. The offeror agrees to furnish any required performance and payment bonds.							
19. ACKNOWLEDGMENT OF AMENDMENTS (The offeror acknowledges receipt of amendments to the solicitation - give number and date of each)							
AMENDMENT NO.							
DATE							
20A. NAME AND TITLE OF PERSON AUTHORIZED TO SIGN OFFER (Type or print)				20B. SIGNATURE		20C. OFFER DATE	
AWARD (To be completed by Government)							
21. ITEMS ACCEPTED:							
22. AMOUNT				23. ACCOUNTING AND APPROPRIATION DATA			
24. SUBMIT INVOICES TO ADDRESS SHOWN IN (4 copies unless otherwise specified)			ITEM	25. OTHER THAN FULL AND OPEN COMPETITION PURSUANT TO			
				<input type="checkbox"/> 10 U.S.C. 2304(c)() <input type="checkbox"/> 41 U.S.C. 253(c)()			
26. ADMINISTERED BY		CODE	27. PAYMENT WILL BE MADE BY				
CONTRACTING OFFICER WILL COMPLETE ITEM 28 OR 29 AS APPLICABLE							
<input type="checkbox"/> 28. NEGOTIATED AGREEMENT (Contractor is required to sign this document and return _____ copies to issuing office.) Contractor agrees to furnish and deliver all items or perform all work, requisitions identified on this form and any continuation sheets for the consideration stated in this contract. The rights and obligations of the parties to this contract shall be governed by (a) this contract award, (b) the solicitation, and (c) the clauses, representations, certifications, and specifications incorporated by reference in or attached to this contract.				<input type="checkbox"/> 29. AWARD (Contractor is not required to sign this document.) Your offer on this solicitation, is hereby accepted as to the items listed. This award consummates the contract, which consists of (a) the Government solicitation and your offer, and (b) this contract award. No further contractual document is necessary.			
30A. NAME AND TITLE OF CONTRACTOR OR PERSON AUTHORIZED TO SIGN (Type or print)				31A. NAME OF CONTRACTING OFFICER (Type or print)			
30B. SIGNATURE		30C. DATE	31B. UNITED STATES OF AMERICA		31C. AWARD DATE		
			BY				

STANDARD FORM 1442 BACK (REV. 4-85)

SECTION 00010
SUPPLIES OR SERVICES AND PRICES/COSTS

ITEM	DESCRIPTION	QUANTITY	U/I	UNIT PRICE	AMOUNT
0001	Bioplant Equalization Basin Closure, complete, including all work incidental thereto as shown on the drawings and as specified, exclusive of items below.	1.00	JO	<u>LUMP SUM</u>	_____.
0002	Archeological Crew Chief for archeological work as specified in the Special Clauses. [ESTIMATED QUANTITY]	80.00	HR	_____.	_____.
0003	Archeological Technicians for archeological work as specified in the Special Clauses. [ESTIMATED QUANTITY]	320.00	HR	_____.	_____.
0004	Common Laborers for archeological work as specified in the Special Clauses. [ESTIMATED QUANTITY]	80.00	HR	_____.	_____.
0005	Night Watchman for archeological work as specified in the Special Clauses. [ESTIMATED QUANTITY]	60.00	HR	_____.	_____.
TOTAL:					\$ _____.

END OF SECTION 00010

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SECTION 00100

INSTRUCTIONS, CONDITIONS, AND NOTICES TO BIDDERS

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3	52.214-3	AMENDMENTS TO INVITATIONS FOR BIDS (DEC 1989)	00100-1
4	52.214-4	FALSE STATEMENTS IN BIDS (APR 1984)	00100-1
5	52.214-5	SUBMISSION OF BIDS (MAR 1997)	00100-2
6	52.214-6	EXPLANATION TO PROSPECTIVE BIDDERS (APR 1984)	00100-2
7	52.214-7	LATE SUBMISSIONS, MODIFICATIONS, AND WITHDRAWALS OF BIDS (MAY 1997)	00100-2
8	52.214-17	AFFILIATED BIDDERS (APR 1984)	00100-4
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12	52.216-1	TYPE OF CONTRACT (APR 1984)	00100-6
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15	52.236-27	SITE VISIT (CONSTRUCTION) (FEB 1995)	00100-8
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SECTION 00100
INSTRUCTIONS, CONDITIONS, AND NOTICES TO BIDDERS

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20	AMOUNT OF BID OR OFFER GUARANTEE	00100-9
21	SOLICITATION DOCUMENTS AND INFORMATION	00100-10
22	EVIDENCE OF AUTHORITY TO SIGN OFFERS	00100-11
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SECTION 00100
INSTRUCTIONS, CONDITIONS, AND NOTICES TO BIDDERS

1

RESERVED

2 52.214-1 SOLICITATION DEFINITIONS--SEALED BIDDING (JUL 1987)

"Government" means United States Government.

"Offer" means "bid" in sealed bidding.

"Solicitation" means an invitation for bids in sealed bidding.

(End of provision)

3 52.214-3 AMENDMENTS TO INVITATIONS FOR BIDS (DEC 1989)

(a) If this solicitation is amended, then all terms and conditions which are not modified remain unchanged.

(b) Bidders shall acknowledge receipt of any amendment to this solicitation (1) by signing and returning the amendment, (2) by identifying the amendment number and date in the space provided for this purpose on the form for submitting a bid, (3) by letter or telegram, or (4) by facsimile, if facsimile bids are authorized in the solicitation. The Government must receive the acknowledgment by the time and at the place specified for receipt of bids.

(End of provision)

4 52.214-4 FALSE STATEMENTS IN BIDS (APR 1984)

Bidders must provide full, accurate, and complete information as required by this solicitation and its attachments. The penalty for making false statements in bids is prescribed in 18 U.S.C. 1001.

(End of provision)

(R 2-201(b)(xiii))

(R 1-2.201(a)(11))

5 52.214-5 SUBMISSION OF BIDS (MAR 1997)

(a) Bids and bid modifications shall be submitted in sealed envelopes or packages (unless submitted by electronic means) (1) addressed to the office specified in the solicitation, and (2) showing the time and date specified for receipt, the solicitation number, and the name and address of the bidder.

(b) Bidders using commercial carrier services shall ensure that the bid is addressed and marked on the outermost envelope or wrapper as prescribed in subparagraphs (a) (1) and (2) of this provision when delivered to the office specified in the solicitation.

(c) Telegraphic bids will not be considered unless authorized by the solicitation; however, bids may be modified or withdrawn by written or telegraphic notice.

(d) Facsimile bids, modifications, or withdrawals, will not be considered unless authorized by the solicitation.

(e) Bids submitted by electronic commerce shall be considered only if the electronic commerce method was specifically stipulated or permitted by the solicitation.

(End of provision)

6 52.214-6 EXPLANATION TO PROSPECTIVE BIDDERS (APR 1984)

Any prospective bidder desiring an explanation or interpretation of the solicitation, drawings, specifications, etc., must request it in writing soon enough to allow a reply to reach all prospective bidders before the submission of their bids. Oral explanations or instructions given before the award of a contract will not be binding. Any information given a prospective bidder concerning a solicitation will be furnished promptly to all other prospective bidders as an amendment to the solicitation, if that information is necessary in submitting bids or if the lack of it would be prejudicial to other prospective bidders.

(End of provision)

(R SF 33A, Para 3, 1978 JAN)

7 52.214-7 LATE SUBMISSIONS, MODIFICATIONS, AND WITHDRAWALS OF BIDS (MAY 1997)

(a) Any bid received at the office designated in the solicitation after the exact time specified for receipt will not be considered unless it is

received before award is made and it--

(1) Was sent by registered or certified mail not later than the fifth calendar day before the date specified for receipt of bids (e.g., a bid submitted in response to a solicitation requiring receipt of bids by the 20th of the month must have been mailed by the 15th);

(2) Was sent by mail (or telegram or facsimile, if authorized) or hand-carried (including delivery by a commercial carrier) if it is determined by the Government that the late receipt was due primarily to Government mishandling after receipt at the Government installation;

(3) Was sent by U.S. Postal Service Express Mail Next Day Service-Post Office To Addressee, not later than 5:00 P.M. at the place of mailing two working days prior to the date specified for receipt of bids. The term "working days" excludes weekends and U.S. Federal holidays; or

(4) Was transmitted through an electronic commerce method authorized by the solicitation and was received at the initial point of entry to the Government infrastructure not later than 5:00 p.m. one working day prior to the date specified for receipt of bids.

(b) Any modification or withdrawal of a bid is subject to the same conditions as in paragraph (a) of this provision.

(c) The only acceptable evidence to establish the date of mailing of a late bid, modification, or withdrawal sent either by registered or certified mail is the U.S. or Canadian Postal Service postmark both on the envelope or wrapper and on the original receipt from the U.S. or Canadian Postal Service. Both postmarks must show a legible date or the bid, modification, or withdrawal shall be processed as if mailed late. "Postmark" means a printed, stamped, or otherwise placed impression (exclusive of a postage meter machine impression) that is readily identifiable without further action as having been supplied and affixed by employees of the U.S. or Canadian Postal Service on the date of mailing. Therefore, bidders should request the postal clerk to place a legible hand cancellation bull's-eye postmark on both the receipt and the envelope or wrapper.

(d) The only acceptable evidence to establish the time of receipt at the Government installation is the time/date stamp of that installation on the bid wrapper or other documentary evidence of receipt maintained by the installation.

(e) The only acceptable evidence to establish the date of mailing of a late bid, modification, or withdrawal sent by U.S. Postal Service Express Mail Next Day Service-Post Office to Addressee is the date entered by the post office receiving clerk on the "Express Mail Next Day Service-Post Office to Addressee" label and the postmark on the envelope or wrapper and

on the original receipt from the U.S. Postal Service. "Postmark" has the same meaning as defined in paragraph (c) of this provision, excluding postmarks of the Canadian Postal Service. Therefore, bidders should request the postal clerk to place a legible hand cancellation bull's-eye postmark on both the receipt and the envelope or wrapper.

(f) Notwithstanding paragraph (a) of this provision, a late modification of an otherwise successful bid that makes its terms more favorable to the Government will be considered at any time it is received and may be accepted.

(g) Bids may be withdrawn by written notice or telegram (including mailgram) received at any time before the exact time set for receipt of bids. If the solicitation authorizes facsimile bids, bids may be withdrawn via facsimile received at any time before the exact time set for receipt of bids, subject to the conditions specified in the provision entitled "Facsimile Bids." A bid may be withdrawn in person by a bidder or its authorized representative if, before the exact time set for receipt of bids, the identity of the person requesting withdrawal is established and the person signs a receipt for the bid.

(h) If an emergency or unanticipated event interrupts normal Government processes so as to cause postponement of the scheduled bid opening, and urgent Government requirements preclude amendment of the solicitation or other notice of an extension of the opening date, the time specified for receipt of bids will be deemed to be extended to the same time of day specified in the solicitation on the first work day on which normal Government processes resume.

(End of provision)

8 52.214-17 AFFILIATED BIDDERS (APR 1984)

(a) Business concerns are affiliates of each other when, either directly or indirectly, (1) one concern controls or has the power to control the other, or (2) a third party controls or has the power to control both.

(b) Each bidder shall submit with its bid an affidavit stating that it has no affiliates, or containing the following information:

(1) The names and addresses of all affiliates of the bidder.

(2) The names and addresses of all persons and concerns exercising control or ownership of the bidder and any or all of its affiliates, and whether they exercise such control or ownership as common officers, directors, stockholders holding controlling interest, or otherwise.

(End of provision)

(R 7-2003.12 1974 APR)

9 52.214-18 PREPARATION OF BIDS--CONSTRUCTION (APR 1984)

(a) Bids must be (1) submitted on the forms furnished by the Government or on copies of those forms, and (2) manually signed. The person signing a bid must initial each erasure or change appearing on any bid form.

(b) The bid form may require bidders to submit bid prices for one or more items on various bases, including--

(1) Lump sum bidding;

(2) Alternate prices;

(3) Units of construction; or

(4) Any combination of subparagraphs (1) through (3) above.

(c) If the solicitation requires bidding on all items, failure to do so will disqualify the bid. If bidding on all items is not required, bidders should insert the words "no bid" in the space provided for any item on which no price is submitted.

(d) Alternate bids will not be considered unless this solicitation authorizes their submission.

(End of provision)

(R SF 22, Para 5, 1978 FEB)

10 52.214-19 CONTRACT AWARD--SEALED BIDDING--CONSTRUCTION (AUG 1996)

(a) The Government will evaluate bids in response to this solicitation without discussions and will award a contract to the responsible bidder whose bid, conforming to the solicitation, will be most advantageous to the Government, considering only price and the price-related factors specified elsewhere in the solicitation.

(b) The Government may reject any or all bids, and waive informalities or minor irregularities in bids received.

(c) The Government may accept any item or combination of items, unless doing so is precluded by a restrictive limitation in the solicitation or the bid.

(d) The Government may reject a bid as nonresponsive if the prices bid are materially unbalanced between line items or subline items. A bid is materially unbalanced when it is based on prices significantly less than cost for some work and prices which are significantly overstated in relation to cost for other work, and if there is a reasonable doubt that

the bid will result in the lowest overall cost to the Government even though it may be the low evaluated bid, or if it is so unbalanced as to be tantamount to allowing an advance payment.

(End of provision)

11 52.214-5000 ARITHMETIC DISCREPANCIES (MAR 1995)--EFARS

(a) For the purpose of initial evaluations of bids, the following will be utilized in the resolving arithmetic discrepancies found on the face of bidding schedule as submitted by the bidder:

- (1) Obviously misplaced decimal points will be corrected;
- (2) Discrepancy between unit price and extended price, the unit price will govern;
- (3) Apparent errors in extension of unit prices will be corrected;
- (4) Apparent errors in addition of lump-sum and extended prices will be corrected.

(b) For the purpose of bid evaluation, the government will proceed on the assumption that the bidder intends his bid to be evaluated on basis of the unit prices, the totals arrived at by resolution of arithmetic discrepancies as provided above and the bid will be so reflected on the abstract of bids.

(c) These correction procedures shall not be used to resolve any ambiguity concerning which bid is low.

(End of statement)

12 52.216-1 TYPE OF CONTRACT (APR 1984)

The Government contemplates award of a firm fixed-price contract resulting from this solicitation.

(End of provision)

13 52.222-23 NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (APR 1984)

(a) The offeror's attention is called to the Equal Opportunity clause and the Affirmative Action Compliance Requirements for Construction clause of this solicitation.

(b) The goals for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade

on all construction work in the covered area, are as follows:

Goals for minority participation for each trade	Goals for female participation for each trade
12.0	6.9

These goals are applicable to all the Contractor's construction work performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, the Contractor shall apply the goals established for the geographical area where the work is actually performed. Goals are published periodically in the Federal Register in notice form, and these notices may be obtained from any Office of Federal Contract Compliance Programs office.

(c) The Contractor's compliance with Executive Order 11246, as amended, and the regulations in 41 CFR 60-4 shall be based on (1) its implementation of the Equal Opportunity clause, (2) specific affirmative action obligations required by the clause entitled "Affirmative Action Compliance Requirements for Construction," and (3) its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade. The Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor, or from project to project, for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, Executive Order 11246, as amended, and the regulations in 41 CFR 60-4. Compliance with the goals will be measured against the total work hours performed.

(d) The Contractor shall provide written notification to the Director, Office of Federal Contract Compliance Programs, within 10 working days following award of any construction subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the--

- (1) Name, address, and telephone number of the subcontractor;
- (2) Employer's identification number of the subcontractor;
- (3) Estimated dollar amount of the subcontract;
- (4) Estimated starting and completion dates of the subcontract; and
- (5) Geographical area in which the subcontract is to be performed.

(e) As used in this Notice, and in any contract resulting from this solicitation, the "covered area" is Radford Army Ammunition Plant, Virginia.

(End of provision)

(R 7-2003.14(d) 1978 SEP)

14 52.233-2 SERVICE OF PROTEST (AUG 1996)

(a) Protests, as defined in section 33.101 of the Federal Acquisition Regulation, that are filed directly with an agency, and copies of any protests that are filed with the General Accounting Office (GAO), shall be served on the Contracting Officer (addressed as follows) by obtaining written and dated acknowledgment of receipt from

Chief, Contracting Division
US Army Engineer District, Norfolk
803 Front Street
Norfolk, VA 23510-1096

(b) The copy of any protest shall be received in the office designated above within one day of filing a protest with the GAO.

(End of provision)

15 52.236-27 SITE VISIT (CONSTRUCTION) (FEB 1995)

(a) The clauses at 52.236-2, Differing Site Conditions, and 52.236-3, Site Investigation and Conditions Affecting the Work, will be included in any contract awarded as a result of this solicitation. Accordingly, offerors or quoters are urged and expected to inspect the site where the work will be performed.

(b) Site visits may be arranged during normal duty hours by contacting:
Name: J. W. Blackburn Address: Southwestern Virginia Area Office
Telephone: 540-639-7656

(End of provision)

16 252.236-7008 CONTRACT PRICES--BIDDING SCHEDULES (DEC 1991)

(a) The Government's payment for the items listed in the Bidding Schedule shall constitute full compensation to the Contractor for--

(1) Furnishing all plant, labor, equipment, appliances, and materials;
and

(2) Performing all operations required to complete the work in conformity with the drawings and specifications.

(b) The Contractor shall include in the prices for the items listed in

(End of provision)

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00100-9

SOLICITATION DOCUMENTS AND INFORMATION

ADDITIONAL COPIES OF SOLICITATION DOCUMENTS: Additional copies of solicitation documents are available from Defense Printing Service (DPS) upon receipt of payment in the amount set forth in the Pre-Solicitation Notice, SF 1417. Document costs are non-refundable and documents cannot be returned. Solicitation documents are NOT available for purchase from Norfolk District.

SOLICITATION INQUIRIES AND INFORMATION: Prospective offerors may submit inquiries in writing, by facsimile, or by telephone; (collect calls will not be accepted). Inquiries relating to this procurement should be directed as follows:

- ORDERING of SOLICITATION DOCUMENTS or
to REQUEST COPIES OF BIDDERS MAILING LISTS:

Defense Printing Service (DPS)
1641 Morris Street
Norfolk, VA 23511
(757)444-5968

- TECHNICAL and CONTRACTUAL QUESTIONS: Submit technical and contractual questions to the individual identified in Block 9 of the SF 1442 or Block 10 of the SF 33. Written inquiries may be faxed to (757)441-7183.

- REQUESTS for BID RESULTS and AWARD INFORMATION:

Telephone.....(757)441-7748
or
Facsimile.....(757)441-7183

- ACCESS FOR INSPECTION OF THE SITE, (Construction only):
Contact the Office of the Area Engineer or Site Manager
identified in FAR 52.236-27, "Site Visit (Construction)."

EVIDENCE OF AUTHORITY TO SIGN OFFERS

Evidence of the authority of individuals signing offers to submit firm offers on behalf of the offeror is required except where the offer is signed, and shows that it is so signed, by: the President, Vice-President, or Secretary of an incorporated offeror; a partner in the case of a partnership; or the owner in the case of a sole proprietorship. Failure to submit with the offer satisfactory evidence of the authority of all other persons may be cause for rejection of the offer as invalid or nonresponsive.

PREAWARD SAFETY CONFERENCE

a. Where an apparent low bidder, in performance of contracts during the previous three-year period, incurred one or more accidents, or where, in the opinion of the Contracting Officer, there is any question regarding this compliance with any safety or accident prevention requirement, such bidder, on request of the Contracting Officer prior to any award under this solicitation, shall attend a conference with representatives of the Contracting Officer to discuss any such accidents or non-compliance, the reason for their occurrence, and measures which will be taken to preclude any recurrence thereof.

b. Information elicited at this conference will be used by the Contracting Officer, in conjunction with other information obtained in a preaward survey, in determining the bidder's responsibility.

c. The items discussed, the preventive measures considered, and any conclusions reached in this conference shall be recorded in minutes of the meeting, which shall be authenticated by the signatures of representatives of the bidder and the Contracting Officer, and any procedures noted therein as agreed upon shall become an obligation of the bidder, along with all other safety and accident prevention requirements of the contract, if award is made to him.

INSPECTION OF THE SITE

Prospective bidders are invited to visit the site of the work in order to acquaint themselves as to site conditions and other problems incident to the prosecution of the work. Arrangements for inspection of the site shall be made through the Office the the Area Engineer identified in the clause 52.236.27, entitled "SITE VISIT (CONSTRUCTION)."

25 SUBCONTRACTING PLAN (CONSTRUCTION)

If the offeror is a large business and the offer amount exceeds \$1,000,000.00, he shall submit a subcontracting plan within three (3) working days of being notified (either verbally or in writing) that he is the apparent low bidder or is otherwise in line for award. The subcontracting plan shall be reviewed and approved by the Contracting Officer prior to award.

26 MAGNITUDE OF CONSTRUCTION PROJECT

The estimated contract price of the work for this project is between \$500,000 and \$1,000,000

27 BASIS OF AWARD

All blanks must be filled in by the bidder. A single award will be made to the lowest responsible, responsive bidder on the basis of the total price bid. Prior to making an award, a pre-award survey will be made and the low bidder will be required to show that he has the necessary capital, experience, and owns or can procure the necessary plant to commence the work at the time prescribed in the specifications and thereafter to prosecute and complete the work safely and satisfactorily within the time specified.

END OF SECTION 00100

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SECTION 00600
REPRESENTATIONS & CERTIFICATIONS

1

CORPORATE CERTIFICATE

Note: Contractor, if a corporation, should cause the following certificate to be executed under its corporate seal, provided that the same officer shall not execute both the contract and the certificate.

CERTIFICATE

I, _____, certify that

I am _____ of the corporation named as Contractor

herein, that _____, was then the

_____ of said corporation; that said contract

was duly signed for and in behalf of said corporation of authority

of its governing body, and is within the scope of its corporate

powers.

(Name of Corporation)

(Signature) (Corporate seal)

NOTE: A CORPORATE OFFICER OTHER THAN THE OFFICER SIGNING THE SOLICITATION MUST FILL OUT AND SIGN THIS FORM.

2 52.203-2 CERTIFICATE OF INDEPENDENT PRICE DETERMINATION (APR 1985)

(a) The offeror certifies that--

(1) The prices in this offer have been arrived at independently, without, for the purpose of restricting competition, any consultation, communication, or agreement with any other offeror or competitor relating to (i) those prices, (ii) the intention to submit an offer, or (iii) the methods or factors used to calculate the prices offered;

(2) The prices in this offer have not been and will not be knowingly disclosed by the offeror, directly or indirectly, to any other offeror or competitor before bid opening (in the case of a sealed bid solicitation) or contract award (in the case of a negotiated solicitation) unless otherwise required by law; and

(3) No attempt has been made or will be made by the offeror to induce any other concern to submit or not to submit an offer for the purpose of restricting competition.

(b) Each signature on the offer is considered to be a certification by the signatory that the signatory--

(1) Is the person in the offeror's organization responsible for determining the prices being offered in this bid or proposal, and that the signatory has not participated and will not participate in any action contrary to subparagraphs (a)(1) through (a)(3) above; or

(2)(i) Has been authorized, in writing, to act as agent for the following principals in certifying that those principals have not participated, and will not participate in any action contrary to subparagraphs (a)(1) through (a)(3) above _____

(insert full name of person(s) in the offeror's organization responsible for determining the prices offered in this bid or proposal, and the

title of his or her position in the offeror's organization);

(ii) As an authorized agent, does certify that the principals named in subdivision (b)(2)(i) above have not participated, and will not participate, in any action contrary to subparagraphs (a)(1) through (a)(3) above; and

(iii) As an agent, has not personally participated, and will not participate, in any action contrary to subparagraphs (a)(1) through (a)(3) above.

(c) If the offeror deletes or modifies subparagraph (a)(2) above, the offeror must furnish with its offer a signed statement setting forth in detail the circumstances of the disclosure.

(End of provision)

3 52.203-11 CERTIFICATION AND DISCLOSURE REGARDING PAYMENTS TO INFLUENCE CERTAIN
FEDERAL TRANSACTIONS (APR 1991)

(a) The definitions and prohibitions contained in the clause, at FAR 52.203-12, Limitation on Payments to Influence Certain Federal Transactions, included in this solicitation, are hereby incorporated by reference in paragraph (b) of this certification.

(b) The offeror, by signing its offer, hereby certifies to the best of his or her knowledge and belief that on or after December 23, 1989--

(1) No Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress on his or her behalf in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment or modification of any Federal contract, grant, loan, or cooperative agreement;

(2) If any funds other than Federal appropriated funds (including profit or fee received under a covered Federal transaction) have been paid, or will be paid, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress on his or her behalf in connection with this solicitation, the offeror shall complete and submit, with its offer, OMB standard form LLL, Disclosure of Lobbying Activities, to the Contracting Officer; and

(3) He or she will include the language of this certification in all

subcontract awards at any tier and require that all recipients of subcontract awards in excess of \$100,000 shall certify and disclose accordingly.

(c) Submission of this certification and disclosure is a prerequisite for making or entering into this contract imposed by section 1352, title 31, United States Code. Any person who makes an expenditure prohibited under this provision or who fails to file or amend the disclosure form to be filed or amended by this provision, shall be subject to a civil penalty of not less than \$10,000, and not more than \$100,000, for each such failure.

(End of provision)

4 52.204-3 TAXPAYER IDENTIFICATION (JUN 1997)

(a) Definitions.

"Common parent," as used in this solicitation provision, means that corporate entity that owns or controls an affiliated group of corporations that files its Federal income tax returns on a consolidated basis, and of which the offeror is a member.

"Corporate status," as used in this solicitation provision, means a designation as to whether the offeror is a corporate entity, an unincorporated entity (e.g., sole proprietorship or partnership), or a corporation providing medical and health care services.

"Taxpayer Identification Number (TIN)," as used in this solicitation provision, means the number required by the IRS to be used by the offeror in reporting income tax and other returns.

(b) All offerors are required to submit the information required in paragraphs (c) through (e) of this solicitation provision in order to comply with reporting requirements of 26 U.S.C. 6041, 6041A, and 6050M and implementing regulations issued by the Internal Revenue Service (IRS). If the resulting contract is subject to the reporting requirements described in FAR 4.903, the failure or refusal by the offeror to furnish the information may result in a 31 percent reduction of payments otherwise due under the contract.

(c) Taxpayer Identification Number (TIN).

☐ TIN: _____.

☐ TIN has been applied for.

☐ TIN is not required because:

☐ Offeror is a nonresident alien, foreign corporation, or foreign partnership that does not have income effectively connected with the

conduct of a trade or business in the U.S. and does not have an office or place of business or a fiscal paying agent in the U.S.;

☐ Offeror is an agency or instrumentality of a foreign government;

☐ Offeror is an agency or instrumentality of a Federal, state, or local government;

☐ Other. State basis. _____

(d) Corporate Status.

☐ Corporation providing medical and health care services, or engaged in the billing and collecting of payments for such services;

☐ Other corporate entity;

☐ Not a corporate entity;

☐ Sole proprietorship

☐ Partnership

☐ Hospital or extended care facility described in 26 CFR 501(c)(3) that is exempt from taxation under 26 CFR 501(a).

(e) Common Parent.

☐ Offeror is not owned or controlled by a common parent as defined in paragraph (a) of this provision. *

☐ Name and TIN of common parent:

Name _____

TIN _____

(End of provision)

5 52.204-5 WOMEN-OWNED BUSINESS (OCT 1995)

(a) Representation. The offeror represents that it ☐ is, ☐ is not a women-owned business concern.

(b) Definition. "Women-owned business concern," as used in this provision, means a concern which is at least 51 percent owned by one or more women; or in the case of any publicly owned business, at least 51 percent of the stock of which is owned by one or more women; and whose management and daily business operations are controlled by one or more women.

(End of provision)

6 52.209-5 CERTIFICATION REGARDING DEBARMENT, SUSPENSION, PROPOSED DEBARMENT, AND OTHER RESPONSIBILITY MATTERS (MAR 1996)

(a)(1) The Offeror certifies, to the best of its knowledge and belief, that--

(i) The Offeror and/or any of its Principals--

(A) Are / / are not / / presently debarred, suspended, proposed for debarment, or declared ineligible for the award of contracts by any Federal agency;

(B) Have / / have not / /, within a three-year period preceding this offer, been convicted of or had a civil judgment rendered against them for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, state, or local) contract or subcontract; violation of Federal or state antitrust statutes relating to the submission of offers; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion, or receiving stolen property; and

(C) Are / / are not / / presently indicted for, or otherwise criminally or civilly charged by a governmental entity with, commission of any of the offenses enumerated in subdivision (a)(1)(i)(B) of this provision.

(ii) The Offeror has / / has not / /, within a three-year period preceding this offer, had one or more contracts terminated for default by any Federal agency.

(2) "Principals," for the purposes of this certification, means officers; directors; owners; partners; and, persons having primary management or supervisory responsibilities within a business entity (e.g., general manager; plant manager; head of a subsidiary, division, or business segment, and similar positions).

THIS CERTIFICATION CONCERNS A MATTER WITHIN THE JURISDICTION OF AN AGENCY OF THE UNITED STATES AND THE MAKING OF A FALSE, FICTITIOUS, OR FRAUDULENT CERTIFICATION MAY RENDER THE MAKER SUBJECT TO PROSECUTION UNDER SECTION 1001, TITLE 18, UNITED STATES CODE.

(b) The Offeror shall provide immediate written notice to the Contracting Officer if, at any time prior to contract award, the Offeror learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

(c) A certification that any of the items in paragraph (a) of this provision exists will not necessarily result in withholding of an award under this solicitation. However, the certification will be considered in connection with a determination of the Offeror's responsibility. Failure of the Offeror to furnish a certification or provide such additional information as requested by the Contracting Officer may render the Offeror

nonresponsible.

(d) Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by paragraph (a) of this provision. The knowledge and information of an Offeror is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

(e) The certification in paragraph (a) of this provision is a material representation of fact upon which reliance was placed when making award. If it is later determined that the Offeror knowingly rendered an erroneous certification, in addition to other remedies available to the Government, the Contracting Officer may terminate the contract resulting from this solicitation for default.

(End of provision)

7 52.214-2 TYPE OF BUSINESS ORGANIZATION--SEALED BIDDING (JUL 1987)

The bidder, by checking the applicable box, represents that--

(a) It operates as ☐ a corporation incorporated under the laws of the State of _____, ☐ an individual, ☐ a partnership, ☐ a nonprofit organization, or ☐ a joint venture; or

(b) If the bidder is a foreign entity, it operates as ☐ an individual, ☐ a partnership, ☐ a nonprofit organization, ☐ a joint venture, or ☐ a corporation, registered for business in _____.
(country)

(End of provision)

8 52.219-1 SMALL BUSINESS PROGRAM REPRESENTATIONS (JAN 1997)

(a)(1) The standard industrial classification (SIC) code for this acquisition is 1629

(2) The small business size standard is \$17,000,000

(3) The small business size standard for a concern which submits an offer in its own name, other than on a construction or service contract, but which proposes to furnish a product which it did not itself manufacture, is 500 employees.

(b) Representations. (1) The offeror represents as part of its offer that it ☐ is, ☐ is not a small business concern.

(2) (Complete only if offeror represented itself as a small business

concern in block (b)(1) of this section.) The offeror represents as part of its offer that it [] is, [] is not a small disadvantaged business concern.

(3) (Complete only if offeror represented itself as a small business concern in block (b)(1) of this section.) The offeror represents as part of its offer that it [] is, [] is not a women-owned small business concern.

(c) Definitions. "Joint venture," for purposes of a small disadvantaged business (SDB) set-aside or price evaluation preference (as prescribed at 13 CFR 124.321), is a concern that is owned and controlled by one or more socially and economically disadvantaged individuals entering into a joint venture agreement with one or more business concerns and is considered to be affiliated for size purposes with such other concern(s). The combined annual receipts or employees of the concerns entering into the joint venture must meet the applicable size standard corresponding to the SIC code designated for the contract. The majority of the venture's earnings must accrue directly to the socially and economically disadvantaged individuals in the SDB concern(s) in the joint venture. The percentage of the ownership involvement in a joint venture by disadvantaged individuals must be at least 51 percent.

"Small business concern," as used in this provision, means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding on Government contracts, and qualified as a small business under the criteria in 13 CFR Part 121 and the size standard in paragraph (a) of this provision.

"Small disadvantaged business concern," as used in this provision, means a small business concern that (1) is at least 51 percent unconditionally owned by one or more individuals who are both socially and economically disadvantaged, or a publicly owned business having at least 51 percent of its stock unconditionally owned by one or more socially and economically disadvantaged individuals, and (2) has its management and daily business controlled by one or more such individuals. This term also means a small business concern that is at least 51 percent unconditionally owned by an economically disadvantaged Indian tribe or Native Hawaiian Organization, or a publicly owned business having at least 51 percent of its stock unconditionally owned by one or more of these entities, which has its management and daily business controlled by members of an economically disadvantaged Indian tribe or Native Hawaiian Organization, and which meets the requirements of 13 CFR Part 124.

"Women-owned small business concern," as used in this provision, means a small business concern--

(1) Which is at least 51 percent owned by one or more women or, in the case of any publicly owned business, at least 51 percent of the stock of which is owned by one or more women; and

(2) Whose management and daily business operations are controlled by one or more women.

(d) Notice. (1) If this solicitation is for supplies and has been set aside, in whole or in part, for small business concerns, then the clause in this solicitation providing notice of the set-aside contains restrictions on the source of the end items to be furnished.

(2) Under 15 U.S.C. 645(d), any person who misrepresents a firm's status as a small or small disadvantaged business concern in order to obtain a contract to be awarded under the preference programs established pursuant to sections 8(a), 8(d), 9, or 15 of the Small Business Act or any other provision of Federal law that specifically references section 8(d) for a definition of program eligibility, shall--

(i) Be punished by imposition of fine, imprisonment, or both;

(ii) Be subject to administrative remedies, including suspension and debarment; and

(iii) Be ineligible for participation in programs conducted under the authority of the Act.

(End of provision)

9 52.219-2 EQUAL LOW BIDS (OCT 1995)

(a) This provision applies to small business concerns only.

(b) The bidder's status as a labor surplus area (LSA) concern may affect entitlement to award in case of tie bids. If the bidder wishes to be considered for this priority, the bidder must identify, in the following space, the LSA in which the costs to be incurred on account of manufacturing or production (by the bidder or the first-tier subcontractors) amount to more than 50 percent of the contract price.

(c) Failure to identify the labor surplus areas as specified in paragraph (b) of this provision will preclude the bidder from receiving priority consideration. If the bidder is awarded a contract as a result of receiving priority consideration under this provision and would not have

otherwise received award, the bidder shall perform the contract or cause the contract to be performed in accordance with the obligations of an LSA concern.

(End of provision)

10 52.219-19 SMALL BUSINESS CONCERN REPRESENTATION FOR THE SMALL BUSINESS COMPETITIVENESS DEMONSTRATION PROGRAM (JAN 1997)

(a) Definition.

"Emerging small business" as used in this solicitation, means a small business concern whose size is no greater than 50 percent of the numerical size standard applicable to the standard industrial classification code assigned to a contracting opportunity.

(b) (Complete only if the Offeror has represented itself under the provision at 52.219-1 as a small business concern under the size standards of this solicitation.)

The Offeror [] is, [] is not an emerging small business.

(c) (Complete only if the Offeror is a small business or an emerging small business, indicating its size range.)

Offeror's number of employees for the past 12 months (check this column if size standard stated in solicitation is expressed in terms of number of employees) or Offeror's average annual gross revenue for the last 3 fiscal years (check this column if size standard stated in solicitation is expressed in terms of annual receipts). (Check one of the following.)

No. of Employees	Avg. Annual Gross Revenues
___ 50 or fewer	___ \$1 million or less
___ 51-100	___ \$1,000,001-\$2 million
___ 101-250	___ \$2,000,001-\$3.5 million
___ 251-500	___ \$3,500,001-\$5 million
___ 501-750	___ \$5,000,001-\$10 million
___ 751-1,000	___ \$10,000,001-\$17 million
___ Over 1,000	___ Over \$17 million

(End of provision)

(a) "Segregated facilities," as used in this provision, means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees, that are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, or national origin because of habit, local custom, or otherwise.

(b) By the submission of this offer, the offeror certifies that it does not and will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not and will not permit its employees to perform their services at any location under its control where segregated facilities are maintained. The offeror agrees that a breach of this certification is a violation of the Equal Opportunity clause in the contract.

(c) The offeror further agrees that (except where it has obtained identical certifications from proposed subcontractors for specific time periods) it will--

(1) Obtain identical certifications from proposed subcontractors before the award of subcontracts under which the subcontractor will be subject to the Equal Opportunity clause;

(2) Retain the certifications in the files; and

(3) Forward the following notice to the proposed subcontractors (except if the proposed subcontractors have submitted identical certifications for specific time periods):

NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENT FOR CERTIFICATIONS OF NONSEGREGATED FACILITIES.

A Certification of Nonsegregated Facilities must be submitted before the award of a subcontract under which the subcontractor will be subject to the Equal Opportunity clause. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semiannually, or annually).

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

(End of provision)

(R 7-2003.14(b)(1)(A) 1970 AUG)

(R 1-12.803-10(d))

12 52.222-22 PREVIOUS CONTRACTS AND COMPLIANCE REPORTS (APR 1984)

The offeror represents that--

(a) It /_/ has, /_/ has not, participated in a previous contract or subcontract subject either to the Equal Opportunity clause of this solicitation, the clause originally contained in Section 310 of Executive Order No. 10925, or the clause contained in Section 201 of Executive Order No. 11114;

(b) It /_/ has, /_/ has not, filed all required compliance reports; and

(c) Representations indicating submission of required compliance reports, signed by proposed subcontractors, will be obtained before subcontract awards.

(End of provision)
(R 7-2003.14(b)(1)(B) 1973 APR)

13 52.223-1 CLEAN AIR AND WATER CERTIFICATION (APR 1984)

The Offeror certifies that--

(a) Any facility to be used in the performance of this proposed contract is /_/ is not /_/ listed on the Environmental Protection Agency (EPA) List of Violating Facilities;

(b) The Offeror will immediately notify the Contracting Officer, before award, of the receipt of any communication from the Administrator, or a designee, of the EPA, indicating that any facility that the Offeror proposes to use for the performance of the contract is under consideration to be listed on the EPA List of Violating Facilities; and

(c) The Offeror will include a certification substantially the same as this certification, including this paragraph (c), in every nonexempt subcontract.

(End of provision)
(AV 7-2003.71 1977 JUN)
(AV 1-1.2302-1)

14 52.223-13 CERTIFICATION OF TOXIC CHEMICAL RELEASE REPORTING (OCT 1996)

(a) Submission of this certification is a prerequisite for making or entering into this contract imposed by Executive Order 12969, August 8,

1995.

(b) By signing this offer, the offeror certifies that----

(1) As the owner or operator of facilities that will be used in the performance of this contract that are subject to the filing and reporting requirements described in section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) (42 U.S.C. 11023) and section 6607 of the Pollution Prevention Act of 1990 (PPA) (42 U.S.C. 13106), the offeror will file and continue to file for such facilities for the life of the contract the Toxic Chemical Release Inventory Form (Form R) as described in sections 313(a) and (g) of EPCRA and section 6607 of PPA; or

(2) None of its owned or operated facilities to be used in the performance of this contract is subject to the Form R filing and reporting requirements because each such facility is exempt for at least one of the following reasons: (Check each block that is applicable.)

☐ (i) The facility does not manufacture, process, or otherwise use any toxic chemicals listed under section 313(c) of EPCRA, 42 U.S.C. 11023(c);

☐ (ii) The facility does not have 10 or more full-time employees as specified in section 313(b)(1)(A) of EPCRA, 42 U.S.C. 11023(b)(1)(A);

☐ (iii) The facility does not meet the reporting thresholds of toxic chemicals established under section 313(f) of EPCRA, 42 U.S.C. 11023(f) (including the alternate thresholds at 40 CFR 372.27, provided an appropriate certification form has been filed with EPA);

☐ (iv) The facility does not fall within Standard Industrial Classification Code (SIC) designations 20 through 39 as set forth in Section 19.102 of the Federal Acquisition Regulation; or

☐ (v) The facility is not located within any State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the United States Virgin Islands, the Northern Mariana Islands, or any other territory or possession over which the United States has jurisdiction.

(End of provision)

15 252.209-7001 DISCLOSURE OF OWNERSHIP OR CONTROL BY THE GOVERNMENT OF A TERRORIST
COUNTRY (SEP 1994)

(a) Definitions.

As used in this provision--

(1) "Government of a terrorist country" includes the state and the government of a terrorist country, as well as any political subdivision, agency, or instrumentality thereof.

(2) "Terrorist country" means a country determined by the Secretary of State, under section 6(j)(1)(A) of the Export Administration Act of 1979 (50 U.S.C. App. 2405(j)(i)(A)), to be a country the government of which has repeatedly provided support for acts of international terrorism. As of the date of this provision, terrorist countries include: Cuba, Iran, Iraq, Libya, North Korea, Sudan, and Syria.

(3) "Significant interest" means--

(i) Ownership of or beneficial interest in 5 percent or more of the firm's or subsidiary's securities. Beneficial interest includes holding 5 percent or more of any class of the firm's securities in "nominee shares," "street names," or some other method of holding securities that does not disclose the beneficial owner;

(ii) Holding a management position in the firm, such as a director or officer;

(iii) Ability to control or influence the election, appointment, or tenure of directors or officers in the firm;

(iv) Ownership of 10 percent or more of the assets of a firm such as equipment, buildings, real estate, or other tangible assets of the firm; or

(v) Holding 50 percent or more of the indebtedness of a firm.

(b) Prohibition on award.

In accordance with 10 U.S.C. 2327, no contract may be awarded to a firm or a subsidiary of a firm if the government of a terrorist country has a significant interest in the firm or subsidiary, unless a waiver is granted by the Secretary of Defense.

(c) Disclosure.

If the government of a terrorist country has a significant interest in the Offeror or a subsidiary of the Offeror, the Offeror shall disclose such interest in an attachment to its offer. If the Offeror is a subsidiary, it shall also disclose any significant interest the government of a terrorist country has in any firm that owns or controls the subsidiary. The disclosure shall include--

(1) Identification of each government holding a significant interest;
and

(2) A description of the significant interest held by each government.

(End of provision)

(a) Definition. "Small disadvantaged business concern," as used in this provision, means a small business concern, owned and controlled by individuals who are both socially and economically disadvantaged, as defined by the Small Business Administration at 13 CFR Part 124, the majority of earnings of which directly accrue to such individuals. This term also means a small business concern owned and controlled by an economically disadvantaged Indian tribe or Native Hawaiian organization which meets the requirements of 13 CFR 124.112 or 13 CFR 124.113, respectively. In general, 13 CFR Part 124 describes a small disadvantaged business concern as a small business concern--

(1) Which is at least 51 percent unconditionally owned by one or more socially and economically disadvantaged individuals; or

(2) In the case of any publicly owned business, at least 51 percent of the voting stock is unconditionally owned by one or more socially and economically disadvantaged individuals; and

(3) Whose management and daily business operations are controlled by one or more such individuals.

(b) Representations. Check the category in which your ownership falls--

_____ Subcontinent Asian (Asian-Indian) American (U.S. citizen with origins from India, Pakistan, Bangladesh, Sri Lanka, Bhutan, the Maldives Islands, or Nepal)

_____ Asian-Pacific American (U.S. citizen with origins from Japan, China, the Philippines, Vietnam, Korea, Samoa, Guam, U.S. Trust Territory of the Pacific Islands (Republic of Palau), the Northern Mariana Islands, Laos, Kampuchea (Cambodia), Taiwan, Burma, Thailand, Malaysia, Indonesia, Singapore, Brunei, Republic of the Marshall Islands, the Federated States of Micronesia, Macao, Hong Kong, Fiji, Tonga, Kiribati, Tuvalu, or Nauru)

_____ Black American (U.S. citizen)

_____ Hispanic American (U.S. citizen with origins from South America, Central America, Mexico, Cuba, the Dominican Republic, Puerto Rico, Spain, or Portugal)

_____ Native American (American Indians, Eskimos, Aleuts, or Native Hawaiians, including Indian tribes or Native Hawaiian organizations)

_____ Individual/concern, other than one of the preceding, currently certified for participation in the Minority Small Business and Capital Ownership Development Program under Section 8(a) of the Small Business Act

_____ Other

(c) Complete the following--

(1) The offeror is _____ is not _____ a small disadvantaged business concern.

(2) The Small Business Administration (SBA) has _____ has not _____ made a determination concerning the offeror's status as a small disadvantaged business concern. If the SBA has made a determination, the date of the determination was _____ and the offeror--
_____ Was found by SBA to be socially and economically disadvantaged and no circumstances have changed to vary that determination.
_____ Was found by SBA not to be socially and economically disadvantaged but circumstances which caused the determination have changed.

(d) Penalties and Remedies. Anyone who misrepresents the status of a concern as a small disadvantaged business for the purpose of securing a contract or subcontract shall--

- (1) Be punished by imposition of a fine, imprisonment, or both;
- (2) Be subject to administrative remedies, including suspension and debarment; and
- (3) Be ineligible for participation in programs conducted under authority of the Small Business Act.

(End of provision)

17 252.247-7022 REPRESENTATION OF EXTENT OF TRANSPORTATION BY SEA (DEC 1991)

(a) The Offeror shall indicate by checking the appropriate blank in paragraph (b) of this provision whether transportation of supplies by sea is anticipated under the resultant contract. The term supplies is defined in the Transportation of Supplies by Sea clause of this solicitation.

(b) Representation. The Offeror represents that it--
_____ Does anticipate that supplies will be transported by sea in the performance of any contract or subcontract resulting from this solicitation.
_____ Does not anticipate that supplies will be transported by sea in the performance of any contract or subcontract resulting from this solicitation.

(c) Any contract resulting from this solicitation will include the Transportation of Supplies by Sea clause. If the Offeror represents that it will not use ocean transportation, the resulting contract will also include the Defense FAR Supplement clause at 252.247-7024, Notification of Transportation of Supplies by Sea.

(End of provision)

18 52.204-6 CONTRACTOR IDENTIFICATION NUMBER--DATA UNIVERSAL NUMBERING SYSTEM (DUNS)
NUMBER (DEC 1996)

(a) Contractor Identification Number, as used in this provision, means "Data Universal Numbering System (DUNS) number," which is a nine-digit number assigned by Dun and Bradstreet Information Services.

(b) Contractor identification is essential for complying with statutory contract reporting requirements. Therefore, the offeror is requested to enter, in the block with its name and address on the Standard Form 33 or similar document, the annotation "DUNS" followed by the DUNS number which identifies the offeror's name and address exactly as stated in the offer.

(c) If the offeror does not have a DUNS number, it should contact Dun and Bradstreet directly to obtain one. A DUNS number will be provided immediately by telephone at no charge to the offeror. For information on obtaining a DUNS number, the offeror should call Dun and Bradstreet at 1-800-333-0505. The offeror should be prepared to provide the following information:

- (1) Company name.
- (2) Company address.
- (3) Company telephone number.
- (4) Line of business.
- (5) Chief executive officer/key manager.
- (6) Date the company was started.
- (7) Number of people employed by the company.
- (8) Company affiliation.

(d) Offerors located outside the United States may obtain the location and phone number of the local Dun and Bradstreet Information Services office from the Internet Home Page at <http://www.dbisna.com/dbis/customer/custlist.htm>. If an offeror is unable to locate a local service center, it may send an e-mail to Dun and Bradstreet at globalinfo@dbisna.com.

(End of provision)

19 CONTRACTOR IDENTIFICATION NUMBER

The offeror is to supply his/her Contractor Identification Number, also known as the Data Universal Numbering System (DUNS) number, in the space provided below:

DUNS: _ _ _ _ _

This number can be obtained by following the instructions in FAR Clause 52.204-0006, which appears in Section L or Section 00100 of this document.

20 252.204-7001 COMMERCIAL AND GOVERNMENT ENTITY (CAGE) CODE REPORTING (DEC 1991)

(a) The Offeror is requested to enter its CAGE code on its offer in the block with its name and address. The CAGE code entered must be for that name and address. Enter CAGE before the number.

(b) If the Offeror does not have a CAGE code, it may ask the Contracting Officer to request one from the Defense Logistics Services Center (DLSC). The Contracting Officer will--

(1) Ask the Contractor to complete section B of a DD Form 2051, Request for Assignment of a Commercial and Government Entity (CAGE) Code;

(2) Complete section A and forward the form to DLSC; and

(3) Notify the Contractor of its assigned CAGE code.

(c) Do not delay submission of the offer pending receipt of a CAGE code.

(End of provision)

COMMERCIAL AND GOVERNMENT ENTITY (CAGE) CODE REPORTING

(a) The Offeror is requested to enter its CAGE code in the space provided below. The CAGE code entered must be for that name and address.

(b) If the Offeror does not have a CAGE code, it may ask the Contracting Officer to request one in accordance with the provisions of DFARS 52.204-7001 in the section of this solicitation entitled "Instructions to Bidders."

(c) Do not delay submission of the offer pending receipt of a CAGE code.

CAGE Code: _ _ _ _ _

() UNKNOWN

END OF SECTION 00600

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SECTION 00700
CONTRACT CLAUSES

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RESERVED

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52.202-1 I DEFINITIONS (OCT 1995)--ALTERNATE I (APR 1984)

(a) "Head of the agency" (also called "agency head") or "Secretary" means the Secretary (or Attorney General, Administrator, Governor, Chairperson, or other chief official, as appropriate) of the agency, including any deputy or assistant chief official of the agency; and the term "authorized representative" means any person, persons, or board (other than the Contracting Officer) authorized to act for the head of the agency or Secretary.

(b) Commercial component means any component that is a commercial item.

(c) Component means any item supplied to the Federal Government as part of an end item or of another component.

(d) Nondevelopmental item means--

(1) Any previously developed item of supply used exclusively for governmental purposes by a Federal agency, a State or local government, or a foreign government with which the United States has a mutual defense cooperation agreement;

(2) Any item described in paragraph (e)(1) of this definition that requires only minor modification or modifications of a type customarily available in the commercial marketplace in order to meet the requirements of the procuring department or agency; or

(3) Any item of supply being produced that does not meet the requirements of paragraph (e)(1) or (e)(2) solely because the item is not yet in use.

(e) "Contracting Officer" means a person with the authority to enter into, administer, and/or terminate contracts and make related determinations and findings. The term includes certain authorized representatives of the Contracting Officer acting within the limits of their authority as delegated by the Contracting Officer.

(f) Except as otherwise provided in this contract, the term "subcontracts" includes, but is not limited to, purchase orders and changes and modifications to purchase orders under this contract.

(End of clause)

3 52.203-3 GRATUITIES (APR 1984)

(a) The right of the Contractor to proceed may be terminated by written notice if, after notice and hearing, the agency head or a designee determines that the Contractor, its agent, or another representative--

(1) Offered or gave a gratuity (e.g., an entertainment or gift) to an officer, official, or employee of the Government; and

(2) Intended, by the gratuity, to obtain a contract or favorable treatment under a contract.

(b) The facts supporting this determination may be reviewed by any court having lawful jurisdiction.

(c) If this contract is terminated under paragraph (a) above, the Government is entitled--

(1) To pursue the same remedies as in a breach of the contract; and

(2) In addition to any other damages provided by law, to exemplary damages of not less than 3 nor more than 10 times the cost incurred by the Contractor in giving gratuities to the person concerned, as determined by the agency head or a designee. (This subparagraph (c)(2) is applicable only if this contract uses money appropriated to the Department of Defense.)

(d) The rights and remedies of the Government provided in this clause shall not be exclusive and are in addition to any other rights and remedies provided by law or under this contract.

(End of clause)

(R 7-104.16 1952 MAR)

4 52.203-5 COVENANT AGAINST CONTINGENT FEES (APR 1984)

(a) The Contractor warrants that no person or agency has been employed or retained to solicit or obtain this contract upon an agreement or understanding for a contingent fee, except a bona fide employee or agency. For breach or violation of this warranty, the Government shall have the right to annul this contract without liability or, in its discretion, to deduct from the contract price or consideration, or otherwise recover, the full amount of the contingent fee.

(b) "Bona fide agency," as used in this clause, means an established commercial or selling agency, maintained by a contractor for the purpose of securing business, that neither exerts nor proposes to exert improper

influence to solicit or obtain Government contracts nor holds itself out as being able to obtain any Government contract or contracts through improper influence.

"Bona fide employee," as used in this clause, means a person, employed by a Contractor and subject to the Contractor's supervision and control as to time, place, and manner of performance, who neither exerts nor proposes to exert improper influence to solicit or obtain Government contracts nor holds out as being able to obtain any Government contract or contracts through improper influence.

"Contingent fee," as used in this clause, means any commission, percentage, brokerage, or other fee that is contingent upon the success that a person or concern has in securing a Government contract.

"Improper influence," as used in this clause, means any influence that induces or tends to induce a Government employee or officer to give consideration or to act regarding a Government contract on any basis other than the merits of the matter.

(End of clause)

(R 7-103.20 1958 JAN)

(R 1-1.503)

(R 1-7.102-18)

5 52.203-8 CANCELLATION, RESCISSION, AND RECOVERY OF FUNDS FOR ILLEGAL OR IMPROPER
ACTIVITY (JAN 1997)

(a) If the Government receives information that a contractor or a person has engaged in conduct constituting a violation of subsection (a), (b), (c), or (d) of Section 27 of the Office of Federal Procurement Policy Act (41 U.S.C. 423) (the Act), as amended by section 4304 of the National Defense Authorization Act for Fiscal Year 1996 (Pub. L. 104-106), the Government may--

(1) Cancel the solicitation, if the contract has not yet been awarded or issued; or

(2) Rescind the contract with respect to which--

(i) The Contractor or someone acting for the Contractor has been convicted for an offense where the conduct constitutes a violation of subsection 27 (a) or (b) of the Act for the purpose of either--

(A) Exchanging the information covered by such subsections for anything of value; or

(B) Obtaining or giving anyone a competitive advantage in the award of a Federal agency procurement contract; or

(ii) The head of the contracting activity has determined, based upon a preponderance of the evidence, that the Contractor or someone acting for the Contractor has engaged in conduct constituting an offense punishable under subsection 27(e)(1) of the Act.

(b) If the Government rescinds the contract under paragraph (a) of this clause, the Government is entitled to recover, in addition to any penalty prescribed by law, the amount expended under the contract.

(c) The rights and remedies of the Government specified herein are not exclusive, and are in addition to any other rights and remedies provided by law, regulation, or under this contract.

(End of clause)

6 52.203-7 ANTI-KICKBACK PROCEDURES (JUL 1995)

(a) Definitions.

"Kickback," as used in this clause, means any money, fee, commission, credit, gift, gratuity, thing of value, or compensation of any kind which is provided, directly or indirectly, to any prime Contractor, prime Contractor employee, subcontractor, or subcontractor employee for the purpose of improperly obtaining or rewarding favorable treatment in connection with a prime contract or in connection with a subcontract relating to a prime contract.

"Person," as used in this clause, means a corporation, partnership, business association of any kind, trust, joint-stock company, or individual.

"Prime contract," as used in this clause, means a contract or contractual action entered into by the United States for the purpose of obtaining supplies, materials, equipment, or services of any kind.

"Prime Contractor" as used in this clause, means a person who has entered into a prime contract with the United States.

"Prime Contractor employee," as used in this clause, means any officer, partner, employee, or agent of a prime Contractor.

"Subcontract," as used in this clause, means a contract or contractual action entered into by a prime Contractor or subcontractor for the purpose of obtaining supplies, materials, equipment, or services of any kind under a prime contract.

"Subcontractor," as used in this clause, (1) means any person, other than the prime Contractor, who offers to furnish or furnishes any supplies, materials, equipment, or services of any kind under a prime contract or a subcontract entered into in connection with such prime

contract, and (2) includes any person who offers to furnish or furnishes general supplies to the prime Contractor or a higher tier subcontractor.

"Subcontractor employee," as used in this clause, means any officer, partner, employee, or agent of a subcontractor.

(b) The Anti-Kickback Act of 1986 (41 U.S.C. 51-58) (the Act), prohibits any person from--

(1) Providing or attempting to provide or offering to provide any kickback;

(2) Soliciting, accepting, or attempting to accept any kickback; or

(3) Including, directly or indirectly, the amount of any kickback in the contract price charged by a prime Contractor to the United States or in the contract price charged by a subcontractor to a prime Contractor or higher tier subcontractor.

(c)(1) The Contractor shall have in place and follow reasonable procedures designed to prevent and detect possible violations described in paragraph (b) of this clause in its own operations and direct business relationships.

(2) When the Contractor has reasonable grounds to believe that a violation described in paragraph (b) of this clause may have occurred, the Contractor shall promptly report in writing the possible violation. Such reports shall be made to the inspector general of the contracting agency, the head of the contracting agency if the agency does not have an inspector general, or the Department of Justice.

(3) The Contractor shall cooperate fully with any Federal agency investigating a possible violation described in paragraph (b) of this clause.

(4) The Contracting Officer may (i) offset the amount of the kickback against any monies owed by the United States under the prime contract and/or (ii) direct that the Prime Contractor withhold from sums owed a subcontractor under the prime contract the amount of the kickback. The Contracting Officer may order that monies withheld under subdivision (c)(4)(ii) of this clause be paid over to the Government unless the Government has already offset those monies under subdivision (c)(4)(i) of this clause. In either case, the Prime Contractor shall notify the Contracting Officer when the monies are withheld.

(5) The Contractor agrees to incorporate the substance of this clause, including subparagraph (c)(5) but excepting subparagraph (c)(1), in all subcontracts under this contract which exceed \$100,000.

(End of clause)

(a) The Government, at its election, may reduce the price of a fixed-price type contract and the total cost and fee under a cost-type contract by the amount of profit or fee determined as set forth in paragraph (b) of this clause if the head of the contracting activity or designee determines that there was a violation of subsection 27 (a), (b), or (c) of the Office of Federal Procurement Policy Act, as amended (41 U.S.C. 423), as implemented in section 3.104 of the Federal Acquisition Regulation.

(b) The price or fee reduction referred to in paragraph (a) of this clause shall be--

(1) For cost-plus-fixed-fee contracts, the amount of the fee specified in the contract at the time of award;

(2) For cost-plus-incentive-fee contracts, the target fee specified in the contract at the time of award, notwithstanding any minimum fee or "fee floor" specified in the contract;

(3) For cost-plus-award-fee contracts--

(i) The base fee established in the contract at the time of contract award;

(ii) If no base fee is specified in the contract, 30 percent of the amount of each award fee otherwise payable to the Contractor for each award fee evaluation period or at each award fee determination point.

(4) For fixed-price-incentive contracts, the Government may--

(i) Reduce the contract target price and contract target profit both by an amount equal to the initial target profit specified in the contract at the time of contract award; or

(ii) If an immediate adjustment to the contract target price and contract target profit would have a significant adverse impact on the incentive price revision relationship under the contract, or adversely affect the contract financing provisions, the Contracting Officer may defer such adjustment until establishment of the total final price of the contract. The total final price established in accordance with the incentive price revision provisions of the contract shall be reduced by an amount equal to the initial target profit specified in the contract at the time of contract award and such reduced price shall be the total final contract price.

(5) For firm-fixed-price contracts, by 10 percent of the initial contract price or a profit amount determined by the Contracting Officer from records or documents in existence prior to the date of the contract award.

(c) The Government may, at its election, reduce a prime contractor's price or fee in accordance with the procedures of paragraph (b) of this clause for violations of the Act by its subcontractors by an amount not to exceed the amount of profit or fee reflected in the subcontract at the time the subcontract was first definitively priced.

(d) In addition to the remedies in paragraphs (a) and (c) of this clause, the Government may terminate this contract for default. The rights and remedies of the Government specified herein are not exclusive, and are in addition to any other rights and remedies provided by law or under this contract.

(End of clause)

8 52.203-12 LIMITATION ON PAYMENTS TO INFLUENCE CERTAIN FEDERAL TRANSACTIONS (JUN 1997)

(a) Definitions.

"Agency," as used in this clause, means executive agency as defined in 2.101.

"Covered Federal action," as used in this clause, means any of the following Federal actions:

- (1) The awarding of any Federal contract.
- (2) The making of any Federal grant.
- (3) The making of any Federal loan.
- (4) The entering into of any cooperative agreement.
- (5) The extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

"Indian tribe" and "tribal organization," as used in this clause, have the meaning provided in section 4 of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450B) and include Alaskan Natives.

"Influencing or attempting to influence," as used in this clause, means making, with the intent to influence, any communication to or appearance before an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with any covered Federal action.

"Local government," as used in this clause, means a unit of government in a State and, if chartered, established, or otherwise recognized by a State for the performance of a governmental duty, including a local public authority, a special district, an intrastate district, a council of governments, a sponsor group representative organization, and any other instrumentality of a local government.

"Officer or employee of an agency," as used in this clause, includes the following individuals who are employed by an agency:

(1) An individual who is appointed to a position in the Government under title 5, United States Code, including a position under a temporary appointment.

(2) A member of the uniformed services, as defined in subsection 101(3), title 37, United States Code.

(3) A special Government employee, as defined in section 202, title 18, United States Code.

(4) An individual who is a member of a Federal advisory committee, as defined by the Federal Advisory Committee Act, title 5, United States Code, appendix 2.

"Person," as used in this clause, means an individual, corporation, company, association, authority, firm, partnership, society, State, and local government, regardless of whether such entity is operated for profit, or not for profit. This term excludes an Indian tribe, tribal organization, or any other Indian organization with respect to expenditures specifically permitted by other Federal law.

"Reasonable compensation," as used in this clause, means, with respect to a regularly employed officer or employee of any person, compensation that is consistent with the normal compensation for such officer or employee for work that is not furnished to, not funded by, or not furnished in cooperation with the Federal Government.

"Reasonable payment," as used in this clause, means, with respect to professional and other technical services, a payment in an amount that is consistent with the amount normally paid for such services in the private sector.

"Recipient," as used in this clause, includes the Contractor and all subcontractors. This term excludes an Indian tribe, tribal organization, or any other Indian organization with respect to expenditures specifically permitted by other Federal law.

"Regularly employed," as used in this clause, means, with respect to an officer or employee of a person requesting or receiving a Federal contract, an officer or employee who is employed by such person for at least 130 working days within 1 year immediately preceding the date of the submission that initiates agency consideration of such person for receipt of such contract. An officer or employee who is employed by such person for less than 130 working days within 1 year immediately preceding the date of the submission that initiates agency consideration of such person shall be considered to be regularly employed as soon as he or she is employed by such person for 130 working days.

"State," as used in this clause, means a State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, a territory or possession of the United States, an agency or instrumentality of a State, and multi-State, regional, or interstate entity having governmental duties and powers.

(b) Prohibitions.

(1) Section 1352 of title 31, United States Code, among other things, prohibits a recipient of a Federal contract, grant, loan, or cooperative agreement from using appropriated funds to pay any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with any of the following covered Federal actions: the awarding of any Federal contract; the making of any Federal grant; the making of any Federal loan; the entering into of any cooperative agreement; or the modification of any Federal contract, grant, loan, or cooperative agreement.

(2) The Act also requires Contractors to furnish a disclosure if any funds other than Federal appropriated funds (including profit or fee received under a covered Federal transaction) have been paid, or will be paid, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with a Federal contract, grant, loan, or cooperative agreement.

(3) The prohibitions of the Act do not apply under the following conditions:

(i) Agency and legislative liaison by own employees.

(A) The prohibition on the use of appropriated funds, in subparagraph (b)(1) of this clause, does not apply in the case of a payment of reasonable compensation made to an officer or employee of a person requesting or receiving a covered Federal action if the payment is for agency and legislative liaison activities not directly related to a covered Federal action.

(B) For purposes of subdivision (b)(3)(i)(A) of this clause, providing any information specifically requested by an agency or Congress is permitted at any time.

(C) The following agency and legislative liaison activities are permitted at any time where they are not related to a specific solicitation for any covered Federal action:

(1) Discussing with an agency the qualities and characteristics (including individual demonstrations) of the person's products or services, conditions or terms of sale, and service capabilities.

(2) Technical discussions and other activities regarding the application or adaptation of the person's products or services for an agency's use.

(D) The following agency and legislative liaison activities are permitted where they are prior to formal solicitation of any covered Federal action--

(1) Providing any information not specifically requested but necessary for an agency to make an informed decision about initiation of a covered Federal action;

(2) Technical discussions regarding the preparation of an unsolicited proposal prior to its official submission; and

(3) Capability presentations by persons seeking awards from an agency pursuant to the provisions of the Small Business Act, as amended by Pub. L. 95-507, and subsequent amendments.

(E) Only those services expressly authorized by subdivision (b)(3)(i)(A) of this clause are permitted under this clause.

(ii) Professional and technical services.

(A) The prohibition on the use of appropriated funds, in subparagraph (b)(1) of this clause, does not apply in the case of--

(1) A payment of reasonable compensation made to an officer or employee of a person requesting or receiving a covered Federal action or an extension, continuation, renewal, amendment, or modification of a covered Federal action, if payment is for professional or technical services rendered directly in the preparation, submission, or negotiation of any bid, proposal, or application for that Federal action or for meeting requirements imposed by or pursuant to law as a condition for receiving that Federal action.

(2) Any reasonable payment to a person, other than an officer or employee of a person requesting or receiving a covered Federal action or an extension, continuation, renewal, amendment, or modification of a covered Federal action if the payment is for professional or technical services rendered directly in the preparation, submission, or negotiation of any bid, proposal, or application for that Federal action or for meeting requirements imposed by or pursuant to law as a condition for receiving that Federal action. Persons other than officers or employees of a person requesting or receiving a covered Federal action include consultants and trade associations.

(B) For purposes of subdivision (b)(3)(ii)(A) of this clause, "professional and technical services" shall be limited to advice and

analysis directly applying any professional or technical discipline. For example, drafting of a legal document accompanying a bid or proposal by a lawyer is allowable. Similarly, technical advice provided by an engineer on the performance or operational capability of a piece of equipment rendered directly in the negotiation of a contract is allowable. However, communications with the intent to influence made by a professional (such as a licensed lawyer) or a technical person (such as a licensed accountant) are not allowable under this section unless they provide advice and analysis directly applying their professional or technical expertise and unless the advice or analysis is rendered directly and solely in the preparation, submission or negotiation of a covered Federal action. Thus, for example, communications with the intent to influence made by a lawyer that do not provide legal advice or analysis directly and solely related to the legal aspects of his or her client's proposal, but generally advocate one proposal over another are not allowable under this section because the lawyer is not providing professional legal services. Similarly, communications with the intent to influence made by an engineer providing an engineering analysis prior to the preparation or submission of a bid or proposal are not allowable under this section since the engineer is providing technical services but not directly in the preparation, submission or negotiation of a covered Federal action.

(C) Requirements imposed by or pursuant to law as a condition for receiving a covered Federal award include those required by law or regulation and any other requirements in the actual award documents.

(D) Only those services expressly authorized by subdivisions (b)(3)(ii)(A)(1) and (2) of this clause are permitted under this clause.

(E) The reporting requirements of FAR 3.803(a) shall not apply with respect to payments of reasonable compensation made to regularly employed officers or employees of a person.

(c) Disclosure.

(1) The Contractor who requests or receives from an agency a Federal contract shall file with that agency a disclosure form, OMB standard form LLL, Disclosure of Lobbying Activities, if such person has made or has agreed to make any payment using nonappropriated funds (to include profits from any covered Federal action), which would be prohibited under subparagraph (b)(1) of this clause, if paid for with appropriated funds.

(2) The Contractor shall file a disclosure form at the end of each calendar quarter in which there occurs any event that materially

affects the accuracy of the information contained in any disclosure form previously filed by such person under subparagraph (c)(1) of this clause. An event that materially affects the accuracy of the information reported includes--

(i) A cumulative increase of \$25,000 or more in the amount paid or expected to be paid for influencing or attempting to influence a covered Federal action; or

(ii) A change in the person(s) or individual(s) influencing or attempting to influence a covered Federal action; or

(iii) A change in the officer(s), employee(s), or Member(s) contacted to influence or attempt to influence a covered Federal action.

(3) The Contractor shall require the submittal of a certification, and if required, a disclosure form by any person who requests or receives any subcontract exceeding \$100,000 under the Federal contract.

(4) All subcontractor disclosure forms (but not certifications) shall be forwarded from tier to tier until received by the prime Contractor. The prime Contractor shall submit all disclosures to the Contracting Officer at the end of the calendar quarter in which the disclosure form is submitted by the subcontractor. Each subcontractor certification shall be retained in the subcontract file of the awarding Contractor.

(d) Agreement. The Contractor agrees not to make any payment prohibited by this clause.

(e) Penalties.

(1) Any person who makes an expenditure prohibited under paragraph (a) of this clause or who fails to file or amend the disclosure form to be filed or amended by paragraph (b) of this clause shall be subject to civil penalties as provided for by 31 U.S.C. 1352. An imposition of a civil penalty does not prevent the Government from seeking any other remedy that may be applicable.

(2) Contractors may rely without liability on the representation made by their subcontractors in the certification and disclosure form.

(f) Cost allowability. Nothing in this clause makes allowable or reasonable any costs which would otherwise be unallowable or unreasonable. Conversely, costs made specifically unallowable by the requirements in this clause will not be made allowable under any other provision.

(End of clause)

(a) In accordance with Executive Order 12873, dated October 20, 1993, as amended by Executive Order 12995, dated March 25, 1996, the Offeror/Contractor is encouraged to submit paper documents, such as offers, letters, or reports, that are printed/copied double-sided on recycled paper that has at least 20 percent postconsumer material.

(b) The 20 percent standard applies to high-speed copier paper, offset paper, forms bond, computer printout paper, carbonless paper, file folders, white woven envelopes, and other uncoated printed and writing paper, such as writing and office paper, book paper, cotton fiber paper, and cover stock. An alternative to meeting the 20 percent postconsumer material standard is 50 percent recovered material content of certain industrial by-products.

(End of clause)

10 52.209-6 PROTECTING THE GOVERNMENT'S INTEREST WHEN SUBCONTRACTING WITH CONTRACTORS
DEBARRED, SUSPENDED, OR PROPOSED FOR DEBARMENT (JUL 1995)

(a) The Government suspends or debar Contractors to protect the Government's interest. The Contractor shall not enter into any subcontract in excess of \$25,000 with a Contractor that is debarred, suspended, or proposed for debarment unless there is a compelling reason to do so.

(b) The Contractor shall require each proposed first-tier subcontractor, whose subcontract will exceed \$25,000, to disclose to the Contractor, in writing, whether as of the time of award of the subcontract, the subcontractor, or its principals, is or is not debarred, suspended, or proposed for debarment by the Federal Government.

(c) A corporate officer or a designee of the Contractor shall notify the Contracting Officer, in writing, before entering into a subcontract with a party that is debarred, suspended, or proposed for debarment (see FAR 9.404 for information on the List of Parties Excluded from Federal Procurement and Nonprocurement Programs). The notice must include the following:

(1) The name of the subcontractor.

(2) The Contractor's knowledge of the reasons for the subcontractor being on the List of Parties Excluded from Federal Procurement and Nonprocurement Programs.

(3) The compelling reason(s) for doing business with the subcontractor notwithstanding its inclusion on the List of Parties Excluded from

Federal Procurement and Nonprocurement Programs.

(4) The systems and procedures the Contractor has established to ensure that it is fully protecting the Government's interests when dealing with such subcontractor in view of the specific basis for the party's debarment, suspension, or proposed debarment.

(End of clause)

11 52.214-26 AUDIT AND RECORDS--SEALED BIDDING (OCT 1995)

(a) As used in this clause, records includes books, documents, accounting procedures and practices, and other data, regardless of type and regardless of whether such items are in written form, in the form of computer data, or in any other form.

(b) Cost or pricing data. If the Contractor has been required to submit cost or pricing data in connection with the pricing of any modification to this contract, the Contracting Officer, or an authorized representative of the Contracting Officer, in order to evaluate the accuracy, completeness, and currency of the cost or pricing data, shall have the right to examine and audit all of the Contractor's records, including computations and projections, related to--

- (1) The proposal for the modification;
- (2) The discussions conducted on the proposal(s), including those related to negotiating;
- (3) Pricing of the modification; or
- (4) Performance of the modification.

(c) Comptroller General. In the case of pricing any modification, the Comptroller General of the United States, or an authorized representative, shall have the same rights as specified in paragraph (b) of this clause.

(d) Availability. The Contractor shall make available at its office at all reasonable times the materials described in reproduction, until 3 years after final payment under this contract, or for any other period specified in Subpart 4.7 of the Federal Acquisition Regulation (FAR). FAR Subpart 4.7, Contractor Records Retention, in effect on the date of this contract, is incorporated by reference in its entirety and made a part of this contract.

(1) If this contract is completely or partially terminated, the records relating to the work terminated shall be made available for 3 years after any resulting final termination settlement.

(2) Records pertaining to appeals under the Disputes clause or to litigation or the settlement of claims arising under or relating to the

performance of this contract shall be made available until disposition of such appeals, litigation, or claims.

(e) The Contractor shall insert a clause containing all the provisions of this clause, including this paragraph (e), in all subcontracts expected to exceed the threshold in FAR 15.804-2(a)(1) for submission of cost or pricing data.

(End of clause)

12 52.214-27 PRICE REDUCTION FOR DEFECTIVE COST OR PRICING DATA--MODIFICATIONS--
SEALED BIDDING (OCT 1995)

(a) This clause shall become operative only for any modification to this contract involving aggregate increases and/or decreases in costs, plus applicable profits, expected to exceed the threshold for the submission of cost or pricing data at FAR 15.804-2(a)(1), except that this clause does not apply to a modification if an exception under FAR 15.804-1 applies.

(b) If any price, including profit, negotiated in connection with any modification under this clause, was increased by any significant amount because (1) the Contractor or a subcontractor furnished cost or pricing data that were not complete, accurate, and current as certified in its Certificate of Current Cost or Pricing Data, (2) a subcontractor or prospective subcontractor furnished the Contractor cost or pricing data that were not complete, accurate, and current as certified in the Contractor's Certificate of Current Cost or Pricing Data, or (3) any of these parties furnished data of any description that were not accurate, the price shall be reduced accordingly and the contract shall be modified to reflect the reduction. This right to a price reduction is limited to that resulting from defects in data relating to modifications for which this clause becomes operative under paragraph (a) above.

(c) Any reduction in the contract price under paragraph (b) above due to defective data from a prospective subcontractor that was not subsequently awarded the subcontract shall be limited to the amount, plus applicable overhead and profit markup, by which (1) the actual subcontract or (2) the actual cost to the Contractor, if there was no subcontract, was less than the prospective subcontract cost estimate submitted by the Contractor; provided, that the actual subcontract price was not itself affected by defective cost or pricing data.

(d)(1) If the Contracting Officer determines under paragraph (b) of this clause that a price or cost reduction should be made, the Contractor agrees

not to raise the following matters as a defense:

(i) The Contractor or subcontractor was a sole source supplier or otherwise was in a superior bargaining position and thus the price of the contract would not have been modified even if accurate, complete, and current cost or pricing data had been submitted.

(ii) The Contracting Officer should have known that the cost or pricing data in issue were defective even though the Contractor or subcontractor took no affirmative action to bring the character of the data to the attention of the Contracting Officer.

(iii) The contract was based on an agreement about the total cost of the contract and there was no agreement about the cost of each item procured under the contract.

(iv) The Contractor or subcontractor did not submit a Certificate of Current Cost or Pricing Data.

(2)(i) Except as prohibited by subdivision (d)(2)(ii) of this clause, an offset in an amount determined appropriate by the Contracting Officer based upon the facts shall be allowed against the amount of a contract price reduction if--

(A) The Contractor certifies to the Contracting Officer that, to the best of the Contractor's knowledge and belief, the Contractor is entitled to the offset in the amount requested; and

(B) The Contractor proves that the cost or pricing data were available before the date of agreement on the price of the contract (or price of the modification) and that the data were not submitted before such date.

(ii) An offset shall not be allowed if--

(A) The understated data was known by the Contractor to be understated when the Certificate of Current Cost or Pricing Data was signed; or

(B) The Government proves that the facts demonstrate that the contract price would not have increased in the amount to be offset even if the available data had been submitted before the date of agreement on price.

(e) If any reduction in the contract price under this clause reduces the price of items for which payment was made prior to the date of the modification reflecting the price reduction, the Contractor shall be liable to and shall pay the United States at the time such overpayment is repaid--

(1) Simple interest on the amount of such overpayment to be computed from the date(s) of overpayment to the Contractor to the date the Government is repaid by the Contractor at the applicable underpayment rate effective for each quarter prescribed by the Secretary of the

Treasury under 26 U.S.C. 6621(a)(2); and

(2) A penalty equal to the amount of the overpayment, if the Contractor or subcontractor knowingly submitted cost or pricing data which were incomplete, inaccurate, or noncurrent.

(End of clause)

13 52.214-28 SUBCONTRACTOR COST OR PRICING DATA--MODIFICATIONS--SEALED BIDDING
(OCT 1995)

(a) The requirements of paragraphs (b) and (c) of this clause shall (1) become operative only for any modification to this contract involving aggregate increases and/or decreases in costs, plus applicable profits, expected to exceed the threshold for submission of cost or pricing data at FAR 15.804-2(a)(1), and (2) be limited to such modifications.

(b) Before awarding any subcontract expected to exceed the threshold for submission of cost or pricing data at FAR 15.804-2(a)(1), on the date of agreement on price or the date of award, whichever is later; or before pricing any subcontract modifications involving aggregate increases and/or decreases in costs, plus applicable profits, expected to exceed the threshold for submission of cost or pricing data at FAR 15.804-2(a)(1), the Contractor shall require the subcontractor to submit cost or pricing data (actually or by specific identification in writing), unless an exception under FAR 15.804-1 applies.

(c) The Contractor shall require the subcontractor to certify in substantially the form prescribed in subsection FAR 15.804-4 that, to the best of its knowledge and belief, the data submitted under paragraph (b) of this clause were accurate, complete, and current as of the date of agreement on the negotiated price of the subcontract or subcontract modification.

(d) The Contractor shall insert the substance of this clause, including this paragraph (d), in each subcontract that, when entered into, exceeds the threshold for submission of cost or pricing data at FAR 15.804-2(a)(1).

(End of clause)

14 52.214-29 ORDER OF PRECEDENCE--SEALED BIDDING (JAN 1986)

Any inconsistency in this solicitation or contract shall be resolved by

giving precedence in the following order: (a) the Schedule (excluding the specifications); (b) representations and other instructions; (c) contract clauses; (d) other documents, exhibits, and attachments; and (e) the specifications.

(End of clause)

15 52.219-8 UTILIZATION OF SMALL, SMALL DISADVANTAGED AND WOMEN-OWNED SMALL
BUSINESS CONCERNS (JUN 1997)

(a) It is the policy of the United States that small business concerns, small business concerns owned and controlled by socially and economically disadvantaged individuals and small business concerns owned and controlled by women shall have the maximum practicable opportunity to participate in performing contracts let by any Federal agency, including contracts and subcontracts for subsystems, assemblies, components, and related services for major systems. It is further the policy of the United States that its prime contractors establish procedures to ensure the timely payment of amounts due pursuant to the terms of their subcontracts with small business concerns, small business concerns owned and controlled by socially and economically disadvantaged individuals and small business concerns owned and controlled by women.

(b) The Contractor hereby agrees to carry out this policy in the awarding of subcontracts to the fullest extent consistent with efficient contract performance. The Contractor further agrees to cooperate in any studies or surveys as may be conducted by the United States Small Business Administration or the awarding agency of the United States as may be necessary to determine the extent of the Contractor's compliance with this clause.

(c) As used in this contract, the term "small business concern" shall mean a small business as defined pursuant to section 3 of the Small Business Act and relevant regulations promulgated pursuant thereto. The term "small business concern owned and controlled by socially and economically disadvantaged individuals" shall mean a small business concern (1) which is at least 51 percent unconditionally owned by one or more socially and economically disadvantaged individuals; or, in the case of any publicly owned business, at least 51 per centum of the stock of which is unconditionally owned by one or more socially and economically disadvantaged individuals; and (2) whose management and daily business operations are controlled by one or more of such individuals. This term also means a small business concern that is at least 51 percent

unconditionally owned by an economically disadvantaged Indian tribe or Native Hawaiian Organization, or a publicly owned business having at least 51 percent of its stock unconditionally owned by one of these entities which has its management and daily business controlled by members of an economically disadvantaged Indian tribe or Native Hawaiian Organization, and which meets the requirements of 13 CFR 124. The Contractor shall presume that socially and economically disadvantaged individuals include Black Americans, Hispanic Americans, Native Americans, Asian-Pacific Americans, Subcontinent Asian Americans, and other minorities, or any other individual found to be disadvantaged by the Administration pursuant to section 8(a) of the Small Business Act. The Contractor shall presume that socially and economically disadvantaged entities also include Indian Tribes and Native Hawaiian Organizations.

(d) The term "small business concern owned and controlled by women" shall mean a small business concern (1) which is at least 51 percent owned by one or more women, or, in the case of any publicly owned business, at least 51 percent of the stock of which is owned by one or more women, and (2) whose management and daily business operations are controlled by one or more women; and

(e) Contractors acting in good faith may rely on written representations by their subcontractors regarding their status as a small business concern, a small business concern owned and controlled by socially and economically disadvantaged individuals or a small business concern owned and controlled by women.

(End of clause)

16 52.219-9 I SMALL, SMALL DISADVANTAGED AND WOMEN-OWNED SMALL BUSINESS SUBCONTRACTING
PLAN (AUG 1996)--ALTERNATE I (OCT 1995)

(a) This clause does not apply to small business concerns.

(b) "Commercial product," as used in this clause, means a product in regular production that is sold in substantial quantities to the general public and/or industry at established catalog or market prices. It also means a product which, in the opinion of the Contracting Officer, differs only insignificantly from the Contractor's commercial product.

"Subcontract," as used in this clause, means any agreement (other than one involving an employer-employee relationship) entered into by a Federal Government prime Contractor or subcontractor calling for supplies or services required for performance of the contract or subcontract.

(c) The apparent low bidder, upon request by the Contracting Officer, shall submit a subcontracting plan, where applicable, which separately addresses subcontracting with small business concerns, with small disadvantaged business concerns and with women-owned small business concerns. If the bidder is submitting an individual contract plan, the plan must separately address subcontracting with small business concerns, small disadvantaged business concerns and women-owned small business concerns, with a separate part for the basic contract and separate parts for each option (if any). The plan shall be included in and made a part of the resultant contract. The subcontracting plan shall be submitted within the time specified by the Contracting Officer. Failure to submit the subcontracting plan shall make the bidder ineligible for the award of a contract.

(d) The offeror's subcontracting plan shall include the following:

(1) Goals, expressed in terms of percentages of total planned subcontracting dollars, for the use of small business concerns, small disadvantaged business concerns and women-owned small business concerns as subcontractors. The offeror shall include all subcontracts that contribute to contract performance, and may include a proportionate share of products and services that are normally allocated as indirect costs.

(2) A statement of--

- (i) Total dollars planned to be subcontracted;
- (ii) Total dollars planned to be subcontracted to small business concerns;
- (iii) Total dollars planned to be subcontracted to small disadvantaged business concerns; and
- (iv) Total dollars planned to be subcontracted to women-owned small business concerns.

(3) A description of the principal types of supplies and services to be subcontracted, and an identification of the types planned for subcontracting to (i) small business concerns, (ii) small disadvantaged business concerns and (iii) women-owned small business concerns.

(4) A description of the method used to develop the subcontracting goals in paragraph (d)(1) of this clause.

(5) A description of the method used to identify potential sources for solicitation purposes (e.g., existing company source lists, the Procurement Automated Source System (PASS) of the Small Business Administration, the National Minority Purchasing Council Vendor Information Service, the Research and Information Division of the Minority Business Development Agency in the Department of Commerce, or small, small disadvantaged and women-owned small business concerns trade

associations). A firm may rely on the information contained in PASS as an accurate representation of a concern's size and ownership characteristics for purposes of maintaining a small business source list. A firm may rely on PASS as its small business source list. Use of the PASS as its source list does not relieve a firm of its responsibilities (e.g., outreach, assistance, counseling, publicizing subcontracting opportunities) in this clause.

(6) A statement as to whether or not the offeror included indirect costs in establishing subcontracting goals, and a description of the method used to determine the proportionate share of indirect costs to be incurred with (i) small business concerns, (ii) small disadvantaged business concerns, and (iii) women-owned small business concerns.

(7) The name of the individual employed by the offeror who will administer the offeror's subcontracting program, and a description of the duties of the individual.

(8) A description of the efforts the offeror will make to assure that small, small disadvantaged and women-owned small business concerns have an equitable opportunity to compete for subcontracts.

(9) Assurances that the offeror will include the clause in this contract entitled "Utilization of Small, Small Disadvantaged and Women-Owned Small Business Concerns" in all subcontracts that offer further subcontracting opportunities, and that the offeror will require all subcontractors (except small business concerns) who receive subcontracts in excess of \$500,000 (\$1,000,000 for construction of any public facility) to adopt a plan similar to the plan agreed to by the offeror.

(10) Assurances that the offeror will (i) cooperate in any studies or surveys as may be required, (ii) submit periodic reports in order to allow the Government to determine the extent of compliance by the offeror with the subcontracting plan, (iii) submit Standard Form (SF) 294, Subcontracting Report for Individual Contracts, and/or SF 295, Summary Subcontract Report, in accordance with the instructions on the forms, and (iv) ensure that its subcontractors agree to submit Standard Forms 294 and 295.

(11) A recitation of the types of records the offeror will maintain to demonstrate procedures that have been adopted to comply with the requirements and goals in the plan, including establishing source lists; and a description of its efforts to locate small, small disadvantaged and women-owned small business concerns and award subcontracts to them. The records shall include at least the following (on a plant-wide or company-wide basis, unless otherwise indicated):

(i) Source lists (e.g., PASS), guides, and other data that identify small, small disadvantaged and women-owned small business concerns.

(ii) Organizations contacted in an attempt to locate sources that are small, small disadvantaged or women-owned small business concerns.

(iii) Records on each subcontract solicitation resulting in an award of more than \$100,000, indicating (A) whether small business concerns were solicited and if not, why not, (B) whether small disadvantaged business concerns were solicited and if not, why not, (C) whether women-owned small business concerns were solicited and if not, why not, and (D) if applicable, the reason award was not made to a small business concern.

(iv) Records of any outreach efforts to contact (A) trade associations, (B) business development organizations, and (C) conferences and trade fairs to locate small, small disadvantaged and women-owned small business sources.

(v) Records of internal guidance and encouragement provided to buyers through (A) workshops, seminars, training, etc., and (B) monitoring performance to evaluate compliance with the program's requirements.

(vi) On a contract-by-contract basis, records to support award data submitted by the offeror to the Government, including the name, address, and business size of each subcontractor. Contractors having company or division-wide annual plans need not comply with this requirement.

(e) In order to effectively implement this plan to the extent consistent with efficient contract performance, the Contractor shall perform the following functions:

(1) Assist small, small disadvantaged and women-owned small business concerns by arranging solicitations, time for the preparation of bids, quantities, specifications, and delivery schedules so as to facilitate the participation by such concerns. Where the contractor's lists of potential small, small disadvantaged and women-owned small business subcontractors are excessively long, reasonable effort shall be made to give all such small business concerns an opportunity to compete over a period of time.

(2) Provide adequate and timely consideration of the potentialities of small, small disadvantaged and women-owned small business concerns in all "make-or-buy" decisions.

(3) Counsel and discuss subcontracting opportunities with representatives of small, small disadvantaged and women-owned small business firms.

(4) Provide notice to subcontractors concerning penalties and remedies

for misrepresentations of business status as small, small disadvantaged or women-owned small business for the purpose of obtaining a subcontract that is to be included as part or all of a goal contained in the Contractor's subcontracting plan.

(f) A master subcontracting plan on a plant or division-wide basis which contains all the elements required by (d) above, except goals, may be incorporated by reference as a part of the subcontracting plan required of the offeror by this clause; provided, (1) the master plan has been approved, (2) the offeror provides copies of the approved master plan and evidence of its approval to the Contracting Officer, and (3) goals and any deviations from the master plan deemed necessary by the Contracting Officer to satisfy the requirements of this contract are set forth in the individual subcontracting plan.

(g)(1) If a commercial product is offered, the subcontracting plan required by this clause may relate to the offeror's production generally, for both commercial and noncommercial products, rather than solely to the Government contract. In these cases, the offeror shall, with the concurrence of the Contracting Officer, submit one company-wide or division-wide annual plan.

(2) The annual plan shall be reviewed for approval by the agency awarding the offeror its first prime contract requiring a subcontracting plan during the fiscal year, or by an agency satisfactory to the Contracting Officer.

(3) The approved plan shall remain in effect during the offeror's fiscal year for all of the offeror's commercial products.

(h) Prior compliance of the offeror with other such subcontracting plans under previous contracts will be considered by the Contracting Officer in determining the responsibility of the offeror for award of the contract.

(i) The failure of the Contractor or subcontractor to comply in good faith with (1) the clause of this contract entitled "Utilization Of Small, Small Disadvantaged and Women-Owned Small Business Concerns," or (2) an approved plan required by this clause, shall be a material breach of the contract.

(End of clause)

17 52.222-3 CONVICT LABOR (AUG 1996)

The Contractor agrees not to employ in the performance of this contract any person undergoing a sentence of imprisonment which has been imposed by

any court of a State, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, or the Trust Territory of the Pacific Islands. This limitation, however, shall not prohibit the employment by the Contractor in the performance of this contract of persons on parole or probation to work at paid employment during the term of their sentence or persons who have been pardoned or who have served their terms. Nor shall it prohibit the employment by the Contractor in the performance of this contract of persons confined for violation of the laws of any of the States, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, or the Trust Territory of the Pacific Islands who are authorized to work at paid employment in the community under the laws of such jurisdiction, if--

(a)(1) The worker is paid or is in an approved work training program on a voluntary basis;

(2) Representatives of local union central bodies or similar labor union organizations have been consulted;

(3) Such paid employment will not result in the displacement of employed workers, or be applied in skills, crafts, or trades in which there is a surplus of available gainful labor in the locality, or impair existing contracts for services; and

(4) The rates of pay and other conditions of employment will not be less than those paid or provided for work of a similar nature in the locality in which the work is being performed; and

(b) The Attorney General of the United States has certified that the work-release laws or regulations of the jurisdiction involved are in conformity with the requirements of Executive Order 11755, as amended by Executive Orders 12608 and 12943.

(End of clause)

18 52.222-4 CONTRACT WORK HOURS AND SAFETY STANDARDS ACT--OVERTIME COMPENSATION
(JUL 1995)

(a) Overtime requirements. No Contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics (see Federal Acquisition Regulation (FAR) 22.300) shall require or permit any such laborers or mechanics in any workweek in which the individual is employed on such work to work in excess of 40 hours in such workweek unless such laborer or mechanic receives

compensation at a rate not less than 1 1/2 times the basic rate of pay for all hours worked in excess of 40 hours in such workweek.

(b) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the provisions set forth in paragraph (a) of this clause, the Contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such Contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic employed in violation of the provisions set forth in paragraph (a) of this clause in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of 40 hours without payment of the overtime wages required by provisions set forth in paragraph (a) of this clause.

(c) Withholding for unpaid wages and liquidated damages. The Contracting Officer shall upon his or her own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the Contractor or subcontractor under any such contract or any other Federal contract with the same Prime Contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act which is held by the same Prime Contractor, such sums as may be determined to be necessary to satisfy any liabilities of such Contractor or subcontractor for unpaid wages and liquidated damages as provided in the provisions set forth in paragraph (b) of this clause.

(d) Payrolls and basic records. (1) The Contractor or subcontractor shall maintain payrolls and basic payroll records during the course of contract work and shall preserve them for a period of 3 years from the completion of the contract for all laborers and mechanics working on the contract. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. Nothing in this paragraph shall require the duplication of records required to be maintained for construction work by Department of Labor regulations at 29 CFR 5.5(a)(3) implementing the Davis-Bacon Act.

(2) The records to be maintained under paragraph (d)(1) of this clause shall be made available by the Contractor or subcontractor for inspection, copying, or transcription by authorized representatives of the Contracting Officer or the Department of Labor. The Contractor or subcontractor shall permit such representatives to interview employees

during working hours on the job.

(e) Subcontracts. The Contractor or subcontractor shall insert in any subcontracts exceeding \$100,000, the provisions set forth in paragraphs (a) through (e) of this clause and also a clause requiring the subcontractors to include these provisions in any lower tier subcontracts. The Prime Contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the provisions set forth in paragraphs (a) through (e) of this clause.

(End of clause)

19 52.222-6 DAVIS-BACON ACT (FEB 1995)

(a) All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the Contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (d) of this clause; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such period. Such laborers and mechanics shall be paid not less than the appropriate wage rate and fringe benefits in the wage determination for the classification of work actually performed, without regard to skill, except as provided in the clause entitled Apprentices and Trainees. Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein; provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classifications and wage rates conformed under paragraph (b) of this

clause) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the Contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

(b)(1) The Contracting Officer shall require that any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The Contracting Officer shall approve an additional classification and wage rate and fringe benefits therefor only when all the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination.

(ii) The classification is utilized in the area by the construction industry.

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(iv) With respect to helpers, such a classification prevails in the area in which the work is performed.

(2) If the Contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the Contracting Officer agree on the classification and wage rate (including the amount designated for fringe benefits, where appropriate), a report of the action taken shall be sent by the Contracting Officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator or an authorized representative will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the Contracting Officer or will notify the Contracting Officer within the 30-day period that additional time is necessary.

(3) In the event the Contractor, the laborers or mechanics to be employed in the classification, or their representatives, and the Contracting Officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the Contracting Officer shall refer the questions, including the views of all interested parties and the recommendation of the Contracting Officer, to the Administrator of the Wage and Hour Division for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the Contracting Officer or will notify the Contracting Officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits, where appropriate) determined pursuant to subparagraphs (b)(2) and (b)(3) of this clause shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(c) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the Contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(d) If the Contractor does not make payments to a trustee or other third person, the Contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program; provided, that the Secretary of Labor has found, upon the written request of the Contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the Contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

(End of clause)

20 52.222-7

WITHHOLDING OF FUNDS (FEB 1988)

The Contracting Officer shall, upon his or her own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the Contractor under this contract or any other Federal contract with the same Prime Contractor, or any other Federally assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same Prime Contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the Contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the Contracting Officer may, after written notice to the Contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

(End of clause)

(a) Payrolls and basic records relating thereto shall be maintained by the Contractor during the course of the work and preserved for a period of 3 years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made, and actual wages paid. Whenever the Secretary of Labor has found, under paragraph (d) of the clause entitled Davis-Bacon Act, that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the Contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(b)(1) The Contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the Contracting Officer. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under paragraph (a) of this clause. This information may be submitted in any form desired. Optional Form WH-347 (Federal Stock Number 029-005-00014-1) is available for this purpose and may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. The Prime Contractor is responsible for the submission of copies of payrolls by all subcontractors.

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the Contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify--

(i) That the payroll for the payroll period contains the information required to be maintained under paragraph (a) of this clause and that

such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in the Regulations, 29 CFR Part 3; and

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by subparagraph (b)(2) of this clause.

(4) The falsification of any of the certifications in this clause may subject the Contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 3729 of Title 31 of the United States Code.

(c) The Contractor or subcontractor shall make the records required under paragraph (a) of this clause available for inspection, copying, or transcription by the Contracting Officer or authorized representatives of the Contracting Officer or the Department of Labor. The Contractor or subcontractor shall permit the Contracting Officer or representatives of the Contracting Officer or the Department of Labor to interview employees during working hours on the job. If the Contractor or subcontractor fails to submit required records or to make them available, the Contracting Officer may, after written notice to the Contractor, take such action as may be necessary to cause the suspension of any further payment. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

(End of clause)

22 52.222-9 APPRENTICES AND TRAINEES (FEB 1988)

(a) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship

program registered with the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State Apprenticeship Agency recognized by the Bureau, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the Contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated in this paragraph, shall be paid not less than the applicable wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the Contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Bureau of Apprenticeship and Training, or a State Apprenticeship Agency recognized by the Bureau, withdraws approval of an apprenticeship program, the Contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(b) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal

certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed in the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate in the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate in the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate in the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the Contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(c) Equal employment opportunity. The utilization of apprentices, trainees, and journeymen under this clause shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

(End of clause)

23 52.222-10 COMPLIANCE WITH COPELAND ACT REQUIREMENTS (FEB 1988)

The Contractor shall comply with the requirements of 29 CFR Part 3, which are hereby incorporated by reference in this contract.

(End of clause)

24 52.222-11 SUBCONTRACTS (LABOR STANDARDS) (FEB 1988)

(a) The Contractor or subcontractor shall insert in any subcontracts the clauses entitled Davis-Bacon Act, Contract Work Hours and Safety Standards Act--Overtime Compensation, Apprentices and Trainees, Payrolls and Basic Records, Compliance with Copeland Act Requirements, Withholding of Funds, Subcontracts (Labor Standards), Contract Termination--Debarment, Disputes Concerning Labor Standards, Compliance with Davis-Bacon and Related Act Regulations, and Certification of Eligibility, and such other clauses as the Contracting Officer may, by appropriate instructions, require, and also a clause requiring subcontractors to include these clauses in any lower tier subcontracts. The Prime Contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with all the contract clauses cited in this paragraph.

(b)(1) Within 14 days after award of the contract, the Contractor shall deliver to the Contracting Officer a completed Statement and Acknowledgment Form (SF 1413) for each subcontract, including the subcontractor's signed and dated acknowledgment that the clauses set forth in paragraph (a) of this clause have been included in the subcontract.

(2) Within 14 days after the award of any subsequently awarded subcontract the Contractor shall deliver to the Contracting Officer an updated completed SF 1413 for such additional subcontract.

(End of clause)

25 52.222-12 CONTRACT TERMINATION--DEBARMENT (FEB 1988)

A breach of the contract clauses entitled Davis-Bacon Act, Contract Work Hours and Safety Standards Act--Overtime Compensation, Apprentices and Trainees, Payrolls and Basic Records, Compliance with Copeland Act Requirements, Subcontracts (Labor Standards), Compliance with Davis-Bacon and Related Act Regulations, or Certification of Eligibility may be grounds for termination of the contract, and for debarment as a Contractor and subcontractor as provided in 29 CFR 5.12.

(End of clause)

26 52.222-13 COMPLIANCE WITH DAVIS-BACON AND RELATED ACT REGULATIONS (FEB 1988)

All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are hereby incorporated by reference in this contract.

(End of clause)

27 52.222-14 DISPUTES CONCERNING LABOR STANDARDS (FEB 1988)

The United States Department of Labor has set forth in 29 CFR Parts 5, 6, and 7 procedures for resolving disputes concerning labor standards requirements. Such disputes shall be resolved in accordance with those procedures and not the Disputes clause of this contract. Disputes within the meaning of this clause include disputes between the Contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees of their representatives.

(End of clause)

28 52.222-15 CERTIFICATION OF ELIGIBILITY (FEB 1988)

(a) By entering into this contract, the Contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the Contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(b) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(c) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

(End of clause)

29 52.222-26 EQUAL OPPORTUNITY (APR 1984)

(a) If, during any 12-month period (including the 12 months preceding the award of this contract), the Contractor has been or is awarded nonexempt Federal contracts and/or subcontracts that have an aggregate value in excess of \$10,000, the Contractor shall comply with subparagraphs (b)(1) through (11) below. Upon request, the Contractor shall provide information necessary to determine the applicability of this clause.

(b) During performing this contract, the Contractor agrees as follows:

(1) The Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin.

(2) The Contractor shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. This shall include, but not be limited to, (i) employment, (ii) upgrading, (iii) demotion, (iv) transfer, (v) recruitment or recruitment advertising, (vi) layoff or termination, (vii) rates of pay or other forms of compensation, and (viii) selection for training, including apprenticeship.

(3) The Contractor shall post in conspicuous places available to employees and applicants for employment the notices to be provided by the Contracting Officer that explain this clause.

(4) The Contractor shall, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

(5) The Contractor shall send, to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, the notice to be provided by the Contracting Officer advising the labor union or workers' representative of the Contractor's commitments under this clause, and post copies of the notice in conspicuous places available to employees and applicants for employment.

(6) The Contractor shall comply with Executive Order 11246, as amended, and the rules, regulations, and orders of the Secretary of Labor.

(7) The Contractor shall furnish to the contracting agency all information required by Executive Order 11246, as amended, and by the rules, regulations, and orders of the Secretary of Labor. Standard Form 100 (EEO-1), or any successor form, is the prescribed form to be filed within 30 days following the award, unless filed within 12 months preceding the date of award.

(8) The Contractor shall permit access to its books, records, and accounts by the contracting agency or the Office of Federal Contract Compliance Programs (OFCCP) for the purposes of investigation to ascertain the Contractor's compliance with the applicable rules, regulations, and orders.

(9) If the OFCCP determines that the Contractor is not in compliance with this clause or any rule, regulation, or order of the Secretary of Labor, this contract may be canceled, terminated, or suspended in whole or in part and the Contractor may be declared ineligible for further Government contracts, under the procedures authorized in Executive Order

11246, as amended. In addition, sanctions may be imposed and remedies invoked against the Contractor as provided in Executive Order 11246, as amended, the rules, regulations, and orders of the Secretary of Labor, or as otherwise provided by law.

(10) The Contractor shall include the terms and conditions of subparagraph (b)(1) through (11) of this clause in every subcontract or purchase order that is not exempted by the rules, regulations, or orders of the Secretary of Labor issued under Executive Order 11246, as amended, so that these terms and conditions will be binding upon each subcontractor or vendor.

(11) The Contractor shall take such action with respect to any subcontract or purchase order as the contracting agency may direct as a means of enforcing these terms and conditions, including sanctions for noncompliance; provided, that if the Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of any direction, the Contractor may request the United States to enter into the litigation to protect the interests of the United States.

(c) Notwithstanding any other clause in this contract, disputes relative to this clause will be governed by the procedures in 41 CFR 60-1.1.

(End of clause)

(R 7-103.18 1978 SEP)

(R 1-12.803-2)

(R 7-607.13 1978 SEP)

30 52.222-27 AFFIRMATIVE ACTION COMPLIANCE REQUIREMENTS FOR CONSTRUCTION (APR 1984)

(a) Definitions.

"Covered area," as used in this clause, means the geographical area described in the solicitation for this contract.

"Director," as used in this clause, means Director, Office of Federal Contract Compliance Programs (OFCCP), United States Department of Labor, or any person to whom the Director delegates authority.

"Employer's identification number," as used in this clause, means the Federal Social Security number used on the employer's quarterly federal tax return, U.S. Treasury Department Form 941.

"Minority," as used in this clause, means--

(1) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

(2) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands);

(3) Black (all persons having origins in any of the black African racial groups not of Hispanic origin); and

(4) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race).

(b) If the Contractor, or a subcontractor at any tier, subcontracts a portion of the work involving any construction trade, each such subcontract in excess of \$10,000 shall include this clause and the Notice containing the goals for minority and female participation stated in the solicitation for this contract.

(c) If the Contractor is participating in a Hometown Plan (41 CFR 60-4) approved by the U.S. Department of Labor in a covered area, either individually or through an association, its affirmative action obligations on all work in the plan area (including goals) shall comply with the plan for those trades that have unions participating in the plan. Contractors must be able to demonstrate participation in, and compliance with, the provisions of the plan. Each Contractor or subcontractor participating in an approved plan is also required to comply with its obligations under the Equal Opportunity clause, and to make a good faith effort to achieve each goal under the plan in each trade in which it has employees. The overall good-faith performance by other Contractors or subcontractors toward a goal in an approved plan does not excuse any Contractor's or subcontractor's failure to make good-faith efforts to achieve the plan's goals.

(d) The Contractor shall implement the affirmative action procedures in subparagraphs (g)(1) through (16) of this clause. The goals stated in the solicitation for this contract are expressed as percentages of the total hours of employment and training of minority and female utilization that the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for the geographical area where that work is actually performed. The Contractor is expected to make substantially uniform progress toward its goals in each craft.

(e) Neither the terms and conditions of any collective bargaining agreement, nor the failure by a union with which the Contractor has a collective bargaining agreement, to refer minorities or women shall excuse the Contractor's obligations under this clause, Executive Order 11246, as amended, or the regulations thereunder.

(f) In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

(g) The Contractor shall take affirmative action to ensure equal employment opportunity. The evaluation of the Contractor's compliance with this clause shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully and implement affirmative action steps at least as extensive as the following:

(1) Ensure a working environment free of harassment, intimidation, and coercion at all sites and in all facilities where the Contractor's employees are assigned to work. The Contractor, if possible, will assign two or more women to each construction project. The Contractor shall ensure that foremen, superintendents, and other onsite supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at these sites or facilities.

(2) Establish and maintain a current list of sources for minority and female recruitment. Provide written notification to minority and female recruitment sources and community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.

(3) Establish and maintain a current file of the names, addresses, and telephone numbers of each minority and female off-the-street applicant, referrals of minorities or females from unions, recruitment sources, or community organizations, and the action taken with respect to each individual. If an individual was sent to the union hiring hall for referral and not referred back to the Contractor by the union or, if referred back, not employed by the Contractor, this shall be documented in the file, along with whatever additional actions the Contractor may have taken.

(4) Immediately notify the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred back to the Contractor a minority or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

(5) Develop on-the-job training opportunities and/or participate in

training programs for the area that expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under subparagraph (g)(2) above.

(6) Disseminate the Contractor's equal employment policy by--

(i) Providing notice of the policy to unions and to training, recruitment, and outreach programs, and requesting their cooperation in assisting the Contractor in meeting its contract obligations;

(ii) Including the policy in any policy manual and in collective bargaining agreements;

(iii) Publicizing the policy in the company newspaper, annual report, etc.;

(iv) Reviewing the policy with all management personnel and with all minority and female employees at least once a year; and

(v) Posting the policy on bulletin boards accessible to employees at each location where construction work is performed.

(7) Review, at least annually, the Contractor's equal employment policy and affirmative action obligations with all employees having responsibility for hiring, assignment, layoff, termination, or other employment decisions. Conduct review of this policy with all onsite supervisory personnel before initiating construction work at a job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

(8) Disseminate the Contractor's equal employment policy externally by including it in any advertising in the news media, specifically including minority and female news media. Provide written notification to, and discuss this policy with, other Contractors and subcontractors with which the Contractor does or anticipates doing business.

(9) Direct recruitment efforts, both oral and written, to minority, female, and community organizations, to schools with minority and female students, and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than 1 month before the date for acceptance of applications for apprenticeship or training by any recruitment source, send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

(10) Encourage present minority and female employees to recruit

minority persons and women. Where reasonable, provide after-school, summer, and vacation employment to minority and female youth both on the site and in other areas of the Contractor's workforce.

(11) Validate all tests and other selection requirements where required under 41 CFR 60-3.

(12) Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities. Encourage these employees to seek or to prepare for, through appropriate training, etc., opportunities for promotion.

(13) Ensure that seniority practices job classifications, work assignments, and other personnel practices do not have a discriminatory effect by continually monitoring all personnel and employment-related activities to ensure that the Contractor's obligations under this contract are being carried out.

(14) Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

(15) Maintain a record of solicitations for subcontracts for minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.

(16) Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's equal employment policy and affirmative action obligations.

(h) The Contractor is encouraged to participate in voluntary associations that may assist in fulfilling one or more of the affirmative action obligations contained in subparagraphs (g)(1) through (16). The efforts of a contractor association, joint contractor-union, contractor-community, or similar group of which the contractor is a member and participant may be asserted as fulfilling one or more of its obligations under subparagraphs (g)(1) through (16), provided the Contractor--

- (1) Actively participates in the group;
- (2) Makes every effort to ensure that the group has a positive impact on the employment of minorities and women in the industry;
- (3) Ensures that concrete benefits of the program are reflected in the Contractor's minority and female workforce participation;
- (4) Makes a good-faith effort to meet its individual goals and timetables; and
- (5) Can provide access to documentation that demonstrates the effectiveness of actions taken on behalf of the Contractor. The

obligation to comply is the Contractor's, and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

(i) A single goal for minorities and a separate single goal for women shall be established. The Contractor is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and nonminority. Consequently, the Contractor may be in violation of Executive Order 11246, as amended, if a particular group is employed in a substantially disparate manner.

(j) The Contractor shall not use goals or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.

(k) The Contractor shall not enter into any subcontract with any person or firm debarred from Government contracts under Executive Order 11246, as amended.

(l) The Contractor shall carry out such sanctions and penalties for violation of this clause and of the Equal Opportunity clause, including suspension, termination, and cancellation of existing subcontracts, as may be imposed or ordered under Executive Order 11246, as amended, and its implementing regulations, by the OFCCP. Any failure to carry out these sanctions and penalties as ordered shall be a violation of this clause and Executive Order 11246, as amended.

(m) The Contractor in fulfilling its obligations under this clause shall implement affirmative action procedures at least as extensive as those prescribed in paragraph (g) above, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of Executive Order 11246, as amended, the implementing regulations, or this clause, the Director shall take action as prescribed in 41 CFR 60-4.8.

(n) The Contractor shall designate a responsible official to--

(1) Monitor all employment-related activity to ensure that the Contractor's equal employment policy is being carried out;

(2) Submit reports as may be required by the Government; and

(3) Keep records that shall at least include for each employee the name, address, telephone number, construction trade, union affiliation (if any), employee identification number, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed.

Records shall be maintained in an easily understandable and retrievable

form; however, to the degree that existing records satisfy this requirement, separate records are not required to be maintained.

(c) Nothing contained herein shall be construed as a limitation upon the application of other laws that establish different standards of compliance or upon the requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

(End of clause)

(R 7-603.60 1978 SEP)

31 52.222-35 AFFIRMATIVE ACTION FOR SPECIAL DISABLED AND VIETNAM ERA VETERANS
(APR 1984)

(a) Definitions.

"Appropriate office of the State employment service system," as used in this clause, means the local office of the Federal-State national system of public employment offices assigned to serve the area where the employment opening is to be filled, including the District of Columbia, Guam, Puerto Rico, Virgin Islands, American Samoa, and the Trust Territory of the Pacific Islands.

"Openings that the Contractor proposes to fill from within its own organization," as used in this clause, means employment openings for which no one outside the Contractor's organization (including any affiliates, subsidiaries, and the parent companies) will be considered and includes any openings that the Contractor proposes to fill from regularly established "recall" lists.

"Openings that the Contractor proposes to fill under a customary and traditional employer-union hiring arrangement," as used in this clause, means employment openings that the Contractor proposes to fill from union halls, under their customary and traditional employer-union hiring relationship.

"Suitable employment openings," as used in this clause--

(1) Includes, but is not limited to, openings that occur in jobs categorized as--

- (i) Production and nonproduction;
- (ii) Plant and office;
- (iii) Laborers and mechanics;
- (iv) Supervisory and nonsupervisory;
- (v) Technical; and
- (vi) Executive, administrative, and professional positions

compensated on a salary basis of less than \$25,000 a year; and
(2) Includes full-time employment, temporary employment of over 3 days, and part-time employment, but not openings that the Contractor proposes to fill from within its own organization or under a customary and traditional employer-union hiring arrangement, nor openings in an educational institution that are restricted to students of that institution.

(b) General. (1) Regarding any position for which the employee or applicant for employment is qualified, the Contractor shall not discriminate against the individual because the individual is a special disabled or Vietnam Era veteran. The Contractor agrees to take affirmative action to employ, advance in employment, and otherwise treat qualified special disabled and Vietnam Era veterans without discrimination based upon their disability or veterans' status in all employment practices such as--

- (i) Employment;
- (ii) Upgrading;
- (iii) Demotion or transfer;
- (iv) Recruitment;
- (v) Advertising;
- (vi) Layoff or termination;
- (vii) Rates of pay or other forms of compensation; and
- (viii) Selection for training, including apprenticeship.

(2) The Contractor agrees to comply with the rules, regulations, and relevant orders of the Secretary of Labor (Secretary) issued under the Vietnam Era Veterans' Readjustment Assistance Act of 1972 (the Act), as amended.

(c) Listing openings. (1) The Contractor agrees to list all suitable employment openings existing at contract award or occurring during contract performance, at an appropriate office of the State employment service system in the locality where the opening occurs. These openings include those occurring at any Contractor facility, including one not connected with performing this contract. An independent corporate affiliate is exempt from this requirement.

(2) State and local government agencies holding Federal contracts of \$10,000 or more shall also list all their suitable openings with the appropriate office of the State employment service.

(3) The listing of suitable employment openings with the State employment service system is required at least concurrently with using any other recruitment source or effort and involves the obligations of placing a bona fide job order, including accepting referrals of veterans and nonveterans. This listing does not require hiring any particular

job applicant or hiring from any particular group of job applicants and is not intended to relieve the Contractor from any requirements of Executive orders or regulations concerning nondiscrimination in employment.

(4) Whenever the Contractor becomes contractually bound to the listing terms of this clause, it shall advise the State employment service system, in each State where it has establishments, of the name and location of each hiring location in the State. As long as the Contractor is contractually bound to these terms and has so advised the State system, it need not advise the State system of subsequent contracts. The Contractor may advise the State system when it is no longer bound by this contract clause.

(5) Under the most compelling circumstances, an employment opening may not be suitable for listing, including situations when (i) the Government's needs cannot reasonably be supplied, (ii) listing would be contrary to national security, or (iii) the requirement of listing would not be in the Government's interest.

(d) Applicability. (1) This clause does not apply to the listing of employment openings which occur and are filled outside the 50 States, the District of Columbia, Puerto Rico, Guam, Virgin Islands, American Samoa, and the Trust Territory of the Pacific Islands.

(2) The terms of paragraph (c) above of this clause do not apply to openings that the Contractor proposes to fill from within its own organization or under a customary and traditional employer-union hiring arrangement. This exclusion does not apply to a particular opening once an employer decides to consider applicants outside of its own organization or employer-union arrangement for that opening.

(e) Postings. (1) The Contractor agrees to post employment notices stating (i) the Contractor's obligation under the law to take affirmative action to employ and advance in employment qualified special disabled veterans and veterans of the Vietnam era, and (ii) the rights of applicants and employees.

(2) These notices shall be posted in conspicuous places that are available to employees and applicants for employment. They shall be in a form prescribed by the Director, Office of Federal Contract Compliance Programs, Department of Labor (Director), and provided by or through the Contracting Officer.

(3) The Contractor shall notify each labor union or representative of workers with which it has a collective bargaining agreement or other contract understanding, that the Contractor is bound by the terms of the Act, and is committed to take affirmative action to employ, and advance

in employment, qualified special disabled and Vietnam Era veterans.

(f) Noncompliance. If the Contractor does not comply with the requirements of this clause, appropriate actions may be taken under the rules, regulations, and relevant orders of the Secretary issued pursuant to the Act.

(g) Subcontracts. The Contractor shall include the terms of this clause in every subcontract or purchase order of \$10,000 or more unless exempted by rules, regulations, or orders of the Secretary. The Contractor shall act as specified by the Director to enforce the terms, including action for noncompliance.

(End of clause)

(R 7-103.27 1976 JUL)

(R FPR Temp. Reg. 39)

32 52.222-36 AFFIRMATIVE ACTION FOR HANDICAPPED WORKERS (APR 1984)

(a) General. (1) Regarding any position for which the employee or applicant for employment is qualified, the Contractor shall not discriminate against any employee or applicant because of physical or mental handicap. The Contractor agrees to take affirmative action to employ, advance in employment, and otherwise treat qualified handicapped individuals without discrimination based upon their physical or mental handicap in all employment practices such as--

- (i) Employment;
- (ii) Upgrading;
- (iii) Demotion or transfer;
- (iv) Recruitment;
- (v) Advertising;
- (vi) Layoff or termination;
- (vii) Rates of pay or other forms of compensation; and
- (viii) Selection for training, including apprenticeship.

(2) The Contractor agrees to comply with the rules, regulations, and relevant orders of the Secretary of Labor (Secretary) issued under the Rehabilitation Act of 1973 (29 U.S.C. 793) (the Act), as amended.

(b) Postings. (1) The Contractor agrees to post employment notices stating (i) the Contractor's obligation under the law to take affirmative action to employ and advance in employment qualified handicapped individuals and (ii) the rights of applicants and employees.

(2) These notices shall be posted in conspicuous places that are available to employees and applicants for employment. They shall be

in a form prescribed by the Director, Office of Federal Contract Compliance Programs, Department of Labor (Director), and provided by or through the Contracting Officer.

(3) The Contractor shall notify each labor union or representative of workers with which it has a collective bargaining agreement or other contract understanding, that the Contractor is bound by the terms of Section 503 of the Act and is committed to take affirmative action to employ, and advance in employment, qualified physically and mentally handicapped individuals.

(c) Noncompliance. If the Contractor does not comply with the requirements of this clause, appropriate actions may be taken under the rules, regulations, and relevant orders of the Secretary issued pursuant to the Act.

(d) Subcontracts. The Contractor shall include the terms of this clause in every subcontract or purchase order in excess of \$2,500 unless exempted by rules, regulations, or orders of the Secretary. The Contractor shall act as specified by the Director to enforce the terms, including action for noncompliance.

(End of clause)
(R 7-103.28 1976 MAY)
(R FPR Temp. Reg. 38)

33 52.222-37 EMPLOYMENT REPORTS ON SPECIAL DISABLED VETERANS AND VETERANS OF THE
VIETNAM ERA (JAN 1988)

(a) The contractor shall report at least annually, as required by the Secretary of Labor, on:

(1) The number of special disabled veterans and the number of veterans of the Vietnam era in the workforce of the contractor by job category and hiring location; and

(2) The total number of new employees hired during the period covered by the report, and of that total, the number of special disabled veterans, and the number of veterans of the Vietnam era.

(b) The above items shall be reported by completing the form entitled "Federal Contractor Veterans' Employment Report VETS-100."

(c) Reports shall be submitted no later than March 31 of each year beginning March 31, 1988.

(d) The employment activity report required by paragraph (a)(2) of this clause shall reflect total hires during the most recent 12-month period as of the ending date selected for the employment profile report required by

paragraph (a)(1) of this clause. Contractors may select an ending date: (1) As of the end of any pay period during the period January through March 1st of the year the report is due, or (2) as of December 31, if the contractor has previous written approval from the Equal Employment Opportunity Commission to do so for purposes of submitting the Employer Information Report EEO-1 (Standard Form 100).

(e) The count of veterans reported according to paragraph (a) of this clause shall be based on voluntary disclosure. Each contractor subject to the reporting requirements at 38 U.S.C. 2012(d) shall invite all special disabled veterans and veterans of the Vietnam era who wish to benefit under the affirmative action program at 38 U.S.C. 2012 to identify themselves to the contractor. The invitation shall state that the information is voluntarily provided, that the information will be kept confidential, that disclosure or refusal to provide the information will not subject the applicant or employee to any adverse treatment and that the information will be used only in accordance with the regulations promulgated under 38 U.S.C. 2012.

(f) Subcontracts. The Contractor shall include the terms of this clause in every subcontract or purchase order of \$10,000 or more unless exempted by rules, regulations, or orders of the Secretary.

(End of clause)

34 52.223-2 CLEAN AIR AND WATER (APR 1984)

(a) "Air Act", as used in this clause, means the Clean Air Act (42 U.S.C. 7401, et seq.).

"Clean air standards," as used in this clause, means--

(1) Any enforceable rules, regulations, guidelines, standards, limitations, orders, controls, prohibitions, work practices, or other requirements contained in, issued under, or otherwise adopted under the Air Act or Executive Order 11738;

(2) An applicable implementation plan as described in section 110(d) of the Air Act (42 U.S.C. 7410(d));

(3) An approved implementation procedure or plan under section 111(c) or section 111(d) of the Air Act (42 U.S.C. 7411(c) or (d)); or

(4) An approved implementation procedure under section 112(d) of the Air Act (42 U.S.C. 7412(d)).

"Clean water standards," as used in this clause, means any enforceable limitation, control, condition, prohibition, standard, or other requirement promulgated under the Water Act or contained in a permit issued to a

discharger by the EPA or by a State under an approved program, as authorized by section 402 of the Water Act (33 U.S.C. 1342), or by local government to ensure compliance with pretreatment regulations as required by section 307 of the Water Act (33 U.S.C. 1317).

"Compliance," as used in this clause, means compliance with--

(1) Clean air or water standards; or

(2) A schedule or plan ordered or approved by a court of competent jurisdiction, the EPA, or an air or water pollution control agency under the requirements of the Air Act or Water Act and related regulations.

"Facility," as used in this clause, means any building, plant, installation, structure, mine, vessel or other floating craft, location, or site of operations, owned, leased, or supervised by a Contractor or subcontractor, used in the performance of a contract or subcontract. When a location or site of operations includes more than one building, plant, installation, or structure, the entire location or site shall be deemed a facility except when the Administrator, or a designee, of the EPA determines that independent facilities are collocated in one geographical area.

"Water Act," as used in this clause, means Clean Water Act (33 U.S.C. 1251, et seq.).

(b) The Contractor agrees--

(1) To comply with all the requirements of section 114 of the Clean Air Act (42 U.S.C. 7414) and section 308 of the Clean Water Act (33 U.S.C. 1318) relating to inspection, monitoring, entry, reports, and information, as well as other requirements specified in section 114 and section 308 of the Air Act and the Water Act, and all regulations and guidelines issued to implement those acts before the award of this contract;

(2) That no portion of the work required by this prime contract will be performed in a facility listed on the EPA List of Violating Facilities on the date when this contract was awarded unless and until the EPA eliminates the name of the facility from the listing;

(3) To use best efforts to comply with clean air standards and clean water standards at the facility in which the contract is being performed; and

(4) To insert the substance of this clause into any nonexempt subcontract, including this subparagraph (b)(4).

(End of clause)

(R 7-103.29 1975 OCT)

(R 1-1.2302)

(a) "Hazardous material," as used in this clause, includes any material defined as hazardous under the latest version of Federal Standard No. 313 (including revisions adopted during the term of the contract).

(b) The Offeror must list any hazardous material, as defined in paragraph (a) of this clause, to be delivered under this contract. The hazardous material shall be properly identified and include any applicable identification number, such as National Stock Number or Special Item Number. This information shall also be included on the Material Safety Data Sheet submitted under this contract.

Material	Identification No.
(If none, insert None)	
_____	_____
_____	_____
_____	_____

(c) This list must be updated during performance of the contract whenever the Contractor determines that any other material to be delivered under this contract is hazardous.

(d) The apparently successful Offeror agrees to submit, for each item as required prior to award, a Material Safety Data Sheet, meeting the requirements of 29 CFR 1910.1200(g) and the latest version of Federal Standard No. 313, for all hazardous material identified in paragraph (b) of this clause. Data shall be submitted in accordance with Federal Standard No. 313, whether or not the apparently successful Offeror is the actual manufacturer of these items. Failure to submit the Material Safety Data Sheet prior to award may result in the apparently successful Offeror being considered nonresponsible and ineligible for award.

(e) If, after award, there is a change in the composition of the item(s) or a revision to Federal Standard No. 313, which renders incomplete or inaccurate the data submitted under paragraph (d) of this clause, the Contractor shall promptly notify the Contracting Officer and resubmit the data.

(f) Neither the requirements of this clause nor any act or failure to act by the Government shall relieve the Contractor of any responsibility or liability for the safety of Government, Contractor, or subcontractor personnel or property.

(g) Nothing contained in this clause shall relieve the Contractor from complying with applicable Federal, State, and local laws, codes,

ordinances, and regulations (including the obtaining of licenses and permits) in connection with hazardous material.

(h) The Government's rights in data furnished under this contract with respect to hazardous material are as follows:

(1) To use, duplicate and disclose any data to which this clause is applicable. The purposes of this right are to--

(i) Apprise personnel of the hazards to which they may be exposed in using, handling, packaging, transporting, or disposing of hazardous materials;

(ii) Obtain medical treatment for those affected by the material; and

(iii) Have others use, duplicate, and disclose the data for the Government for these purposes.

(2) To use, duplicate, and disclose data furnished under this clause, in accordance with subparagraph (h)(1) of this clause, in precedence over any other clause of this contract providing for rights in data.

(3) The Government is not precluded from using similar or data acquired from other sources. *

(End of clause)

36 52.223-6 DRUG-FREE WORKPLACE (JAN 1997)

(a) Definitions. As used in this clause--

"Controlled substance" means a controlled substance in schedules I through V of section 202 of the Controlled Substances Act (21 U.S.C. 812) and as further defined in regulation at 21 CFR 1308.11 - 1308.15.

"Conviction" means a finding of guilt (including a plea of nolo contendere) or imposition of sentence, or both, by any judicial body charged with the responsibility to determine violations of the Federal or State criminal drug statutes.

"Criminal drug statute" means a Federal or non-Federal criminal statute involving the manufacture, distribution, dispensing, possession or use of any controlled substance.

"Drug-free workplace" means the site(s) for the performance of work done by the Contractor in connection with a specific contract at which employees of the Contractor are prohibited from engaging in the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance.

"Employee" means an employee of a Contractor directly engaged in the performance of work under a Government contract. "Directly engaged" is defined to include all direct cost employees and any other Contractor

employee who has other than a minimal impact or involvement in contract performance.

"Individual" means an offeror/contractor that has no more than one employee including the offeror/contractor.

(b) The Contractor, if other than an individual, shall--within 30 days after award (unless a longer period is agreed to in writing for contracts of 30 days or more performance duration), or as soon as possible for contracts of less than 30 days performance duration--

(1) Publish a statement notifying its employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the Contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition;

(2) Establish an ongoing drug-free awareness program to inform such employees about--

(i) The dangers of drug abuse in the workplace;

(ii) The Contractor's policy of maintaining a drug-free workplace;

(iii) Any available drug counseling, rehabilitation, and employee assistance programs; and

(iv) The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace;

(3) Provide all employees engaged in performance of the contract with a copy of the statement required by subparagraph (b)(1) of this clause;

(4) Notify such employees in writing in the statement required by subparagraph (b)(1) of this clause that, as a condition of continued employment on this contract, the employee will--

(i) Abide by the terms of the statement; and

(ii) Notify the employer in writing of the employee's conviction under a criminal drug statute for a violation occurring in the workplace no later than 5 days after such conviction.

(5) Notify the Contracting Officer in writing within 10 days after receiving notice under subdivision (b)(4)(ii) of this clause, from an employee or otherwise receiving actual notice of such conviction. The notice shall include the position title of the employee;

(6) Within 30 days after receiving notice under subdivision (b)(4)(ii) of this clause of a conviction, take one of the following actions with respect to any employee who is convicted of a drug abuse violation occurring in the workplace:

(i) Taking appropriate personnel action against such employee, up to and including termination; or

(ii) Require such employee to satisfactorily participate in a drug

abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency, and

(7) Make a good faith effort to maintain a drug-free workplace through implementation of subparagraphs (b)(1) through (b)(6) of this clause.

(c) The Contractor, if an individual, agrees by award of the contract or acceptance of a purchase order, not to engage in the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance while performing this contract.

(d) In addition to other remedies available to the Government, the Contractor's failure to comply with the requirements of paragraph (b) or (c) of this clause may, pursuant to FAR 23.506, render the Contractor subject to suspension of contract payments, termination of the contract for default, and suspension or debarment.

(End of clause)

37 52.223-14 TOXIC CHEMICAL RELEASE REPORTING (OCT 1996)

(a) Unless otherwise exempt, the Contractor, as owner or operator of a facility used in the performance of this contract, shall file by July 1 for the prior calendar year an annual Toxic Chemical Release Inventory Form (Form R) as described in sections 313(a) and (g) of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) (42 U.S.C. 11023(a) and (g)), and section 6607 of the Pollution Prevention Act of 1990 (PPA) (42 U.S.C. 13106). The Contractor shall file, for each facility subject to the Form R filing and reporting requirements, the annual Form R throughout the life of the contract.

(b) A Contractor owned or operated facility used in the performance of this contract is exempt from the requirement to file an annual Form R if--

(1) The facility does not manufacture, process, or otherwise use any toxic chemicals listed under section 313(c) of EPCRA, 42 U.S.C. 11023(c);

(2) The facility does not have 10 or more full-time employees as specified in section 313(b)(1)(A) of EPCRA, 42 U.S.C. 11023(b)(1)(A);

(3) The facility does not meet the reporting thresholds of toxic chemicals established under section 313(f) of EPCRA, 42 U.S.C. 11023(f) (including the alternate thresholds at 40 CFR 372.27, provided an appropriate certification form has been filed with EPA);

(4) The facility does not fall within Standard Industrial Classification Code (SIC) designations 20 through 39 as set forth in

Section 19.102 of the Federal Acquisition Regulation (FAR); or

(5) The facility is not located within any State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the United States Virgin Islands, the Northern Mariana Islands, or any other territory or possession over which the United States has jurisdiction.

(c) If the Contractor has certified to an exemption in accordance with one or more of the criteria in paragraph (b) of this clause, and after award of the contract circumstances change so that any of its owned or operated facilities used in the performance of this contract is no longer exempt--

(1) The Contractor shall notify the Contracting Officer; and

(2) The Contractor, as owner or operator of a facility used in the performance of this contract that is no longer exempt, shall (i) submit a Toxic Chemical Release Inventory Form (Form R) on or before July 1 for the prior calendar year during which the facility becomes eligible; and (ii) continue to file the annual Form R for the life of the contract for such facility.

(d) The Contracting Officer may terminate this contract or take other action as appropriate, if the Contractor fails to comply accurately and fully with the EPCRA and PPA toxic chemical release filing and reporting requirements.

(e) Except for acquisitions of commercial items as defined in FAR Part 2, the Contractor shall--

(1) For competitive subcontracts expected to exceed \$100,000 (including all options), include a solicitation provision substantially the same as the provision at FAR 52.223-13, Certification of Toxic Chemical Release Reporting; and

(2) Include in any resultant subcontract exceeding \$100,000 (including all options), the substance of this clause, except this paragraph (e).

(End of clause)

38 52.225-5 BUY AMERICAN ACT--CONSTRUCTION MATERIALS (JUN 1997)

(a) The Buy American Act (41 U.S.C. 10) provides that the Government give preference to domestic construction material.

"Components," means those articles, materials, and supplies incorporated directly into construction materials.

"Construction materials," means an article, material, or supply brought to the construction site for incorporation into the building or work.

Construction material also includes an item brought to the site pre-assembled from articles, materials or supplies. However, emergency life safety systems, such as emergency lighting, fire alarm, and audio evacuation systems, which are discrete systems incorporated into a public building or work and which are produced as a complete system, shall be evaluated as a single and distinct construction material regardless of when or how the individual parts or components of such systems are delivered to the construction site.

"Domestic construction material," means (1) an unmanufactured construction material mined or produced in the United States, or (2) a construction material manufactured in the United States, if the cost of its components mined, produced, or manufactured in the United States exceeds 50 percent of the cost of all its components. Components of foreign origin of the same class or kind as the construction materials determined to be unavailable pursuant to subparagraph 25.202(a)(2) of the Federal Acquisition Regulation (FAR) shall be treated as domestic.

(b)(1) The Buy American Act (41 U.S.C. 10a-10d) requires that only domestic construction material be used in performing this contract, except as provided in paragraphs (b)(2) and (b)(3) of this clause.

(2) This requirement does not apply to the excepted construction material or components listed by the Government as follows:

%%Insert list of applicable accepted materials or indicate "none"

NONE

(3) Other foreign construction material may be added to the list in paragraph (b)(2) of this clause if the Government determines that--

(i) The cost would be unreasonable (the cost of a particular domestic construction material shall be determined to be unreasonable when the cost of such material exceeds the cost of foreign material by more than 6 percent, unless the agency head determines a higher percentage to be appropriate);

(ii) The application of the restriction of the Buy American Act to a particular construction material would be impracticable or inconsistent with the public interest; or

(iii) The construction material is not mined, produced, or manufactured in the United States in sufficient and reasonably available commercial quantities of a satisfactory quality.

(4) The Contractor agrees that only domestic construction material will be used by the Contractor, subcontractors, material men, and suppliers in the performance of this contract, except for foreign construction materials, if any, listed in paragraph (b)(2) of this clause.

(c) Request for determination. (1) Contractors requesting to use foreign

construction material under paragraph (b)(3) of this clause shall provide adequate information for Government evaluation of the request for a determination regarding the inapplicability of the Buy American Act. Each submission shall include a description of the foreign and domestic construction materials, including unit of measure, quantity, price, time of delivery or availability, location of the construction project, name and address of the proposed contractor, and a detailed justification of the reason for use of foreign materials cited in accordance with paragraph (b)(3) of this clause. A submission based on unreasonable cost shall include a reasonable survey of the market and a completed price comparison table in the format in paragraph (d) of this clause. The price of construction material shall include all delivery costs to the construction site and any applicable duty (whether or not a duty-free certificate may be issued).

(2) If the Government determines after contract award that an exception to the Buy American Act applies, the contract shall be modified to allow use of the foreign construction material, and adequate consideration shall be negotiated. However, when the basis for the exception is the unreasonable price of a domestic construction material, adequate consideration shall not be less than the differential established in paragraph (b)(3)(i) of this clause.

(3) If the Government does not determine that an exception to the Buy American Act applies, the use of that particular foreign construction material will be a failure to comply with the Act.

(d) For evaluation of requests under paragraph (c) of this clause based on unreasonable cost, the following information and any applicable supporting data based on the survey of suppliers shall be included in the request:

Foreign and Domestic Construction Materials Price Comparison

Construction material description	Unit of measure	Quantity	Price (dollars) +
Item 1:			
Foreign construction material.....
Domestic construction material.....
Item 2:			
Foreign construction material.....
Domestic construction material.....

List name, address, telephone number, and contact for suppliers surveyed. Attach copy of response; if oral, attach summary. Include other

applicable supporting information.

+ Include all delivery costs to the construction site and any applicable duty (whether or not a duty-free entry certificate is issued).

(End of clause)

39 52.225-11 RESTRICTIONS ON CERTAIN FOREIGN PURCHASES (OCT 1996)

(a) Unless advance written approval of the Contracting Officer is obtained, the Contractor shall not acquire, for use in the performance of this contract, any supplies or services originating from sources within, or that were located in or transported from or through, countries whose products are banned from importation into the United States under regulations of the Office of Foreign Assets Control, Department of the Treasury. Those countries include Cuba, Iran, Iraq, Libya, and North Korea.

(b) The Contractor shall not acquire for use in the performance of this contract any supplies or services from entities controlled by the Government of Iraq.

(c) The Contractor agrees to insert the provisions of this clause, including this paragraph (c), in all subcontracts hereunder.

(End of clause)

40 52.226-1 UTILIZATION OF INDIAN ORGANIZATIONS AND INDIAN-OWNED ECONOMIC ENTERPRISES
(SEP 1996)

(a) For Department of Defense contracts, this clause applies only if the contract includes a subcontracting plan incorporated under the terms of the clause at 52.219-9, Small, Small Disadvantaged and Women-Owned Small Business Subcontracting Plan. It does not apply to contracts awarded based on a subcontracting plan submitted and approved under paragraph (g) of the clause at 52.219

(b) Definitions. As used in this clause:

"Indian" means any person who is a member of any Indian tribe, band, group, pueblo or community which is recognized by the Federal Government as eligible for services from the Bureau of Indian Affairs (BIA) in accordance with 25 U.S.C. 1452(c) and any "Native" as defined in the Alaska Native Claims Settlement Act (43 U.S.C. 1601).

"Indian organization" means the governing body of any Indian tribe or

entity established or recognized by the governing body of an Indian tribe for the purposes of 25 U.S.C., Chapter 17.

"Indian-owned economic enterprise" means any Indian-owned (as determined by the Secretary of the Interior) commercial, industrial, or business activity established or organized for the purpose of profit, provided that Indian ownership shall constitute not less than 51 percent of the enterprise.

"Indian tribe" means any Indian tribe, band, group, pueblo or community, including native villages and native groups (including corporations organized by Kenai, Juneau, Sitka, and Kodiak) as defined in the Alaska Native Claims Settlement Act, which is recognized by the Federal Government as eligible for services from BIA in accordance with 25 U.S.C. 1542(c).

"Interested party" means a prime contractor or an actual or prospective offeror whose direct economic interest would be affected by the award of a subcontract or by the failure to award a subcontract.

(c) The Contractor agrees to use its best efforts to give Indian organizations and Indian-owned economic enterprises (25 U.S.C. 1544) the maximum practicable opportunity to participate in the subcontracts it awards to the fullest extent consistent with efficient performance of its contract.

(1) The Contracting Officer and the Contractor, acting in good faith, may rely on the self-certification of an Indian organization or Indian-owned economic enterprise as to its eligibility, unless an interested party challenges its status or the Contracting Officer has independent reason to question that status. In the event of a challenge to the self-certification of a subcontractor, the Contracting Officer shall refer the matter to the U.S. Department of the Interior, Bureau of Indian Affairs (BIA), Attn: Chief, Division of Contracting and Grants Administration, 1849 C Street, NW, MS-334A-SIB, Washington, DC 20245. The BIA will determine the eligibility and notify the Contracting Officer. The 5 percent incentive payment will not be made within 50 working days of subcontract award or while a challenge is pending. If a subcontractor is determined to be an ineligible participant, no incentive payment will be made under the Indian Incentive Program.

(2) The Contractor may request an adjustment under the Indian Incentive Program to the following:

(i) The estimated cost of a cost-type contract.

(ii) The target cost of a cost-plus-incentive-fee prime contract.

(iii) The target cost and ceiling price of a fixed-price incentive prime contract.

(iv) The price of a firm-fixed-price prime contract.

(3) The amount of the equitable adjustment to the prime contract shall be 5 percent of the estimated cost, target cost or firm-fixed-price included in the subcontract initially awarded to the Indian organization or Indian-owned economic enterprise.

(4) The Contractor has the burden of proving the amount claimed and must assert its request for an adjustment prior to completion of contract performance.

(d) The Contracting Officer, subject to the terms and conditions of the contract and the availability of funds, shall authorize an incentive payment of 5 percent of the amount paid to the subcontractor. Contracting Officers shall seek funding in accordance with agency procedures. The Contracting Officer's decision is final and not subject to the Disputes clause of this contract.

(End of clause)

41 52.227-1 AUTHORIZATION AND CONSENT (JUL 1995)

(a) The Government authorizes and consents to all use and manufacture, in performing this contract or any subcontract at any tier, of any invention described in and covered by a United States patent (1) embodied in the structure or composition of any article the delivery of which is accepted by the Government under this contract or (2) used in machinery, tools, or methods whose use necessarily results from compliance by the Contractor or a subcontractor with (i) specifications or written provisions forming a part of this contract or (ii) specific written instructions given by the Contracting Officer directing the manner of performance. The entire liability to the Government for infringement of a patent of the United States shall be determined solely by the provisions of the indemnity clause, if any, included in this contract or any subcontract hereunder (including any lower-tier subcontract), and the Government assumes liability for all other infringement to the extent of the authorization and consent hereinabove granted.

(b) The Contractor agrees to include, and require inclusion of, this clause, suitably modified to identify the parties, in all subcontracts at any tier for supplies or services (including construction, architect-engineer services, and materials, supplies, models, samples, and design or testing services expected to exceed the simplified acquisition threshold); however, omission of this clause from any subcontract, including those at or below the simplified acquisition threshold, does not

affect this authorization and consent.

(End of clause)

42 52.227-4 PATENT INDEMNITY--CONSTRUCTION CONTRACTS (APR 1984)

Except as otherwise provided, the Contractor agrees to indemnify the Government and its officers, agents, and employees against liability, including costs and expenses, for infringement upon any United States patent (except a patent issued upon an application that is now or may hereafter be withheld from issue pursuant to a Secrecy Order under 35 U.S.C. 181) arising out of performing this contract or out of the use or disposal by or for the account of the Government of supplies furnished or work performed under this contract.

(End of clause)

(R 7-602.16 1964 JUN)

43 52.228-1 BID GUARANTEE (SEP 1996)

(a) Failure to furnish a bid guarantee in the proper form and amount, by the time set for opening of bids, may be cause for rejection of the bid.

(b) The bidder shall furnish a bid guarantee in the form of a firm commitment, e.g., bid bond supported by good and sufficient surety or sureties acceptable to the Government, postal money order, certified check, cashier's check, irrevocable letter of credit, or, under Treasury Department regulations, certain bonds or notes of the United States. The Contracting Officer will return bid guarantees, other than bid bonds, (1) to unsuccessful bidders as soon as practicable after the opening of bids, and (2) to the successful bidder upon execution of contractual documents and bonds (including any necessary coinsurance or reinsurance agreements), as required by the bid as accepted.

(c) The amount of the bid guarantee shall be 20 percent of the bid price or \$3,000,000, whichever is less.

(d) If the successful bidder, upon acceptance of its bid by the Government within the period specified for acceptance, fails to execute all contractual documents or furnish executed bond(s) within 10 days after receipt of the forms by the bidder, the Contracting Officer may terminate the contract for default.

(e) In the event the contract is terminated for default, the

bidder is liable for any cost of acquiring the work that exceeds the amount of its bid, and the bid guarantee is available to offset the difference.
(End of provision)

44 52.228-2 ADDITIONAL BOND SECURITY (JUN 1996)

The Contractor shall promptly furnish additional security required to protect the Government and persons supplying labor or materials under this contract if--

(a) Any surety upon any bond, or issuing financial institution for other security, furnished with this contract becomes unacceptable to the Government;

(b) Any surety fails to furnish reports on its financial condition as required by the Government;

(c) The contract price is increased so that the penal sum of any bond becomes inadequate in the opinion of the Contracting Officer; or

(d) The contract performance period is extended and an irrevocable letter of credit (ILC) is used as security. If the Contractor does not furnish an acceptable extension or replacement ILC, or other acceptable substitute, at least 30 days before an ILC's scheduled expiration, the Contracting Officer has the right to immediately draw on the ILC.

(End of clause)

45 52.228-5 INSURANCE--WORK ON A GOVERNMENT INSTALLATION (JAN 1997)

(a) The Contractor shall, at its own expense, provide and maintain during the entire performance of this contract, at least the kinds and minimum amounts of insurance required in the Schedule or elsewhere in the contract.

(b) Before commencing work under this contract, the Contractor shall notify the Contracting Officer in writing that the required insurance has been obtained. The policies evidencing required insurance shall contain an endorsement to the effect that any cancellation or any material change adversely affecting the Government's interest shall not be effective (1) for such period as the laws of the State in which this contract is to be performed prescribe, or (2) until 30 days after the insurer or the Contractor gives written notice to the Contracting Officer, whichever period is longer.

(c) The Contractor shall insert the substance of this clause, including this paragraph (c), in subcontracts under this contract that require work on a Government installation and shall require subcontractors to provide and maintain the insurance required in the Schedule or elsewhere in the contract. The Contractor shall maintain a copy of all subcontractors' proofs of required insurance, and shall make copies available to the Contracting Officer upon request.

(End of clause)

46 52.228-11 PLEDGES OF ASSETS (FEB 1992)

(a) Offerors shall obtain from each person acting as an individual surety on a bid guarantee, a performance bond, or a payment bond--

(1) Pledge of assets; and

(2) Standard Form 28, Affidavit of Individual Surety.

(b) Pledges of assets from each person acting as an individual surety shall be in the form of--

(1) Evidence of an escrow account containing cash, certificates of deposit, commercial or Government securities, or other assets described in FAR 28.203-2 (except see 28.203-2(b)(2) with respect to Government securities held in book entry form) and/or;

(2) A recorded lien on real estate. The offeror will be required to provide--

(i) Evidence of title in the form of a certificate of title prepared by a title insurance company approved by the United States Department of Justice. This title evidence must show fee simple title vested in the surety along with any concurrent owners; whether any real estate taxes are due and payable; and any recorded encumbrances against the property, including the lien filed in favor of the Government as required by FAR 28.203-3(d);

(ii) Evidence of the amount due under any encumbrance shown in the evidence of title;

(iii) A copy of the current real estate tax assessment of the property or a current appraisal dated no earlier than 6 months prior to the date of the bond, prepared by a professional appraiser who certifies that the appraisal has been conducted in accordance with the generally accepted appraisal standards as reflected in the Uniform Standards of Professional Appraisal Practice, as promulgated by the Appraisal Foundation.

(End of clause)

47 52.228-12 PROSPECTIVE SUBCONTRACTOR REQUESTS FOR BONDS (OCT 1995)

In accordance with Section 806(a)(3) of Pub. L. 102-190, as amended by Sections 2091 and 8105 of Pub. L. 103-355, upon the request of a prospective subcontractor or supplier offering to furnish labor or material for the performance of this contract for which a payment bond has been furnished to the Government pursuant to the Miller Act, the Contractor shall promptly provide a copy of such payment bond to the requester.

(End of clause)

48 REQUIREMENT FOR "PAYMENT AND PERFORMANCE BONDS" OR "PAYMENT BONDS ONLY"

If the resulting contract is awarded for an amount in excess of \$100,000, the contractor shall be required to provide both payment and performance bonds in accordance with FAR 52.228-15, "Performance and Payment Bonds--Construction." FAR 52.228-15 applies only to those contracts awarded for an amount in excess of \$100,000.

If the resulting contract is awarded for an amount in excess of \$25,000 but no more than \$100,000, the contractor shall not be required to provide a performance bond. The required payment bond shall be provided in accordance with FAR 52.228-13, "Alternative Payment Protections." FAR 52.228-13 applies only to those contracts awarded for an amount in excess of \$25,000 by no more than \$100,000.

Neither payment nor performance bonds are required for contracts awarded for an amount less than \$25,000.

49 52.228-13 ALTERNATIVE PAYMENT PROTECTIONS (JUN 1996)

- (a) The Contractor shall submit one of the following payment protections:
 - (i) a payment bond; or
 - (b) The penal sum of the payment protection shall be in the amount of \$50,000 or 50% of contract amount, whichever is less.
 - (c) The submission of the payment protection is required by the 10th calendar day after date of award

(d) The payment protection shall provide protection for the full contract performance period plus a one-year period.

(e) Except for escrow agreements and payment bonds, which provide their own protection procedures, the Contracting Officer is authorized to access funds under the payment protection when it has been alleged in writing by a supplier of labor or material that a nonpayment has occurred, and to withhold such funds pending resolution by administrative or judicial proceedings or mutual agreement of the parties.

(f) When a tripartite escrow agreement is used, the Contractor shall utilize only suppliers of labor and material who signed the escrow agreement.

(End of clause)

50 52.228-14 IRREVOCABLE LETTER OF CREDIT (JUN 1996)

(a) Irrevocable letter of credit (ILC), as used in this clause, means a written commitment by a federally insured financial institution to pay a stated amount of money on demand to the Government (the beneficiary), until the expiration date of the letter. Neither the financial institution nor the offeror/Contractor can revoke or condition the letter of credit.

(b) If the offeror intends to use an ILC in lieu of a bid bond, or to support other types of bonds such as performance and payment bonds, the letter of credit and letter of confirmation formats in paragraphs (e) and (f) of this clause shall be used.

(c) The letter of credit shall be irrevocable, unconditional, issued by an acceptable federally insured financial institution as provided in paragraph (d) of this clause, and--

(1) If used as a bid guarantee, the ILC shall expire no earlier than 60 days after the close of the bid acceptance period;

(2) If used to secure a performance or payment bond, the offeror/Contractor may submit an ILC to cover the entire period of performance or may submit an ILC with an initial expiration date which is a minimum period of one year from the date of issuance, with a provision which states that the ILC is automatically extended without amendment for one year from the expiration date, or any future expiration date, until the period of performance is completed. The final expiration date shall be:

(i) For contracts subject to the Miller Act, the later of--

(A) One year following the expected date of final payment;

(B) For performance bonds only, until completion of any warranty

period; or

(C) For payment bonds only, until resolution of all claims filed against the payment bond during the one-year period following final payment.

(ii) For contracts not subject to the Miller Act, the later of--

(A) 90 days following final payment; or

(B) Until completion of any warranty period for performance bonds only.

(d) The ILC shall be issued or confirmed by a federally insured financial institution rated investment grade or higher. The offeror/Contractor shall provide the Contracting Officer a credit rating that indicates the financial institution has the required rating(s) as of the date of issuance of the ILC. ILCs over \$5 million must be confirmed by another acceptable financial institution that had letter of credit business of at least \$25 million in the past year.

(e) The following format shall be used by the issuing financial institution to create an ILC:

(Issuing Financial Institution's Letterhead or Name and Address)

Issue Date _____

Irrevocable Letter of Credit No. _____

Account party's name _____

Account party's address _____

For Solicitation No. _____

(For reference only)

TO: (U.S. Government agency)

(U.S. Government agency's address)

1. We hereby establish this irrevocable, unconditional, and transferable Letter of Credit in your favor for one or more drawings up to United States \$ _____. This Letter of Credit is payable at (issuing financial institution's and, if any, confirming financial institution's) office at (issuing financial institution's address and, if any, confirming financial institution's address) and expires with our close of business on _____, or any automatically extended expiration date.

2. We hereby undertake to honor your or transferee's sight draft(s) drawn on issuing and, if any, confirming financial institution, for all or any part of this credit that is presented at the office specified in

paragraph 1 of this Letter of Credit on or before the expiration date or any automatically extended expiration date.

3. (This paragraph is omitted if used as a bid guarantee, and subsequent paragraphs are renumbered.) It is a condition of this Letter of Credit that it is deemed to be automatically extended without amendment for one year from the expiration date hereof, or any future expiration date, unless at least 60 days prior to any expiration date, we notify you or the transferee by registered mail, or other receipted means of delivery, that we elect not to consider this Letter of Credit renewed for any such additional period. At the time we notify you, we also agree to notify the account party (and confirming financial institution, if any) by the same means of delivery.

4. This Letter of Credit is transferable. Transfers and assignments of proceeds are to be effected without charge to either the beneficiary or the transferee/assignee of proceeds.

5. This Letter of Credit is subject to the Uniform Customs and Practice (UCP) for Documentary Credits, 1993 Revision, International Chamber of Commerce Publication No. 500, and to the extent not inconsistent therewith, to the laws of _____ (state of confirming financial institution, if any, otherwise state of issuing financial institution).

6. If this credit expires during an interruption of business of this financial institution as described in Article 19 of the UCP, the financial institution specifically agrees to effect payment if this credit is drawn against within 30 calendar days after the resumption of our business.

Sincerely,
(Issuing financial institution)

(f) The following format shall be used by the financial institution to confirm an ILC:

(Confirming Financial Institution's Letterhead or Name and Address)

Date _____ 19____

Our Letter of Credit Advice Number _____

Beneficiary: _____

(U.S. Government agency)

Issuing Financial Institution: _____

Issuing Financial Institution's LC No.: _____

Gentlemen:

1. We hereby confirm the above indicated Letter of Credit, the original of which is attached, issued by _____ (name of issuing financial institution) for drawings of up to United States dollars _____/U.S. \$ _____ and expiring with our close of business on _____ (the expiration date), or any automatically extended expiration date.

2. Draft(s) drawn under the Letter of Credit and this Confirmation are payable at our office located at _____.

3. We hereby undertake to honor sight draft(s) drawn under the Letter of Credit and this Confirmation if presented at our offices as specified herein.

4. (This paragraph is omitted if used as a bid guarantee, and subsequent paragraphs are renumbered.) It is a condition of this confirmation that it be deemed automatically extended without amendment for one year from the expiration date hereof, or any automatically extended expiration date, unless:

(a) At least sixty (60) days prior to any such expiration date we shall notify the Contracting Officer, or the transferee and the issuing financial institution, by registered mail or other receipted means of delivery, that we elect not to consider this confirmation extended for any such additional period; or

(b) The issuing financial institution shall have exercised its right to notify you or the transferee, the account party, and ourselves, of its election not to extend the expiration date of the Letter of Credit.

5. This confirmation is subject to the Uniform Customs and Practice (UCP) for Documentary Credits, 1993 Revision, International Chamber of Commerce Publication No. 500, and to the extent not inconsistent therewith, to the laws of _____ (state of confirming financial institution).

6. If this confirmation expires during an interruption of business of this financial institution as described in Article 19 of the UCP, we specifically agree to effect payment if this credit is drawn against within 30 calendar days after the resumption of our business.

Sincerely,

(Confirming financial institution)

(g) The following format shall be used by the Contracting Officer for a sight draft to draw on the Letter of Credit:

SIGHT DRAFT

(City, State)

_____, 19____

(Name and address of financial institution)
Pay to the order of _____
(Beneficiary Agency)
the sum of United States \$ _____
This draft is drawn under _____
Irrevocable Letter of Credit No. _____
By: _____
(Beneficiary Agency)
(End of clause)

51 52.228-15 Performance and Payment Bonds--Construction (SEP 1996)

(a) Definitions. As used in this clause--

Contract price means the award price of the contract or, for requirements contracts, the price payable for the estimated quantity; or for indefinite-delivery type contracts, the price payable for the specified minimum quantity.

(b) Unless the resulting contract price is \$100,000 or less, the successful offeror shall be required to furnish performance and payment bonds to the Contracting Officer as follows:

(1) Performance Bonds (Standard Form 25):

(i) The penal amount of performance bonds shall be 100 percent of the original contract price.

(ii) The Government may require additional performance bond protection when the contract price is increased. The increase in protection shall generally equal 100 percent of the increase in contract price.

(iii) The Government may secure additional protection by directing the Contractor to increase the penal amount of the existing bond or to obtain an additional bond.

(2) Payment Bonds (Standard Form 25-A):

(i) The penal amount of payment bonds shall equal--

(A) 50 percent of the contract price if the contract price is not more than \$1 million;

(B) 40 percent of the contract price if the contract price is more than \$1 million but not more than \$5 million; or

(C) \$2.5 million if the contract price is more than \$5 million.

(ii) If the original contract price is \$5 million or less, the Government may require additional protection if the contract price is increased. The penal amount of the total protection shall meet the requirement of subparagraph (b)(2)(i) of this clause.

(iii) The Government may secure additional protection by directing the Contractor to increase the penal sum of the existing bond or to obtain an additional bond.

(c) The Contractor shall furnish all executed bonds, including any necessary reinsurance agreements, to the Contracting Officer, within the time period specified in the Bid Guarantee provision of the solicitation, or otherwise specified by the Contracting Officer, but in any event, before starting work.

(d) The bonds shall be in the form of firm commitment, supported by corporate sureties whose names appear on the list contained in Treasury Department Circular 570, individual sureties, or by other acceptable security such as postal money order, certified check, cashier's check, irrevocable letter of credit, or, in accordance with Treasury Department regulations, certain bonds or notes of the United States. Treasury Circular 570 is published in the Federal Register, or may be obtained from the U.S. Department of Treasury, Financial Management Service, Surety Bond Branch, 401 14th Street, NW., 2nd Floor, West Wing, Washington, DC 20227.

(End of clause)

52 52.229-3 FEDERAL, STATE, AND LOCAL TAXES (JAN 1991)

(a) "Contract date," as used in this clause, means the date set for bid opening or, if this is a negotiated contract or a modification, the effective date of this contract or modification.

"All applicable Federal, State, and local taxes and duties," as used in this clause, means all taxes and duties, in effect on the contract date, that the taxing authority is imposing and collecting on the transactions or property covered by this contract.

"After-imposed Federal tax," as used in this clause, means any new or increased Federal excise tax or duty, or tax that was exempted or excluded on the contract date but whose exemption was later revoked or reduced during the contract period, on the transactions or property covered by this contract that the Contractor is required to pay or bear as the result of legislative, judicial, or administrative action taking effect after the contract date. It does not include social security tax or other employment taxes.

"After-relieved Federal tax," as used in this clause, means any amount of Federal excise tax or duty, except social security or other employment taxes, that would otherwise have been payable on the transactions or property covered by this contract, but which the Contractor is not required to pay or bear, or for which the Contractor obtains a refund or drawback, as the result of legislative, judicial, or administrative action taking effect after the contract date.

(b) The contract price includes all applicable Federal, State, and local taxes and duties.

(c) The contract price shall be increased by the amount of any after-imposed Federal tax, provided the Contractor warrants in writing that no amount for such newly imposed Federal excise tax or duty or rate increase was included in the contract price, as a contingency reserve or otherwise.

(d) The contract price shall be decreased by the amount of any after-relieved Federal tax.

(e) The contract price shall be decreased by the amount of any Federal excise tax or duty, except social security or other employment taxes, that the Contractor is required to pay or bear, or does not obtain a refund of, through the Contractor's fault, negligence, or failure to follow instructions of the Contracting Officer.

(f) No adjustment shall be made in the contract price under this clause unless the amount of the adjustment exceeds \$250.

(g) The Contractor shall promptly notify the Contracting Officer of all matters relating to any Federal excise tax or duty that reasonably may be expected to result in either an increase or decrease in the contract price and shall take appropriate action as the Contracting Officer directs.

(h) The Government shall, without liability, furnish evidence appropriate to establish exemption from any Federal, State, or local tax when the Contractor requests such evidence and a reasonable basis exists to sustain the exemption.

(End of clause)

53 52.232-5 PAYMENTS UNDER FIXED-PRICE CONSTRUCTION CONTRACTS (MAY 1997)

(a) Payment of price. The Government shall pay the Contractor the contract price as provided in this contract.

(b) Progress payments. The Government shall make progress payments monthly as the work proceeds, or at more frequent intervals as determined by the Contracting Officer, on estimates of work accomplished which meets the standards of quality established under the contract, as approved by the

Contracting Officer.

(1) The Contractor's request for progress payments shall include the following substantiation:

(i) An itemization of the amounts requested, related to the various elements of work required by the contract covered by the payment requested.

(ii) A listing of the amount included for work performed by each subcontractor under the contract.

(iii) A listing of the total amount of each subcontract under the contract.

(iv) A listing of the amounts previously paid to each such subcontractor under the contract.

(v) Additional supporting data in a form and detail required by the Contracting Officer.

(2) In the preparation of estimates, the Contracting Officer may authorize material delivered on the site and preparatory work done to be taken into consideration. Material delivered to the Contractor at locations other than the site also may be taken into consideration if--

(i) Consideration is specifically authorized by this contract; and

(ii) The Contractor furnishes satisfactory evidence that it has acquired title to such material and that the material will be used to perform this contract.

(c) Contractor certification. Along with each request for progress payments, the Contractor shall furnish the following certification, or payment shall not be made: (However, if the Contractor elects to delete paragraph (c)(4) from the certification, the certification is still acceptable.)

I hereby certify, to the best of my knowledge and belief, that--

(1) The amounts requested are only for performance in accordance with the specifications, terms, and conditions of the contract;

(2) Payments to subcontractors and suppliers have been made from previous payments received under the contract, and timely payments will be made from the proceeds of the payment covered by this certification, in accordance with subcontract agreements and the requirements of chapter 39 of Title 31, United States Code;

(3) This request for progress payments does not include any amounts which the prime contractor intends to withhold or retain from a subcontractor or supplier in accordance with the terms and conditions of the subcontract; and

(4) This certification is not to be construed as final acceptance of a subcontractor's performance.

(Name)

(Title)

(Date)

(d) Refund of unearned amounts. If the Contractor, after making a certified request for progress payments, discovers that a portion or all of such request constitutes a payment for performance by the Contractor that fails to conform to the specifications, terms, and conditions of this contract (hereinafter referred to as the "unearned amount"), the Contractor shall--

- (1) Notify the Contracting Officer of such performance deficiency; and
- (2) Be obligated to pay the Government an amount (computed by the Contracting Officer in the manner provided in paragraph (j) of this clause) equal to interest on the unearned amount from the 8th day after the date of receipt of the unearned amount until--

(i) The date the Contractor notifies the Contracting Officer that the performance deficiency has been corrected; or

(ii) The date the Contractor reduces the amount of any subsequent certified request for progress payments by an amount equal to the unearned amount.

(e) Retainage. If the Contracting Officer finds that satisfactory progress was achieved during any period for which a progress payment is to be made, the Contracting Officer shall authorize payment to be made in full. However, if satisfactory progress has not been made, the Contracting Officer may retain a maximum of 10 percent of the amount of the payment until satisfactory progress is achieved. When the work is substantially complete, the Contracting Officer may retain from previously withheld funds and future progress payments that amount the Contracting Officer considers adequate for protection of the Government and shall release to the Contractor all the remaining withheld funds. Also, on completion and acceptance of each separate building, public work, or other division of the contract, for which the price is stated separately in the contract, payment shall be made for the completed work without retention of a percentage.

(f) Title, liability, and reservation of rights. All material and work covered by progress payments made shall, at the time of payment, become the sole property of the Government, but this shall not be construed as--

- (1) Relieving the Contractor from the sole responsibility for all material and work upon which payments have been made or the restoration of any damaged work; or

(2) Waiving the right of the Government to require the fulfillment of all of the terms of the contract.

(g) Reimbursement for bond premiums. In making these progress payments, the Government shall, upon request, reimburse the Contractor for the amount of premiums paid for performance and payment bonds (including coinsurance and reinsurance agreements, when applicable) after the Contractor has furnished evidence of full payment to the surety. The retainage provisions in paragraph (e) of this clause shall not apply to that portion of progress payments attributable to bond premiums.

(h) Final payment. The Government shall pay the amount due the Contractor under this contract after--

(1) Completion and acceptance of all work;

(2) Presentation of a properly executed voucher; and

(3) Presentation of release of all claims against the Government arising by virtue of this contract, other than claims, in stated amounts, that the Contractor has specifically excepted from the operation of the release. A release may also be required of the assignee if the Contractor's claim to amounts payable under this contract has been assigned under the Assignment of Claims Act of 1940 (31 U.S.C. 3727 and 41 U.S.C. 15).

(i) Limitation because of undefinitized work. Notwithstanding any provision of this contract, progress payments shall not exceed 80 percent on work accomplished on undefinitized contract actions. A "contract action" is any action resulting in a contract, as defined in FAR Subpart 2.1, including contract modifications for additional supplies or services, but not including contract modifications that are within the scope and under the terms of the contract, such as contract modifications issued pursuant to the Changes clause, or funding and other administrative changes.

(j) Interest computation on unearned amounts. In accordance with 31 U.S.C. 3903(c)(1), the amount payable under subparagraph (d)(2) of this clause shall be--

(1) Computed at the rate of average bond equivalent rates of 91-day Treasury bills auctioned at the most recent auction of such bills prior to the date the Contractor receives the unearned amount; and

(2) Deducted from the next available payment to the Contractor.

(End of clause)

(a) Except as otherwise provided in this contract under a Price Reduction for Defective Cost or Pricing Data clause or a Cost Accounting Standards clause, all amounts that become payable by the Contractor to the Government under this contract (net of any applicable tax credit under the Internal Revenue Code (26 U.S.C. 1481)) shall bear simple interest from the date due until paid unless paid within 30 days of becoming due. The interest rate shall be the interest rate established by the Secretary of the Treasury as provided in Section 12 of the Contract Disputes Act of 1978 (Public Law 95-563), which is applicable to the period in which the amount becomes due, as provided in paragraph (b) of this clause, and then at the rate applicable for each six-month period as fixed by the Secretary until the amount is paid.

(b) Amounts shall be due at the earliest of the following dates:

(1) The date fixed under this contract.

(2) The date of the first written demand for payment consistent with this contract, including any demand resulting from a default termination.

(3) The date the Government transmits to the Contractor a proposed supplemental agreement to confirm completed negotiations establishing the amount of debt.

(4) If this contract provides for revision of prices, the date of written notice to the Contractor stating the amount of refund payable in connection with a pricing proposal or a negotiated pricing agreement not confirmed by contract modification.

(c) The interest charge made under this clause may be reduced under the procedures prescribed in 32.614-2 of the Federal Acquisition Regulation in effect on the date of this contract.

(End of clause)

55 52.232-23 ASSIGNMENT OF CLAIMS (JAN 1986)

(a) The Contractor, under the Assignment of Claims Act, as amended, 31 U.S.C. 3727, 41 U.S.C. 15 (hereafter referred to as "the Act"), may assign its rights to be paid amounts due or to become due as a result of the performance of this contract to a bank, trust company, or other financing institution, including any Federal lending agency. The assignee under such an assignment may thereafter further assign or reassign its right under the original assignment to any type of financing institution described in the preceding sentence.

(b) Any assignment or reassignment authorized under the Act and this clause shall cover all unpaid amounts payable under this contract, and

shall not be made to more than one party, except that an assignment or reassignment may be made to one party as agent or trustee for two or more parties participating in the financing of this contract.

(c) The Contractor shall not furnish or disclose to any assignee under this contract any classified document (including this contract) or information related to work under this contract until the Contracting Officer authorizes such action in writing.

(End of clause)

56 52.232-27 PROMPT PAYMENT FOR CONSTRUCTION CONTRACTS (APR 1989)

Notwithstanding any other payment terms in this contract, the Government will make invoice payments and contract financing payments under the terms and conditions specified in this clause. Payment shall be considered as being made on the day a check is dated or an electronic funds transfer is made. Definitions of pertinent terms are set forth in 32.902. All days referred to in this clause are calendar days, unless otherwise specified.

(a) Invoice Payments.

(1) For purposes of this clause, there are several types of invoice payments which may occur under this contract, as follows:

(i) Progress payments, if provided for elsewhere in this contract, based on Contracting Officer approval of the estimated amount and value of work or services performed, including payments for reaching milestones in any project:

(A) The due date for making such payments shall be 14 days after receipt of the payment request by the designated billing office. However, if the designated billing office fails to annotate the payment request with the actual date of receipt, the payment due date shall be deemed to be the 14th day after the date the Contractor's payment request is dated, provided a proper payment request is received and there is no disagreement over quantity, quality, or Contractor compliance with contract requirements.

(B) The due date for payment of any amounts retained by the Contracting Officer in accordance with the clause at 52.232-5, Payments Under Fixed-Price Construction Contracts, shall be as specified in the contract or, if not specified, 30 days after approval for release to the Contractor by the Contracting Officer.

(ii) Final payments based on completion and acceptance of all work and presentation of release of all claims against the Government arising by virtue of the contract, and payments for partial deliveries that have been accepted by the Government (e.g., each separate building, public work, or other division of the contract for which the price is stated separately in the contract):

(A) The due date for making such payments shall be either the 30th day after receipt by the designated billing office of a proper invoice from the Contractor, or the 30th day after Government acceptance of the work or services completed by the Contractor, whichever is later. However, if the designated billing office fails to annotate the invoice with the date of actual receipt, the invoice payment due date shall be deemed to be the 30th day after the date the Contractor's invoice is dated, provided a proper invoice is received and there is no disagreement over quantity, quality, or Contractor compliance with contract requirements.

(B) On a final invoice where the payment amount is subject to contract settlement actions (e.g., release of claims), acceptance shall be deemed to have occurred on the effective date of the contract settlement.

(2) An invoice is the Contractor's bill or written request for payment under the contract for work or services performed under the contract. An invoice shall be prepared and submitted to the designated billing office. A proper invoice must include the items listed in subdivisions (a)(2)(i) through (a)(2)(ix) of this clause. If the invoice does not comply with these requirements, the Contractor will be notified of the defect within 7 days after receipt of the invoice at the designated billing office. Untimely notification will be taken into account in the computation of any interest penalty owed the Contractor in the manner described in subparagraph (a)(4) of this clause:

(i) Name and address of the Contractor.

(ii) Invoice date.

(iii) Contract number or other authorization for work or services performed (including order number and contract line item number).

(iv) Description of work or services performed.

(v) Delivery and payment terms (e.g., prompt payment discount terms).

(vi) Name and address of Contractor official to whom payment is to be sent (must be the same as that in the contract or in a proper notice of assignment).

(vii) Name (where practicable), title, phone number, and mailing address of person to be notified in event of a defective invoice.

(viii) For payments described in subdivision (a)(1)(i) of this clause, substantiation of the amounts requested and certification in accordance with the requirements of the clause at 52.232-5, Payments Under Fixed-Price Construction Contracts.

(ix) Any other information or documentation required by the contract.

(3) An interest penalty shall be paid automatically by the designated payment office, without request from the Contractor, if payment is not made by the due date and the conditions listed in subdivisions (a)(3)(i) through (a)(3)(iii) of this clause are met, if applicable.

(i) A proper invoice was received by the designated billing office.

(ii) A receiving report or other Government documentation authorizing payment was processed and there was no disagreement over quantity, quality, Contractor compliance with any contract term or condition, or requested progress payment amount.

(iii) In the case of a final invoice for any balance of funds due the Contractor for work or services performed, the amount was not subject to further contract settlement actions between the Government and the Contractor.

(4) The interest penalty shall be at the rate established by the Secretary of the Treasury under section 12 of the Contract Disputes Act of 1978 (41 U.S.C. 611) that is in effect on the day after the due date, except where the interest penalty is prescribed by other governmental authority. This rate is referred to as the "Renegotiation Board Interest Rate," and it is published in the Federal Register semiannually on or about January 1 and July 1. The interest penalty shall accrue daily on the invoice payment amount approved by the Government and be compounded in 30-day increments inclusive from the first day after the due date through the payment date. That is, interest accrued at the end of any 30-day period will be added to the approved invoice payment amount and be subject to interest

penalties if not paid in the succeeding 30-day period. If the designated billing office failed to notify the Contractor of a defective invoice within the periods prescribed in subparagraph (a)(2) of this clause, then the due date on the corrected invoice will be adjusted by subtracting the number of days taken beyond the prescribed notification of defects period. Any interest penalty owed the Contractor will be based on this adjusted due date. Adjustments will be made by the designated payment office for errors in calculating interest penalties, if requested by the Contractor.

(i) For the sole purpose of computing an interest penalty that might be due the Contractor for payments described in subdivision (a)(1)(ii) of this clause, Government acceptance or approval shall be deemed to have occurred constructively on the 7th day after the Contractor has completed the work or services in accordance with the terms and conditions of the contract. In the event that actual acceptance or approval occurs within the constructive acceptance or approval period, the determination of an interest penalty shall be based on the actual date of acceptance or approval. Constructive acceptance or constructive approval requirements do not apply if there is a disagreement over quantity, quality, or Contractor compliance with a contract provision. These requirements also do not compel Government officials to accept work or services, approve Contractor estimates, perform contract administration functions, or make payment prior to fulfilling their responsibilities.

(ii) The following periods of time will not be included in the determination of an interest penalty:

(A) The period taken to notify the Contractor of defects in invoices submitted to the Government, but this may not exceed 7 days.

(B) The period between the defects notice and resubmission of the corrected invoice by the Contractor.

(iii) Interest penalties will not continue to accrue after the filing of a claim for such penalties under the clause at 52.233-1, Disputes, or for more than 1 year. Interest penalties of less than \$1.00 need not be paid.

(iv) Interest penalties are not required on payment delays due to disagreement between the Government and Contractor over the payment amount or other issues involving contract compliance, or on amounts temporarily withheld or retained in accordance with

the terms of the contract. Claims involving disputes, and any interest that may be payable, will be resolved in accordance with the clause at 52.233-1, Disputes.

(5) An interest penalty shall also be paid automatically by the designated payment office, without request from the Contractor, if a discount for prompt payment is taken improperly. The interest penalty will be calculated on the amount of discount taken for the period beginning with the first day after the end of the discount period through the date when the Contractor is paid.

(6) If this contract was awarded on or after October 1, 1989, a penalty amount, calculated in accordance with regulations issued by the Office of Management and Budget, shall be paid in addition to the interest penalty amount if the Contractor--

(i) Is owed an interest penalty;

(ii) Is not paid the interest penalty within 10 days after the date the invoice amount is paid; and

(iii) Makes a written demand, not later than 40 days after the date the invoice amount is paid, that the agency pay such a penalty.

(b) Contract Financing Payments.

(1) For purposes of this clause, if applicable, "contract financing payment" means a Government disbursement of monies to a Contractor under a contract clause or other authorization prior to acceptance of supplies or services by the Government, other than progress payments based on estimates of amount and value of work performed. Contract financing payments include advance payments and interim payments under cost-type contracts.

(2) If this contract provides for contract financing, requests for payment shall be submitted to the designated billing office as specified in this contract or as directed by the Contracting Officer. Contract financing payments shall be made on the 30th day after receipt of a proper contract financing request by the designated billing office. In the event that an audit or other review of a specific financing request is required to ensure compliance with the terms and conditions of the contract, the designated payment office is not compelled to make payment by the due date specified. For advance payments, loans, or other arrangements that do not involve recurrent submissions of contract financing requests, payment shall be made in accordance with the corresponding contract terms or as

directed by the Contracting Officer. Contract financing payments shall not be assessed an interest penalty for payment delays.

(c) The Contractor shall include in each subcontract for property or services (including a material supplier) for the purpose of performing this contract the following:

(1) A payment clause which obligates the Contractor to pay the subcontractor for satisfactory performance under its subcontract not later than 7 days from receipt of payment out of such amounts as are paid to the Contractor under this contract.

(2) An interest penalty clause which obligates the Contractor to pay to the subcontractor an interest penalty for each payment not made in accordance with the payment clause--

(i) For the period beginning on the day after the required payment date and ending on the date on which payment of the amount due is made; and

(ii) Computed at the rate of interest established by the Secretary of the Treasury, and published in the Federal Register, for interest payments under section 12 of the Contract Disputes Act of 1978 (41 U.S.C. 611) in effect at the time the Contractor accrues the obligation to pay an interest penalty.

(3) A clause requiring each subcontractor to include a payment clause and an interest penalty clause conforming to the standards set forth in subparagraphs (c)(1) and (c)(2) of this clause in each of its subcontracts, and to require each of its subcontractors to include such clauses in their subcontracts with each lower-tier subcontractor or supplier.

(d) The clauses required by paragraph (c) of this clause shall not be construed to impair the right of Contractor or a subcontractor at any tier to negotiate, and to include in their subcontract, provisions which--

(1) Permit the Contractor or a subcontractor to retain (without cause) a specified percentage of each progress payment otherwise due to a subcontractor for satisfactory performance under the subcontract without incurring any obligation to pay a late payment interest penalty, in accordance with terms and conditions agreed to by the parties to the subcontract, giving such recognition as the parties deem appropriate to the ability of a subcontractor to furnish a performance bond and a payment bond;

(2) Permit the Contractor or subcontractor to make a determination that part or all of the subcontractor's request for

payment may be withheld in accordance with the subcontract agreement; and

(3) Permit such withholding without incurring any obligation to pay a late payment penalty if--

(i) A notice conforming to the standards of paragraph (g) of this clause has been previously furnished to the subcontractor; and

(ii) A copy of any notice issued by a Contractor pursuant to subdivision (d)(3)(i) of this clause has been furnished to the Contracting Officer.

(e) If a Contractor, after making a request for payment to the Government but before making a payment to a subcontractor for the subcontractor's performance covered by the payment request, discovers that all or a portion of the payment otherwise due such subcontractor is subject to withholding from the subcontractor in accordance with the subcontract agreement, then the Contractor shall--

(1) Furnish to the subcontractor a notice conforming to the standards of paragraph (g) of this clause as soon as practicable upon ascertaining the cause giving rise to a withholding, but prior to the due date for subcontractor payment;

(2) Furnish to the Contracting Officer, as soon as practicable, a copy of the notice furnished to the subcontractor pursuant to subparagraph (e)(1) of this clause;

(3) Reduce the subcontractor's progress payment by an amount not to exceed the amount specified in the notice of withholding furnished under subparagraph (e)(1) of this clause;

(4) Pay the subcontractor as soon as practicable after the correction of the identified subcontract performance deficiency, and--

(i) Make such payment within--

(A) Seven days after correction of the identified subcontract performance deficiency (unless the funds therefor must be recovered from the Government because of a reduction under subdivision (e)(5)(i)) of this clause; or

(B) Seven days after the Contractor recovers such funds from the Government; or

(ii) Incur an obligation to pay a late payment interest penalty computed at the rate of interest established by the Secretary of the Treasury, and published in the Federal Register, for interest payments under section 12 of the Contracts Disputes

Act of 1978 (41 U.S.C. 611) in effect at the time the Contractor accrues the obligation to pay an interest penalty;

(5) Notify the Contracting Officer upon--

(i) Reduction of the amount of any subsequent certified application for payment; or

(ii) Payment to the subcontractor of any withheld amounts of a progress payment, specifying--

(A) The amounts withheld under subparagraph (e)(1) of this clause; and

(B) The dates that such withholding began and ended; and

(6) Be obligated to pay to the Government an amount equal to interest on the withheld payments (computed in the manner provided in 31 U.S.C. 3903(c)(1)), from the 8th day after receipt of the withheld amounts from the Government until--

(i) The day the identified subcontractor performance deficiency is corrected; or

(ii) The date that any subsequent payment is reduced under subdivision (e)(5)(i) of this clause.

(f)(1) If a Contractor, after making payment to a first-tier subcontractor, receives from a supplier or subcontractor of the first-tier subcontractor (hereafter referred to as a "second-tier subcontractor") a written notice in accordance with section 2 of the Act of August 24, 1935 (40 U.S.C. 270b, Miller Act), asserting a deficiency in such first-tier subcontractor's performance under the contract for which the Contractor may be ultimately liable, and the Contractor determines that all or a portion of future payments otherwise due such first-tier subcontractor is subject to withholding in accordance with the subcontract agreement, then the Contractor may, without incurring an obligation to pay an interest penalty under subparagraph (e)(6) of this clause--

(i) Furnish to the first-tier subcontractor a notice conforming to the standards of paragraph (g) of this clause as soon as practicable upon making such determination; and

(ii) Withhold from the first-tier subcontractor's next available progress payment or payments an amount not to exceed the amount specified in the notice of withholding furnished under subdivision (f)(1)(i) of this clause.

(2) As soon as practicable, but not later than 7 days after receipt of satisfactory written notification that the identified subcontract performance deficiency has been corrected, the

Contractor shall pay the amount withheld under subdivision (f)(1)(ii) of this clause to such first-tier subcontractor, or shall incur an obligation to pay a late payment interest penalty to such first-tier subcontractor computed at the rate of interest established by the Secretary of the Treasury, and published in the Federal Register, for interest payments under section 12 of the Contracts Disputes Act of 1978 (41 U.S.C. 611) in effect at the time the Contractor accrues the obligation to pay an interest penalty.

(g) A written notice of any withholding shall be issued to a subcontractor (with a copy to the Contracting Officer of any such notice issued by the Contractor), specifying--

(1) The amount to be withheld;

(2) The specific causes for the withholding under the terms of the subcontract; and

(3) The remedial actions to be taken by the subcontractor in order to receive payment of the amounts withheld.

(h) The Contractor may not request payment from the Government of any amount withheld or retained in accordance with paragraph (d) of this clause until such time as the Contractor has determined and certified to the Contracting Officer that the subcontractor is entitled to the payment of such amount.

(i) A dispute between the Contractor and subcontractor relating to the amount or entitlement of a subcontractor to a payment or a late payment interest penalty under a clause included in the subcontract pursuant to paragraph (c) of this clause does not constitute a dispute to which the United States is a party. The United States may not be interpleaded in any judicial or administrative proceeding involving such a dispute.

(j) Except as provided in paragraph (i) of this clause, this clause shall not limit or impair any contractual, administrative, or judicial remedies otherwise available to the Contractor or a subcontractor in the event of a dispute involving late payment or nonpayment by the Contractor or deficient subcontract performance or nonperformance by a subcontractor.

(k) The Contractor's obligation to pay an interest penalty to a subcontractor pursuant to the clauses included in a subcontract under paragraph (c) of this clause shall not be construed to be an obligation of the United States for such interest penalty. A cost reimbursement claim may not include any amount for reimbursement of such interest penalty.

(End of clause)

57 52.233-1 DISPUTES (OCT 1995)

(a) This contract is subject to the Contract Disputes Act of 1978, as amended (41 U.S.C. 601-613).

(b) Except as provided in the Act, all disputes arising under or relating to this contract shall be resolved under this clause.

(c) "Claim," as used in this clause, means a written demand or written assertion by one of the contracting parties seeking, as a matter of right, the payment of money in a sum certain, the adjustment or interpretation of contract terms, or other relief arising under or relating to this contract. A claim arising under a contract, unlike a claim relating to that contract, is a claim that can be resolved under a contract clause that provides for the relief sought by the claimant. However, a written demand or written assertion by the Contractor seeking the payment of money exceeding \$100,000 is not a claim under the Act until certified as required by subparagraph (d)(2) of this clause. A voucher, invoice, or other routine request for payment that is not in dispute when submitted is not a claim under the Act. The submission may be converted to a claim under the Act, by complying with the submission and certification requirements of this clause, if it is disputed either as to liability or amount or is not acted upon in a reasonable time.

(d)(1) A claim by the Contractor shall be made in writing and, unless otherwise stated in this contract, submitted within 6 years after accrual of the claim to the Contracting Officer for a written decision. A claim by the Government against the Contractor shall be subject to a written decision by the Contracting Officer.

(2)(i) Contractors shall provide the certification specified in subparagraph (d)(2)(iii) of this clause when submitting any claim--

(A) Exceeding \$100,000; or

(B) Regardless of the amount claimed, when using--

(1) Arbitration conducted pursuant to 5 U.S.C. 575-580; or

(2) Any other alternative means of dispute resolution (ADR) technique that the agency elects to handle in accordance with the Administrative Dispute Resolution Act (ADRA).

(ii) The certification requirement does not apply to issues in controversy that have not been submitted as all or part of a claim.

(iii) The certification shall state as follows:

"I certify that the claim is made in good faith; that the supporting data are accurate and complete to the best of my knowledge and belief; that the amount requested accurately reflects the contract adjustment for which the Contractor believes the Government is liable; and that I am duly authorized to certify the claim on behalf of the Contractor."

(3) The certification may be executed by any person duly authorized to bind the Contractor with respect to the claim.

(e) For Contractor claims of \$100,000 or less, the Contracting Officer must, if requested in writing by the Contractor, render a decision within 60 days of the request. For Contractor-certified claims over \$100,000, the Contracting Officer must, within 60 days, decide the claim or notify the Contractor of the date by which the decision will be made.

(f) The Contracting Officer's decision shall be final unless the Contractor appeals or files a suit as provided in the Act.

(g) If the claim by the Contractor is submitted to the Contracting Officer or a claim by the Government is presented to the Contractor, the parties, by mutual consent, may agree to use ADR. If the Contractor refuses an offer for alternative disputes resolution, the Contractor shall inform the Contracting Officer, in writing, of the Contractor's specific reasons for rejecting the request. When using arbitration conducted pursuant to 5 U.S.C. 575-580, or when using any other ADR technique that the agency elects to handle in accordance with the ADRA, any claim, regardless of amount, shall be accompanied by the certification described in subparagraph (d)(2)(iii) of this clause, and executed in accordance with subparagraph (d)(3) of this clause.

(h) The Government shall pay interest on the amount found due and unpaid from (1) the date that the Contracting Officer receives the claim (certified, if required); or (2) the date that payment otherwise would be due, if that date is later, until the date of payment. With regard to claims having defective certifications, as defined in (FAR) 48 CFR 33.201, interest shall be paid from the date that the Contracting Officer initially receives the claim. Simple interest on claims shall be paid at the rate, fixed by the Secretary of the Treasury as provided in the Act, which is applicable to the period during which the Contracting Officer receives the claim and then at the rate applicable for each 6-month period as fixed by the Treasury Secretary during the pendency of the claim.

(i) The Contractor shall proceed diligently with performance of this contract, pending final resolution of any request for relief, claim,

appeal, or action arising under the contract, and comply with any decision of the Contracting Officer.

(End of clause)

58 52.233-3 PROTEST AFTER AWARD (AUG 1996)

(a) Upon receipt of a notice of protest (as defined in FAR 33.101) or a determination that a protest is likely (see FAR 33.102(d)), the Contracting Officer may, by written order to the Contractor, direct the Contractor to stop performance of the work called for by this contract. The order shall be specifically identified as a stop-work order issued under this clause. Upon receipt of the order, the Contractor shall immediately comply with its terms and take all reasonable steps to minimize the incurrence of costs allocable to the work covered by the order during the period of work stoppage. Upon receipt of the final decision in the protest, the Contracting Officer shall either--

(1) Cancel the stop-work order; or

(2) Terminate the work covered by the order as provided in the Default, or the Termination for Convenience of the Government, clause of this contract.

(b) If a stop-work order issued under this clause is canceled either before or after a final decision in the protest, the Contractor shall resume work. The Contracting Officer shall make an equitable adjustment in the delivery schedule or contract price, or both, and the contract shall be modified, in writing, accordingly, if--

(1) The stop-work order results in an increase in the time required for, or in the Contractor's cost properly allocable to, the performance of any part of this contract; and

(2) The Contractor asserts its right to an adjustment within 30 days after the end of the period of work stoppage; provided, that if the Contracting Officer decides the facts justify the action, the Contracting Officer may receive and act upon a proposal at any time before final payment under this contract.

(c) If a stop-work order is not canceled and the work covered by the order is terminated for the convenience of the Government, the Contracting Officer shall allow reasonable costs resulting from the stop-work order in arriving at the termination settlement.

(d) If a stop-work order is not canceled and the work covered by the order is terminated for default, the Contracting Officer shall allow, by equitable adjustment or otherwise, reasonable costs resulting from the

stop-work order.

(e) The Government's rights to terminate this contract at any time are not affected by action taken under this clause.

(f) If, as the result of the Contractor's intentional or negligent misstatement, misrepresentation, or miscertification, a protest related to this contract is sustained, and the Government pays costs, as provided in FAR 33.102(b)(2) or 33.104(h)(1), the Government may require the Contractor to reimburse the Government the amount of such costs. In addition to any other remedy available, and pursuant to the requirements of Subpart 32.6, the Government may collect this debt by offsetting the amount against any payment due the Contractor under any contract between the Contractor and the Government.

(End of clause)

59 52.236-2 DIFFERING SITE CONDITIONS (APR 1984)

(a) The Contractor shall promptly, and before the conditions are disturbed, give a written notice to the Contracting Officer of (1) subsurface or latent physical conditions at the site which differ materially from those indicated in this contract, or (2) unknown physical conditions at the site, of an unusual nature, which differ materially from those ordinarily encountered and generally recognized as inhering in work of the character provided for in the contract.

(b) The Contracting Officer shall investigate the site conditions promptly after receiving the notice. If the conditions do materially so differ and cause an increase or decrease in the Contractor's cost of, or the time required for, performing any part of the work under this contract, whether or not changed as a result of the conditions, an equitable adjustment shall be made under this clause and the contract modified in writing accordingly.

(c) No request by the Contractor for an equitable adjustment to the contract under this clause shall be allowed, unless the Contractor has given the written notice required; provided, that the time prescribed in (a) above for giving written notice may be extended by the Contracting Officer.

(d) No request by the Contractor for an equitable adjustment to the contract for differing site conditions shall be allowed if made after final payment under this contract.

(End of clause)

(a) The Contractor acknowledges that it has taken steps reasonably necessary to ascertain the nature and location of the work, and that it has investigated and satisfied itself as to the general and local conditions which can affect the work or its cost, including but not limited to (1) conditions bearing upon transportation, disposal, handling, and storage of materials; (2) the availability of labor, water, electric power, and roads; (3) uncertainties of weather, river stages, tides, or similar physical conditions at the site; (4) the conformation and conditions of the ground; and (5) the character of equipment and facilities needed preliminary to and during work performance. The Contractor also acknowledges that it has satisfied itself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, including all exploratory work done by the Government, as well as from the drawings and specifications made a part of this contract. Any failure of the Contractor to take the actions described and acknowledged in this paragraph will not relieve the Contractor from responsibility for estimating properly the difficulty and cost of successfully performing the work, or for proceeding to successfully perform the work without additional expense to the Government.

(b) The Government assumes no responsibility for any conclusions or interpretations made by the Contractor based on the information made available by the Government. Nor does the Government assume responsibility for any understanding reached or representation made concerning conditions which can affect the work by any of its officers or agents before the execution of this contract, unless that understanding or representation is expressly stated in this contract.

(End of clause)

(a) All equipment, material, and articles incorporated into the work covered by this contract shall be new and of the most suitable grade for the purpose intended, unless otherwise specifically provided in this contract. References in the specifications to equipment, material, articles, or patented processes by trade name, make, or catalog number, shall be regarded as establishing a standard of quality and shall not

be construed as limiting competition. The Contractor may, at its option, use any equipment, material, article, or process that, in the judgment of the Contracting Officer, is equal to that named in the specifications, unless otherwise specifically provided in this contract.

(b) The Contractor shall obtain the Contracting Officer's approval of the machinery and mechanical and other equipment to be incorporated into the work. When requesting approval, the Contractor shall furnish to the Contracting Officer the name of the manufacturer, the model number, and other information concerning the performance, capacity, nature, and rating of the machinery and mechanical and other equipment. When required by this contract or by the Contracting Officer, the Contractor shall also obtain the Contracting Officer's approval of the material or articles which the Contractor contemplates incorporating into the work. When requesting approval, the Contractor shall provide full information concerning the material or articles. When directed to do so, the Contractor shall submit samples for approval at the Contractor's expense, with all shipping charges prepaid. Machinery, equipment, material, and articles that do not have the required approval shall be installed or used at the risk of subsequent rejection.

(c) All work under this contract shall be performed in a skillful and workmanlike manner. The Contracting Officer may require, in writing, that the Contractor remove from the work any employee the Contracting Officer deems incompetent, careless, or otherwise objectionable.

(End of clause)

(R 7-602.9 1964 JUN)

62 52.236-6 SUPERINTENDENCE BY THE CONTRACTOR (APR 1984)

At all times during performance of this contract and until the work is completed and accepted, the Contractor shall directly superintend the work or assign and have on the work site a competent superintendent who is satisfactory to the Contracting Officer and has authority to act for the Contractor.

(End of clause)

63 52.236-7 PERMITS AND RESPONSIBILITIES (NOV 1991)

The Contractor shall, without additional expense to the Government, be responsible for obtaining any necessary licenses and permits, and for

complying with any Federal, State, and municipal laws, codes, and regulations applicable to the performance of the work. The Contractor shall also be responsible for all damages to persons or property that occur as a result of the Contractor's fault or negligence. The Contractor shall also be responsible for all materials delivered and work performed until completion and acceptance of the entire work, except for any completed unit of work which may have been accepted under the contract.

(End of clause)

64 52.236-8 OTHER CONTRACTS (APR 1984)

The Government may undertake or award other contracts for additional work at or near the site of the work under this contract. The Contractor shall fully cooperate with the other contractors and with Government employees and shall carefully adapt scheduling and performing the work under this contract to accommodate the additional work, heeding any direction that may be provided by the Contracting Officer. The Contractor shall not commit or permit any act that will interfere with the performance of work by any other contractor or by Government employees.

(End of clause)

65 52.236-9 PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS (APR 1984)

(a) The Contractor shall preserve and protect all structures, equipment, and vegetation (such as trees, shrubs, and grass) on or adjacent to the work site, which are not to be removed and which do not unreasonably interfere with the work required under this contract. The Contractor shall only remove trees when specifically authorized to do so, and shall avoid damaging vegetation that will remain in place. If any limbs or branches of trees are broken during contract performance, or by the careless operation of equipment, or by workmen, the Contractor shall trim those limbs or branches with a clean cut and paint the cut with a tree-pruning compound as directed by the Contracting Officer.

(b) The Contractor shall protect from damage all existing improvements and utilities (1) at or near the work site, and (2) on adjacent property of a third party, the locations of which are made known to or should be known by the Contractor. The Contractor shall repair any damage to those facilities, including those that are the property of a third party,

resulting from failure to comply with the requirements of this contract or failure to exercise reasonable care in performing the work. If the Contractor fails or refuses to repair the damage promptly, the Contracting Officer may have the necessary work performed and charge the cost to the Contractor.

(End of clause)

66 52.236-10 OPERATIONS AND STORAGE AREAS (APR 1984)

(a) The Contractor shall confine all operations (including storage of materials) on Government premises to areas authorized or approved by the Contracting Officer. The Contractor shall hold and save the Government, its officers and agents, free and harmless from liability of any nature occasioned by the Contractor's performance.

(b) Temporary buildings (e.g., storage sheds, shops, offices) and utilities may be erected by the Contractor only with the approval of the Contracting Officer and shall be built with labor and materials furnished by the Contractor without expense to the Government. The temporary buildings and utilities shall remain the property of the Contractor and shall be removed by the Contractor at its expense upon completion of the work. With the written consent of the Contracting Officer, the buildings and utilities may be abandoned and need not be removed.

(c) The Contractor shall, under regulations prescribed by the Contracting Officer, use only established roadways, or use temporary roadways constructed by the Contractor when and as authorized by the Contracting Officer. When materials are transported in prosecuting the work, vehicles shall not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by any Federal, State, or local law or regulation. When it is necessary to cross curbs or sidewalks, the Contractor shall protect them from damage. The Contractor shall repair or pay for the repair of any damaged curbs, sidewalks, or roads.

(End of clause)

67 52.236-11 USE AND POSSESSION PRIOR TO COMPLETION (APR 1984)

(a) The Government shall have the right to take possession of or use any completed or partially completed part of the work. Before taking possession of or using any work, the Contracting Officer shall furnish

the Contractor a list of items of work remaining to be performed or corrected on those portions of the work that the Government intends to take possession of or use. However, failure of the Contracting Officer to list any item of work shall not relieve the Contractor of responsibility for complying with the terms of the contract. The Government's possession or use shall not be deemed an acceptance of any work under the contract.

(b) While the Government has such possession or use, the Contractor shall be relieved of the responsibility for the loss of or damage to the work resulting from the Government's possession or use, notwithstanding the terms of the clause in this contract entitled "Permits and Responsibilities." If prior possession or use by the Government delays the progress of the work or causes additional expense to the Contractor, an equitable adjustment shall be made in the contract price or the time of completion, and the contract shall be modified in writing accordingly.

(End of clause)

68 52.236-12 CLEANING UP (APR 1984)

The Contractor shall at all times keep the work area, including storage areas, free from accumulations of waste materials. Before completing the work, the Contractor shall remove from the work and premises any rubbish, tools, scaffolding, equipment, and materials that are not the property of the Government. Upon completing the work, the Contractor shall leave the work area in a clean, neat, and orderly condition satisfactory to the Contracting Officer.

(End of clause)

69 52.236-13 I ACCIDENT PREVENTION (NOV 1991)--ALTERNATE I (NOV 1991)

(a) The Contractor shall provide and maintain work environments and procedures which will (1) safeguard the public and Government personnel, property, materials, supplies, and equipment exposed to Contractor operations and activities; (2) avoid interruptions of Government operations and delays in project completion dates; and (3) control costs in the performance of this contract.

(b) For these purposes on contracts for construction or dismantling, demolition, or removal of improvements, the Contractor shall--

(1) Provide appropriate safety barricades, signs, and signal lights;

(2) Comply with the standards issued by the Secretary of Labor at 29 CFR Part 1926 and 29 CFR Part 1910; and

(3) Ensure that any additional measures the Contracting Officer determines to be reasonably necessary for the purposes are taken.

(c) If this contract is for construction or dismantling, demolition or removal of improvements with any Department of Defense agency or component, the Contractor shall comply with all pertinent provisions of the latest version of U.S. Army Corps of Engineers Safety and Health Requirements Manual, EM 385-1-1, in effect on the date of the solicitation.

(d) Whenever the Contracting Officer becomes aware of any noncompliance with these requirements or any condition which poses a serious or imminent danger to the health or safety of the public or Government personnel, the Contracting Officer shall notify the Contractor orally, with written confirmation, and request immediate initiation of corrective action. This notice, when delivered to the Contractor or the Contractor's representative at the work site, shall be deemed sufficient notice of the noncompliance and that corrective action is required. After receiving the notice, the Contractor shall immediately take corrective action. If the Contractor fails or refuses to promptly take corrective action, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. The Contractor shall not be entitled to any equitable adjustment of the contract price or extension of the performance schedule on any stop work order issued under this clause.

(e) The Contractor shall insert this clause, including this paragraph (e), with appropriate changes in the designation of the parties, in subcontracts.

(f) Before commencing the work, the Contractor shall--

(1) Submit a written proposed plan for implementing this clause. The plan shall include an analysis of the significant hazards to life, limb, and property inherent in contract work performance and a plan for controlling these hazards; and

(2) Meet with representatives of the Contracting Officer to discuss and develop a mutual understanding relative to administration of the overall safety program.

(End of clause)

70 52.236-15 SCHEDULES FOR CONSTRUCTION CONTRACTS (APR 1984)

(a) The Contractor shall, within five days after the work commences on

the contract or another period of time determined by the Contracting Officer, prepare and submit to the Contracting Officer for approval three copies of a practicable schedule showing the order in which the Contractor proposes to perform the work, and the dates on which the Contractor contemplates starting and completing the several salient features of the work (including acquiring materials, plant, and equipment). The schedule shall be in the form of a progress chart of suitable scale to indicate appropriately the percentage of work scheduled for completion by any given date during the period. If the Contractor fails to submit a schedule within the time prescribed, the Contracting Officer may withhold approval of progress payments until the Contractor submits the required schedule.

(b) The Contractor shall enter the actual progress on the chart as directed by the Contracting Officer, and upon doing so shall immediately deliver three copies of the annotated schedule to the Contracting Officer. If, in the opinion of the Contracting Officer, the Contractor falls behind the approved schedule, the Contractor shall take steps necessary to improve its progress, including those that may be required by the Contracting Officer, without additional cost to the Government. In this circumstance, the Contracting Officer may require the Contractor to increase the number of shifts, overtime operations, days of work, and/or the amount of construction plant, and to submit for approval any supplementary schedule or schedules in chart form as the Contracting Officer deems necessary to demonstrate how the approved rate of progress will be regained.

(c) Failure of the Contractor to comply with the requirements of the Contracting Officer under this clause shall be grounds for a determination by the Contracting Officer that the Contractor is not prosecuting the work with sufficient diligence to ensure completion within the time specified in the contract. Upon making this determination, the Contracting Officer may terminate the Contractor's right to proceed with the work, or any separable part of it, in accordance with the default terms of this contract.

(End of clause)

71 52.236-17 LAYOUT OF WORK (APR 1984)

The Contractor shall lay out its work from Government-established base lines and bench marks indicated on the drawings, and shall be responsible for all measurements in connection with the layout. The Contractor shall furnish, at its own expense, all stakes, templates, platforms, equipment, tools, materials, and labor required to lay out any part of the work. The Contractor shall be responsible for executing the work to the lines and

grades that may be established or indicated by the Contracting Officer. The Contractor shall also be responsible for maintaining and preserving all stakes and other marks established by the Contracting Officer until authorized to remove them. If such marks are destroyed by the Contractor or through its negligence before their removal is authorized, the Contracting Officer may replace them and deduct the expense of the replacement from any amounts due or to become due to the Contractor.

(End of clause)
(R 7-604.3 1965 JAN)

72 52.236-21 SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION (FEB 1997)

(a) The Contractor shall keep on the work site a copy of the drawings and specifications and shall at all times give the Contracting Officer access thereto. Anything mentioned in the specifications and not shown on the drawings, or shown on the drawings and not mentioned in the specifications, shall be of like effect as if shown or mentioned in both. In case of difference between drawings and specifications, the specifications shall govern. In case of discrepancy in the figures, in the drawings, or in the specifications, the matter shall be promptly submitted to the Contracting Officer, who shall promptly make a determination in writing. Any adjustment by the Contractor without such a determination shall be at its own risk and expense. The Contracting Officer shall furnish from time to time such detailed drawings and other information as considered necessary, unless otherwise provided.

(b) Wherever in the specifications or upon the drawings the words "directed", "required", "ordered", "designated", "prescribed", or words of like import are used, it shall be understood that the "direction", "requirement", "order", "designation", or "prescription", of the Contracting Officer is intended and similarly the words "approved", "acceptable", "satisfactory", or words of like import shall mean "approved by", or "acceptable to", or "satisfactory to" the Contracting Officer, unless otherwise expressly stated.

(c) Where "as shown," "as indicated", "as detailed", or words of similar import are used, it shall be understood that the reference is made to the drawings accompanying this contract unless stated otherwise. The word "provided" as used herein shall be understood to mean "provide complete in place," that is "furnished and installed".

(d) Shop drawings means drawings, submitted to the Government by the Contractor, subcontractor, or any lower tier subcontractor pursuant to a

construction contract, showing in detail (1) the proposed fabrication and assembly of structural elements, and (2) the installation (i.e., fit, and attachment details) of materials or equipment. It includes drawings, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data, and similar materials furnished by the contractor to explain in detail specific portions of the work required by the contract. The Government may duplicate, use, and disclose in any manner and for any purpose shop drawings delivered under this contract.

(e) If this contract requires shop drawings, the Contractor shall coordinate all such drawings, and review them for accuracy, completeness, and compliance with contract requirements and shall indicate its approval thereon as evidence of such coordination and review. Shop drawings submitted to the Contracting Officer without evidence of the Contractor's approval may be returned for resubmission. The Contracting Officer will indicate an approval or disapproval of the shop drawings and if not approved as submitted shall indicate the Government's reasons therefor. Any work done before such approval shall be at the Contractor's risk. Approval by the Contracting Officer shall not relieve the Contractor from responsibility for any errors or omissions in such drawings, nor from responsibility for complying with the requirements of this contract, except with respect to variations described and approved in accordance with (f) below.

(f) If shop drawings show variations from the contract requirements, the Contractor shall describe such variations in writing, separate from the drawings, at the time of submission. If the Contracting Officer approves any such variation, the Contracting Officer shall issue an appropriate contract modification, except that, if the variation is minor or does not involve a change in price or in time of performance, a modification need not be issued.

(g) The Contractor shall submit to the Contracting Officer for approval four copies (unless otherwise indicated) of all shop drawings as called for under the various headings of these specifications. Three sets (unless otherwise indicated) of all shop drawings, will be retained by the Contracting Officer and one set will be returned to the Contractor.

(End of clause)

73 52.236-26 PRECONSTRUCTION CONFERENCE (FEB 1995)

If the Contracting Officer decides to conduct a preconstruction conference, the successful offeror will be notified and will be required to

attend. The Contracting Officer's notification will include specific details regarding the date, time, and location of the conference, any need for attendance by subcontractors, and information regarding the items to be discussed.

(End of clause)

74 52.242-13 BANKRUPTCY (JUL 1995)

In the event the Contractor enters into proceedings relating to bankruptcy, whether voluntary or involuntary, the Contractor agrees to furnish, by certified mail or electronic commerce method authorized by the contract, written notification of the bankruptcy to the Contracting Officer responsible for administering the contract. This notification shall be furnished within five days of the initiation of the proceedings relating to bankruptcy filing. This notification shall include the date on which the bankruptcy petition was filed, the identity of the court in which the bankruptcy petition was filed, and a listing of Government contract numbers and contracting offices for all Government contracts against which final payment has not been made. This obligation remains in effect until final payment under this contract.

(End of clause)

75 52.242-14 SUSPENSION OF WORK (APR 1984)

(a) The Contracting Officer may order the Contractor, in writing, to suspend, delay, or interrupt all or any part of the work of this contract for the period of time that the Contracting Officer determines appropriate for the convenience of the Government.

(b) If the performance of all or any part of the work is, for an unreasonable period of time, suspended, delayed, or interrupted (1) by an act of the Contracting Officer in the administration of this contract, or (2) by the Contracting Officer's failure to act within the time specified in this contract (or within a reasonable time if not specified), an adjustment shall be made for any increase in the cost of performance of this contract (excluding profit) necessarily caused by the unreasonable suspension, delay, or interruption, and the contract modified in writing accordingly. However, no adjustment shall be made under this clause for any suspension, delay, or interruption to the extent that performance would

have been so suspended, delayed, or interrupted by any other cause, including the fault or negligence of the Contractor, or for which an equitable adjustment is provided for or excluded under any other term or condition of this contract.

(c) A claim under this clause shall not be allowed (1) for any costs incurred more than 20 days before the Contractor shall have notified the Contracting Officer in writing of the act or failure to act involved (but this requirement shall not apply as to a claim resulting from a suspension order), and (2) unless the claim, in an amount stated, is asserted in writing as soon as practicable after the termination of the suspension, delay, or interruption, but not later than the date of final payment under the contract.

(End of clause)

76 52.243-4 CHANGES (AUG 1987)

(a) The Contracting Officer may, at any time, without notice to the sureties, if any, by written order designated or indicated to be a change order, make changes in the work within the general scope of the contract, including changes--

- (1) In the specifications (including drawings and designs);
- (2) In the method or manner of performance of the work;
- (3) In the Government-furnished facilities, equipment, materials, services, or site; or
- (4) Directing acceleration in the performance of the work.

(b) Any other written or oral order (which, as used in this paragraph (b), includes direction, instruction, interpretation, or determination) from the Contracting Officer that causes a change shall be treated as a change order under this clause; provided, that the Contractor gives the Contracting Officer written notice stating (1) the date, circumstances, and source of the order and (2) that the Contractor regards the order as a change order.

(c) Except as provided in this clause, no order, statement, or conduct of the Contracting Officer shall be treated as a change under this clause or entitle the Contractor to an equitable adjustment.

(d) If any change under this clause causes an increase or decrease in the Contractor's cost of, or the time required for, the performance of any part of the work under this contract, whether or not changed by any such order, the Contracting Officer shall make an equitable adjustment and modify the contract in writing. However, except for an adjustment based on defective

specifications, no adjustment for any change under paragraph (b) of this clause shall be made for any costs incurred more than 20 days before the Contractor gives written notice as required. In the case of defective specifications for which the Government is responsible, the equitable adjustment shall include any increased cost reasonably incurred by the Contractor in attempting to comply with the defective specifications.

(e) The Contractor must assert its right to an adjustment under this clause within 30 days after (1) receipt of a written change order under paragraph (a) of this clause or (2) the furnishing of a written notice under paragraph (b) of this clause, by submitting to the Contracting Officer a written statement describing the general nature and amount of the proposal, unless this period is extended by the Government. The statement of proposal for adjustment may be included in the notice under paragraph (b) above.

(f) No proposal by the Contractor for an equitable adjustment shall be allowed if asserted after final payment under this contract.

(End of clause)

77

DFARS 52.243-7002

CERTIFICATION OF REQUESTS FOR EQUITABLE ADJUSTMENT (JULY 1997)

(a) In accordance with 10 U.S.C. 2410(a), any request for equitable adjustment to contract terms that exceeds the simplified acquisition threshold shall bear, at the time of submission, the following certificate executed by an individual authorized to certify the request on behalf of the Contractor:

I certify that the request is made in good faith, and that the supporting data are accurate and complete to the best of my knowledge and belief.

(Official's Signature)

(Title)

(b) The certification in paragraph (a) of this clause requires full disclosure of all relevant facts, including--

(1) Cost or pricing data if required in accordance with FAR

15.804-2; and

(2) Actual cost data and data to support any estimated costs, even if cost or pricing data are not required.

(c) The certification requirement in paragraph (a) of this clause does not apply to--

(1) Requests for routine contract payments; for example, requests for payment for accepted supplies and services, routine vouchers under a cost-reimbursement type contract, or progress payment invoices; or

(2) Final adjustments under an incentive provision of the contract.

(d) The amount requested shall accurately reflect the contract adjustment for which the Contractor believes the Government is liable. The request shall include only costs for performing the change, and shall not include any costs that already have been reimbursed or that have been separately claimed. All indirect costs included in the request shall be properly allocable to the change in accordance with applicable acquisition regulations.

(End of clause)

78 52.244-1 SUBCONTRACTS (FIXED-PRICE CONTRACTS) (FEB 1995)

(a) This clause does not apply to firm-fixed-price contracts and fixed-price contracts with economic price adjustment. However, it does apply to subcontracts resulting from unpriced modifications to such contracts.

(b) "Subcontract," as used in this clause, includes but is not limited to purchase orders, and changes and modifications to purchase orders. The Contractor shall notify the Contracting Officer reasonably in advance of entering into any subcontract if the Contractor does not have an approved purchasing system and if the subcontract--

(1) Is proposed to exceed \$100,000; or

(2) Is one of a number of subcontracts with a single subcontractor, under this contract, for the same or related supplies or services, that in the aggregate are expected to exceed \$100,000.

(c) The advance notification required by paragraph (b) above shall include--

(1) A description of the supplies or services to be subcontracted;

(2) Identification of the type of subcontract to be used;

(3) Identification of the proposed subcontractor and an explanation of why and how the proposed subcontractor was selected, including the competition obtained;

(4) The proposed subcontract price and the Contractor's cost or price

analysis;

(5) The subcontractor's current, complete, and accurate cost or pricing data and Certificate of Current Cost or Pricing Data, if required by other contract provisions;

(6) The subcontractor's Disclosure Statement or Certificate relating to Cost Accounting Standards when such data are required by other provisions of this contract; and

(7) A negotiation memorandum reflecting--

(i) The principal elements of the subcontract price negotiations;

(ii) The most significant considerations controlling establishment of initial or revised prices;

(iii) The reason cost or pricing data were or were not required;

(iv) The extent, if any, to which the Contractor did not rely on the subcontractor's cost or pricing data in determining the price objective and in negotiating the final price;

(v) The extent, if any, to which it was recognized in the negotiation that the subcontractor's cost or pricing data were not accurate, complete, or current; the action taken by the Contractor and subcontractor; and the effect of any such defective data on the total price negotiated;

(vi) The reasons for any significant difference between the Contractor's price objective and the price negotiated; and

(vii) A complete explanation of the incentive fee or profit plan when incentives are used. The explanation shall identify each critical performance element, management decisions used to quantify each incentive element, reasons for the incentives, and a summary of all trade-off possibilities considered.

(d) The Contractor shall obtain the Contracting Officer's written consent before placing any subcontract for which advance notification is required under paragraph (b) above. However, the Contracting Officer may ratify in writing any such subcontract. Ratification shall constitute the consent of the Contracting Officer.

(e) Even if the Contractor's purchasing system has been approved, the Contractor shall obtain the Contracting Officer's written consent before placing subcontracts identified below: NONE

(f) Unless the consent or approval specifically provides otherwise, neither consent by the Contracting Officer to any subcontract nor approval of the Contractor's purchasing system shall constitute a determination (1) of the acceptability of any subcontract terms or conditions, (2) of the acceptability of any subcontract price or of any amount paid under any subcontract, or (3) to relieve the Contractor of any responsibility for

performing this contract.

(g) No subcontract placed under this contract shall provide for payment on a cost-plus-a-percentage-of-cost basis, and any fee payable under cost-reimbursement subcontracts shall not exceed the fee limitations in subsection 15.903(d) of the Federal Acquisition Regulation (FAR).

(h) The Government reserves the right to review the Contractor's purchasing system as set forth in FAR Subpart 44.3.

(End of clause)

79 52.244-6 SUBCONTRACTS FOR COMMERCIAL ITEMS AND COMMERCIAL COMPONENTS (OCT 1995)

(a) Definition.

"Commercial item," as used in this clause, has the meaning contained in the clause at 52.202-1, Definitions.

"Subcontract," as used in this clause, includes a transfer of commercial items between divisions, subsidiaries, or affiliates of the Contractor or subcontractor at any tier.

(b) To the maximum extent practicable, the Contractor shall incorporate, and require its subcontractors at all tiers to incorporate, commercial items or nondevelopmental items as components of items to be supplied under this contract.

(c) Notwithstanding any other clause of this contract, the Contractor is not required to include any FAR provision or clause, other than those listed below to the extent they are applicable and as may be required to establish the reasonableness of prices under Part 15, in a subcontract at any tier for commercial items or commercial components:

(1) 52.222-26, Equal Opportunity (E.O. 11246);

(2) 52.222-35, Affirmative Action for Special Disabled and Vietnam Era Veterans (38 U.S.C. 4212(a));

(3) 52.222-36, Affirmative Action for Handicapped Workers (29 U.S.C. 793); and

(4) 52.247-64, Preference for Privately Owned U.S.-Flagged Commercial Vessels (46 U.S.C. 1241) (flow down not required for subcontracts awarded beginning May 1, 1996).

(d) The Contractor shall include the terms of this clause, including this paragraph (d), in subcontracts awarded under this contract.

(End of clause)

(a) Government-furnished property. (1) The Government shall deliver to the Contractor, for use in connection with and under the terms of this contract, the Government-furnished property described in the Schedule or specifications together with any related data and information that the Contractor may request and is reasonably required for the intended use of the property (hereinafter referred to as "Government-furnished property").

(2) The delivery or performance dates for this contract are based upon the expectation that Government-furnished property suitable for use (except for property furnished "as is") will be delivered to the Contractor at the times stated in the Schedule or, if not so stated, in sufficient time to enable the Contractor to meet the contract's delivery or performance dates.

(3) If Government-furnished property is received by the Contractor in a condition not suitable for the intended use, the Contractor shall, upon receipt of it, notify the Contracting Officer, detailing the facts, and, as directed by the Contracting Officer and at Government expense, either repair, modify, return, or otherwise dispose of the property. After completing the directed action and upon written request of the Contractor, the Contracting Officer shall make an equitable adjustment as provided in paragraph (h) of this clause.

(4) If Government-furnished property is not delivered to the Contractor by the required time, the Contracting Officer shall, upon the Contractor's timely written request, make a determination of the delay, if any, caused the Contractor and shall make an equitable adjustment in accordance with paragraph (h) of this clause.

(b) Changes in Government-furnished property. (1) The Contracting Officer may, by written notice, (i) decrease the Government-furnished property provided or to be provided under this contract, or (ii) substitute other Government-furnished property for the property to be provided by the Government, or to be acquired by the Contractor for the Government, under this contract. The Contractor shall promptly take such action as the Contracting Officer may direct regarding the removal, shipment, or disposal of the property covered by such notice.

(2) Upon the Contractor's written request, the Contracting Officer shall make an equitable adjustment to the contract in accordance with paragraph (h) of this clause, if the Government has agreed in the Schedule to make the property available for performing this contract and there is any--

(i) Decrease or substitution in this property pursuant to

subparagraph (b)(1) above; or

(ii) Withdrawal of authority to use this property, if provided under any other contract or lease.

(c) Title in Government property. (1) The Government shall retain title to all Government-furnished property.

(2) All Government-furnished property and all property acquired by the Contractor, title to which vests in the Government under this paragraph (collectively referred to as "Government property"), are subject to the provisions of this clause. However, special tooling accountable to this contract is subject to the provisions of the Special Tooling clause and is not subject to the provisions of this clause. Title to Government property shall not be affected by its incorporation into or attachment to any property not owned by the Government, nor shall Government property become a fixture or lose its identity as personal property by being attached to any real property.

(3) Title to each item of facilities and special test equipment acquired by the Contractor for the Government under this contract shall pass to and vest in the Government when its use in performing this contract commences or when the Government has paid for it, whichever is earlier, whether or not title previously vested in the Government.

(4) If this contract contains a provision directing the Contractor to purchase material for which the Government will reimburse the Contractor as a direct item of cost under this contract--

(i) Title to material purchased from a vendor shall pass to and vest in the Government upon the vendor's delivery of such material; and

(ii) Title to all other material shall pass to and vest in the Government upon--

(A) Issuance of the material for use in contract performance;

(B) Commencement of processing of the material or its use in contract performance; or

(C) Reimbursement of the cost of the material by the Government, whichever occurs first.

(d) Use of Government property. The Government property shall be used only for performing this contract, unless otherwise provided in this contract or approved by the Contracting Officer.

(e) Property administration. (1) The Contractor shall be responsible and accountable for all Government property provided under this contract and shall comply with Federal Acquisition Regulation (FAR) Subpart 45.5, as in effect on the date of this contract.

(2) The Contractor shall establish and maintain a program for the use, maintenance, repair, protection, and preservation of Government property

in accordance with sound industrial practice and the applicable provisions of Subpart 45.5 of the FAR.

(3) If damage occurs to Government property, the risk of which has been assumed by the Government under this contract, the Government shall replace the items or the Contractor shall make such repairs as the Government directs. However, if the Contractor cannot effect such repairs within the time required, the Contractor shall dispose of the property as directed by the Contracting Officer. When any property for which the Government is responsible is replaced or repaired, the Contracting Officer shall make an equitable adjustment in accordance with paragraph (h) of this clause.

(4) The Contractor represents that the contract price does not include any amount for repairs or replacement for which the Government is responsible. Repair or replacement of property for which the Contractor is responsible shall be accomplished by the Contractor at its own expense.

(f) Access. The Government and all its designees shall have access at all reasonable times to the premises in which any Government property is located for the purpose of inspecting the Government property.

(g) Risk of loss. Unless otherwise provided in this contract, the Contractor assumes the risk of, and shall be responsible for, any loss or destruction of, or damage to, Government property upon its delivery to the Contractor or upon passage of title to the Government under paragraph (c) of this clause. However, the Contractor is not responsible for reasonable wear and tear to Government property or for Government property properly consumed in performing this contract.

(h) Equitable adjustment. When this clause specifies an equitable adjustment, it shall be made to any affected contract provision in accordance with the procedures of the Changes clause. When appropriate, the Contracting Officer may initiate an equitable adjustment in favor of the Government. The right to an equitable adjustment shall be the Contractor's exclusive remedy. The Government shall not be liable to suit for breach of contract for--

- (1) Any delay in delivery of Government-furnished property;
- (2) Delivery of Government-furnished property in a condition not suitable for its intended use;
- (3) A decrease in or substitution of Government-furnished property; or
- (4) Failure to repair or replace Government property for which the Government is responsible.

(i) Final accounting and disposition of Government property. Upon completing this contract, or at such earlier dates as may be fixed by the

Contracting Officer, the Contractor shall submit, in a form acceptable to the Contracting Officer, inventory schedules covering all items of Government property (including any resulting scrap) not consumed in performing this contract or delivered to the Government. The Contractor shall prepare for shipment, deliver f.o.b. origin, or dispose of the Government property as may be directed or authorized by the Contracting Officer. The net proceeds of any such disposal shall be credited to the contract price or shall be paid to the Government as the Contracting Officer directs.

(j) Abandonment and restoration of Contractor's premises. Unless otherwise provided herein, the Government--

(1) May abandon any Government property in place, at which time all obligations of the Government regarding such abandoned property shall cease; and

(2) Has no obligation to restore or rehabilitate the Contractor's premises under any circumstances (e.g., abandonment, disposition upon completion of need, or upon contract completion). However, if the Government-furnished property (listed in the Schedule or specifications) is withdrawn or is unsuitable for the intended use, or if other Government property is substituted, then the equitable adjustment under paragraph (h) of this clause may properly include restoration or rehabilitation costs.

(k) Communications. All communications under this clause shall be in writing.

(l) Overseas contracts. If this contract is to be performed outside of the United States of America, its territories, or possessions, the words "Government" and "Government-furnished" (wherever they appear in this clause) shall be construed as "United States Government" and "United States Government-furnished," respectively.

(End of clause)

81 52.246-12 INSPECTION OF CONSTRUCTION (AUG 1996)

(a) Definition. "Work" includes, but is not limited to, materials, workmanship, and manufacture and fabrication of components.

(b) The Contractor shall maintain an adequate inspection system and perform such inspections as will ensure that the work performed under the contract conforms to contract requirements. The Contractor shall maintain complete inspection records and make them available to the Government. All work shall be conducted under the general direction of the Contracting

Officer and is subject to Government inspection and test at all places and at all reasonable times before acceptance to ensure strict compliance with the terms of the contract.

(c) Government inspections and tests are for the sole benefit of the Government and do not--

(1) Relieve the Contractor of responsibility for providing adequate quality control measures;

(2) Relieve the Contractor of responsibility for damage to or loss of the material before acceptance;

(3) Constitute or imply acceptance; or

(4) Affect the continuing rights of the Government after acceptance of the completed work under paragraph (i) below.

(d) The presence or absence of a Government inspector does not relieve the Contractor from any contract requirement, nor is the inspector authorized to change any term or condition of the specification without the Contracting Officer's written authorization.

(e) The Contractor shall promptly furnish, at no increase in contract price, all facilities, labor, and material reasonably needed for performing such safe and convenient inspections and tests as may be required by the Contracting Officer. The Government may charge to the Contractor any additional cost of inspection or test when work is not ready at the time specified by the Contractor for inspection or test, or when prior rejection makes reinspection or retest necessary. The Government shall perform all inspections and tests in a manner that will not unnecessarily delay the work. Special, full size, and performance tests shall be performed as described in the contract.

(f) The Contractor shall, without charge, replace or correct work found by the Government not to conform to contract requirements, unless in the public interest the Government consents to accept the work with an appropriate adjustment in contract price. The Contractor shall promptly segregate and remove rejected material from the premises.

(g) If the Contractor does not promptly replace or correct rejected work, the Government may (1) by contract or otherwise, replace or correct the work and charge the cost to the Contractor or (2) terminate for default the Contractor's right to proceed.

(h) If, before acceptance of the entire work, the Government decides to examine already completed work by removing it or tearing it out, the Contractor, on request, shall promptly furnish all necessary facilities, labor, and material. If the work is found to be defective or nonconforming in any material respect due to the fault of the Contractor or its subcontractors, the Contractor shall defray the expenses of the examination

and of satisfactory reconstruction. However, if the work is found to meet contract requirements, the Contracting Officer shall make an equitable adjustment for the additional services involved in the examination and reconstruction, including, if completion of the work was thereby delayed, an extension of time.

(i) Unless otherwise specified in the contract, the Government shall accept, as promptly as practicable after completion and inspection, all work required by the contract or that portion of the work the Contracting Officer determines can be accepted separately. Acceptance shall be final and conclusive except for latent defects, fraud, gross mistakes amounting to fraud, or the Government's rights under any warranty or guarantee.

(End of clause)

82 52.246-21 WARRANTY OF CONSTRUCTION (MAR 1994)

(a) In addition to any other warranties in this contract, the Contractor warrants, except as provided in paragraph (i) of this clause, that work performed under this contract conforms to the contract requirements and is free of any defect in equipment, material, or design furnished, or workmanship performed by the Contractor or any subcontractor or supplier at any tier.

(b) This warranty shall continue for a period of 1 year from the date of final acceptance of the work. If the Government takes possession of any part of the work before final acceptance, this warranty shall continue for a period of 1 year from the date the Government takes possession.

(c) The Contractor shall remedy at the Contractor's expense any failure to conform, or any defect. In addition, the Contractor shall remedy at the Contractor's expense any damage to Government-owned or controlled real or personal property, when that damage is the result of--

(1) The Contractor's failure to conform to contract requirements; or

(2) Any defect of equipment, material, workmanship, or design furnished.

(d) The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for 1 year from the date of repair or replacement.

(e) The Contracting Officer shall notify the Contractor, in writing, within a reasonable time after the discovery of any failure, defect, or damage.

(f) If the Contractor fails to remedy any failure, defect, or damage

within a reasonable time after receipt of notice, the Government shall have the right to replace, repair, or otherwise remedy the failure, defect, or damage at the Contractor's expense.

(g) With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this contract, the Contractor shall--

(1) Obtain all warranties that would be given in normal commercial practice;

(2) Require all warranties to be executed, in writing, for the benefit of the Government, if directed by the Contracting Officer; and

(3) Enforce all warranties for the benefit of the Government, if directed by the Contracting Officer.

(h) In the event the Contractor's warranty under paragraph (b) of this clause has expired, the Government may bring suit at its expense to enforce a subcontractor's, manufacturer's, or supplier's warranty.

(i) Unless a defect is caused by the negligence of the Contractor or subcontractor or supplier at any tier, the Contractor shall not be liable for the repair of any defects of material or design furnished by the Government nor for the repair of any damage that results from any defect in Government-furnished material or design.

(j) This warranty shall not limit the Government's rights under the Inspection and Acceptance clause of this contract with respect to latent defects, gross mistakes, or fraud.

(End of clause)

(R 7-604.4 1976 JUL)

83 52.248-3 I VALUE ENGINEERING--CONSTRUCTION (MAR 1989)--ALTERNATE I (APR 1984)

(a) General. The Contractor is encouraged to develop, prepare, and submit value engineering change proposals (VECP's) voluntarily. The Contractor shall share in any instant contract savings realized from accepted VECP's, in accordance with paragraph (f) below.

(b) Definitions. "Collateral costs," as used in this clause, means agency costs of operation, maintenance, logistic support, or Government-furnished property.

"Collateral savings," as used in this clause, means those measurable net reductions resulting from a VECP in the agency's overall projected collateral costs, exclusive of acquisition savings, whether or not the acquisition cost changes.

"Contractor's development and implementation costs," as used in this

clause, means those costs the Contractor incurs on a VECP specifically in developing, testing, preparing, and submitting the VECP, as well as those costs the Contractor incurs to make the contractual changes required by Government acceptance of a VECP.

"Government costs," as used in this clause, means those agency costs that result directly from developing and implementing the VECP, such as any net increases in the cost of testing, operations, maintenance, and logistic support. The term does not include the normal administrative costs of processing the VECP.

"Instant contract savings," as used in this clause, means the estimated reduction in Contractor cost of performance resulting from acceptance of the VECP, minus allowable Contractor's development and implementation costs, including subcontractors' development and implementation costs (see paragraph (h) below).

"Value engineering change proposal (VECP)" means a proposal that--

- (1) Requires a change to this, the instant contract, to implement; and
- (2) Results in reducing the contract price or estimated cost without impairing essential functions or characteristics; provided, that it does not involve a change--

- (i) In deliverable end item quantities only; or
- (ii) To the contract type only.

(c) VECP preparation. As a minimum, the Contractor shall include in each VECP the information described in subparagraphs (1) through (7) below. If the proposed change is affected by contractually required configuration management or similar procedures, the instructions in those procedures relating to format, identification, and priority assignment shall govern VECP preparation. The VECP shall include the following:

(1) A description of the difference between the existing contract requirement and that proposed, the comparative advantages and disadvantages of each, a justification when an item's function or characteristics are being altered, and the effect of the change on the end item's performance.

(2) A list and analysis of the contract requirements that must be changed if the VECP is accepted, including any suggested specification revisions.

(3) A separate, detailed cost estimate for (i) the affected portions of the existing contract requirement and (ii) the VECP. The cost reduction associated with the VECP shall take into account the Contractor's allowable development and implementation costs, including any amount attributable to subcontracts under paragraph (h) below.

(4) A description and estimate of costs the Government may incur in

implementing the VECP, such as test and evaluation and operating and support costs.

(5) A prediction of any effects the proposed change would have on collateral costs to the agency.

(6) A statement of the time by which a contract modification accepting the VECP must be issued in order to achieve the maximum cost reduction, noting any effect on the contract completion time or delivery schedule.

(7) Identification of any previous submissions of the VECP, including the dates submitted, the agencies and contract numbers involved, and previous Government actions, if known.

(d) Submission. The Contractor shall submit VECP's to the Resident Engineer at the worksite, with a copy to the Contracting Officer.

(e) Government action. (1) The Contracting Officer shall notify the Contractor of the status of the VECP within 45 calendar days after the contracting office receives it. If additional time is required, the Contracting Officer shall notify the Contractor within the 45-day period and provide the reason for the delay and the expected date of the decision. The Government will process VECP's expeditiously; however, it shall not be liable for any delay in acting upon a VECP.

(2) If the VECP is not accepted, the Contracting Officer shall notify the Contractor in writing, explaining the reasons for rejection. The Contractor may withdraw any VECP, in whole or in part, at any time before it is accepted by the Government. The Contracting Officer may require that the Contractor provide written notification before undertaking significant expenditures for VECP effort.

(3) Any VECP may be accepted, in whole or in part, by the Contracting Officer's award of a modification to this contract citing this clause. The Contracting Officer may accept the VECP, even though an agreement on price reduction has not been reached, by issuing the Contractor a notice to proceed with the change. Until a notice to proceed is issued or a contract modification applies a VECP to this contract, the Contractor shall perform in accordance with the existing contract. The Contracting Officer's decision to accept or reject all or part of any VECP shall be final and not subject to the Disputes clause or otherwise subject to litigation under the Contract Disputes Act of 1978 (41 U.S.C. 601-613).

(f) Sharing. (1) Rates. The Government's share of savings is determined by subtracting Government costs from instant contract savings and multiplying the result by (i) 45 percent for fixed-price contracts or (ii) 75 percent for cost-reimbursement contracts.

(2) Payment. Payment of any share due the Contractor for use of a VECP on this contract shall be authorized by a modification to this

contract to--

- (i) Accept the VECP;
- (ii) Reduce the contract price or estimated cost by the amount of instant contract savings; and
- (iii) Provide the Contractor's share of savings by adding the amount calculated to the contract price or fee.

(g) Subcontracts. The Contractor shall include an appropriate value engineering clause in any subcontract of \$50,000 or more and may include one in subcontracts of lesser value. In computing any adjustment in this contract's price under paragraph (f) above, the Contractor's allowable development and implementation costs shall include any subcontractor's allowable development and implementation costs clearly resulting from a VECP accepted by the Government under this contract, but shall exclude any value engineering incentive payments to a subcontractor. The Contractor may choose any arrangement for subcontractor value engineering incentive payments; provided, that these payments shall not reduce the Government's share of the savings resulting from the VECP.

(h) Data. The Contractor may restrict the Government's right to use any part of a VECP or the supporting data by marking the following legend on the affected parts:

"These data, furnished under the Value Engineering--Construction clause of contract _____, shall not be disclosed outside the Government or duplicated, used, or disclosed, in whole or in part, for any purpose other than to evaluate a value engineering change proposal submitted under the clause. This restriction does not limit the Government's right to use information contained in these data if it has been obtained or is otherwise available from the Contractor or from another source without limitations."

If a VECP is accepted, the Contractor hereby grants the Government unlimited rights in the VECP and supporting data, except that, with respect to data qualifying and submitted as limited rights technical data, the Government shall have the rights specified in the contract modification implementing the VECP and shall appropriately mark the data. (The terms "unlimited rights" and "limited rights" are defined in Part 27 of the Federal Acquisition Regulation.)

(End of clause)

84 52.249-2 I TERMINATION FOR CONVENIENCE OF THE GOVERNMENT (FIXED-PRICE) (SEP 1996)--
ALTERNATE I (SEP 1996)

(a) The Government may terminate performance of work under this contract in whole or, from time to time, in part if the Contracting Officer determines that a termination is in the Government's interest. The Contracting Officer shall terminate by delivering to the Contractor a Notice of Termination specifying the extent of termination and the effective date.

(b) After receipt of a Notice of Termination, and except as directed by the Contracting Officer, the Contractor shall immediately proceed with the following obligations, regardless of any delay in determining or adjusting any amounts due under this clause:

(1) Stop work as specified in the notice.

(2) Place no further subcontracts or orders (referred to as subcontracts in this clause) for materials, services, or facilities, except as necessary to complete the continued portion of the contract.

(3) Terminate all subcontracts to the extent they relate to the work terminated.

(4) Assign to the Government, as directed by the Contracting Officer, all right, title, and interest of the Contractor under the subcontracts terminated, in which case the Government shall have the right to settle or to pay any termination settlement proposal arising out of those terminations.

(5) With approval or ratification to the extent required by the Contracting Officer, settle all outstanding liabilities and termination settlement proposals arising from the termination of subcontracts; the approval or ratification will be final for purposes of this clause.

(6) As directed by the Contracting Officer, transfer title and deliver to the Government (i) the fabricated or unfabricated parts, work in process, completed work, supplies, and other material produced or acquired for the work terminated, and (ii) the completed or partially completed plans, drawings, information, and other property that, if the contract had been completed, would be required to be furnished to the Government.

(7) Complete performance of the work not terminated.

(8) Take any action that may be necessary, or that the Contracting Officer may direct, for the protection and preservation of the property related to this contract that is in the possession of the Contractor and in which the Government has or may acquire an interest.

(9) Use its best efforts to sell, as directed or authorized by the Contracting Officer, any property of the types referred to in subparagraph (b)(6) of this clause; provided, however, that the Contractor (i) is not required to extend credit to any purchaser and (ii)

may acquire the property under the conditions prescribed by, and at prices approved by, the Contracting Officer. The proceeds of any transfer or disposition will be applied to reduce any payments to be made by the Government under this contract, credited to the price or cost of the work, or paid in any other manner directed by the Contracting Officer.

(c) The Contractor shall submit complete termination inventory schedules no later than 120 days from the effective date of termination, unless extended in writing by the Contracting Officer upon written request of the Contractor within this 120-day period.

(d) After expiration of the plant clearance period as defined in Subpart 45.6 of the Federal Acquisition Regulation, the Contractor may submit to the Contracting Officer a list, certified as to quantity and quality, of termination inventory not previously disposed of, excluding items authorized for disposition by the Contracting Officer. The Contractor may request the Government to remove those items or enter into an agreement for their storage. Within 15 days, the Government will accept title to those items and remove them or enter into a storage agreement. The Contracting Officer may verify the list upon removal of the items, or if stored, within 45 days from submission of the list, and shall correct the list, as necessary, before final settlement.

(e) After termination, the Contractor shall submit a final termination settlement proposal to the Contracting Officer in the form and with the certification prescribed by the Contracting Officer. The Contractor shall submit the proposal promptly, but no later than 1 year from the effective date of termination, unless extended in writing by the Contracting Officer upon written request of the Contractor within this 1 year period. However, if the Contracting Officer determines that the facts justify it, a termination settlement proposal may be received and acted on after 1 year or any extension. If the Contractor fails to submit the proposal within the time allowed, the Contracting Officer may determine, on the basis of information available, the amount, if any, due the Contractor because of the termination and shall pay the amount determined.

(f) Subject to paragraph (e) of this clause, the Contractor and the Contracting Officer may agree upon the whole or any part of the amount to be paid or remaining to be paid because of the termination. The amount may include a reasonable allowance for profit on work done. However, the agreed amount, whether under this paragraph (f) or paragraph (g) of this clause, exclusive of costs shown in subparagraph (g)(3) of this clause, may not exceed the total contract price as reduced by (1) the amount of payments previously made and (2) the contract price of work not terminated.

The contract shall be modified, and the Contractor paid the agreed amount. Paragraph (g) of this clause shall not limit, restrict, or affect the amount that may be agreed upon to be paid under this paragraph.

(g) If the Contractor and Contracting Officer fail to agree on the whole amount to be paid the Contractor because of the termination of work, the Contracting Officer shall pay the Contractor the amounts determined as follows, but without duplication of any amounts agreed upon under paragraph (f) of this clause:

(1) For contract work performed before the effective date of termination, the total (without duplication of any items) of--

(i) The cost of this work;

(ii) The cost of settling and paying termination settlement proposals under terminated subcontracts that are properly chargeable to the terminated portion of the contract if not included in subdivision (g)(1)(i) of this clause; and

(iii) A sum, as profit on subdivision (g)(1)(i) of this clause, determined by the Contracting Officer under 49.202 of the Federal Acquisition Regulation, in effect on the date of this contract, to be fair and reasonable; however, if it appears that the Contractor would have sustained a loss on the entire contract had it been completed, the Contracting Officer shall allow no profit under this subdivision (iii) and shall reduce the settlement to reflect the indicated rate of loss.

(2) The reasonable costs of settlement of the work terminated, including--

(i) Accounting, legal, clerical, and other expenses reasonably necessary for the preparation of termination settlement proposals and supporting data;

(ii) The termination and settlement of subcontracts (excluding the amounts of such settlements); and

(iii) Storage, transportation, and other costs incurred, reasonably necessary for the preservation, protection, or disposition of the termination inventory.

(h) Except for normal spoilage, and except to the extent that the Government expressly assumed the risk of loss, the Contracting Officer shall exclude from the amounts payable to the Contractor under paragraph (g) of this clause, the fair value, as determined by the Contracting Officer, of property that is destroyed, lost, stolen, or damaged so as to become undeliverable to the Government or to a buyer.

(i) The cost principles and procedures of Part 31 of the Federal Acquisition Regulation, in effect on the date of this contract, shall govern all costs claimed, agreed to, or determined under this clause.

(j) The Contractor shall have the right of appeal, under the Disputes clause, from any determination made by the Contracting Officer under paragraph (e), (g), or (l) of this clause, except that if the Contractor failed to submit the termination settlement proposal or request for equitable adjustment within the time provided in paragraph (e) or (l), respectively, and failed to request a time extension, there is no right of appeal.

(k) In arriving at the amount due the Contractor under this clause, there shall be deducted--

(1) All unliquidated advance or other payments to the Contractor under the terminated portion of this contract;

(2) Any claim which the Government has against the Contractor under this contract; and

(3) The agreed price for, or the proceeds of sale of, materials, supplies, or other things acquired by the Contractor or sold under the provisions of this clause and not recovered by or credited to the Government.

(l) If the termination is partial, the Contractor may file a proposal with the Contracting Officer for an equitable adjustment of the price(s) of the continued portion of the contract. The Contracting Officer shall make any equitable adjustment agreed upon. Any proposal by the Contractor for an equitable adjustment under this clause shall be requested within 90 days from the effective date of termination unless extended in writing by the Contracting Officer.

(m)(1) The Government may, under the terms and conditions it prescribes, make partial payments and payments against costs incurred by the Contractor for the terminated portion of the contract, if the Contracting Officer believes the total of these payments will not exceed the amount to which the Contractor will be entitled.

(2) If the total payments exceed the amount finally determined to be due, the Contractor shall repay the excess to the Government upon demand, together with interest computed at the rate established by the Secretary of the Treasury under 50 U.S.C. App. 1215(b)(2). Interest shall be computed for the period from the date the excess payment is received by the Contractor to the date the excess is repaid. Interest shall not be charged on any excess payment due to a reduction in the Contractor's termination settlement proposal because of retention or other disposition of termination inventory until 10 days after the date of the retention or disposition, or a later date determined by the Contracting Officer because of the circumstances.

(n) Unless otherwise provided in this contract or by statute, the

Contractor shall maintain all records and documents relating to the terminated portion of this contract for 3 years after final settlement. This includes all books and other evidence bearing on the Contractor's costs and expenses under this contract. The Contractor shall make these records and documents available to the Government, at the Contractor's office, at all reasonable times, without any direct charge. If approved by the Contracting Officer, photographs, microphotographs, or other authentic reproductions may be maintained instead of original records and documents.

(End of clause)

85 52.249-10 DEFAULT (FIXED-PRICE CONSTRUCTION) (APR 1984)

(a) If the Contractor refuses or fails to prosecute the work or any separable part, with the diligence that will insure its completion within the time specified in this contract including any extension, or fails to complete the work within this time, the Government may, by written notice to the Contractor, terminate the right to proceed with the work (or the separable part of the work) that has been delayed. In this event, the Government may take over the work and complete it by contract or otherwise, and may take possession of and use any materials, appliances, and plant on the work site necessary for completing the work. The Contractor and its sureties shall be liable for any damage to the Government resulting from the Contractor's refusal or failure to complete the work within the specified time, whether or not the Contractor's right to proceed with the work is terminated. This liability includes any increased costs incurred by the Government in completing the work.

(b) The Contractor's right to proceed shall not be terminated nor the Contractor charged with damages under this clause, if-

(1) The delay in completing the work arises from unforeseeable causes beyond the control and without the fault or negligence of the Contractor. Examples of such causes include (i) acts of God or of the public enemy, (ii) acts of the Government in either its sovereign or contractual capacity, (iii) acts of another Contractor in the performance of a contract with the Government, (iv) fires, (v) floods, (vi) epidemics, (vii) quarantine restrictions, (viii) strikes, (ix) freight embargoes, (x) unusually severe weather, or (xi) delays of subcontractors or suppliers at any tier arising from unforeseeable causes beyond the control and without the fault or negligence of both the Contractor and the subcontractors or suppliers; and

(2) The Contractor, within 10 days from the beginning of any delay (unless extended by the Contracting Officer), notifies the Contracting Officer in writing of the causes of delay. The Contracting Officer shall ascertain the facts and the extent of delay. If, in the judgment of the Contracting Officer, the findings of fact warrant such action, the time for completing the work shall be extended. The findings of the Contracting Officer shall be final and conclusive on the parties, but subject to appeal under the Disputes clause.

(c) If, after termination of the Contractor's right to proceed, it is determined that the Contractor was not in default, or that the delay was excusable, the rights and obligations of the parties will be the same as if the termination had been issued for the convenience of the Government.

(d) The rights and remedies of the Government in this clause are in addition to any other rights and remedies provided by law or under this contract.

(End of clause)

86 52.253-1 COMPUTER GENERATED FORMS (JAN 1991)

(a) Any data required to be submitted on a Standard or Optional Form prescribed by the Federal Acquisition Regulation (FAR) may be submitted on a computer generated version of the form, provided there is no change to the name, content, or sequence of the data elements on the form, and provided the form carries the Standard or Optional Form number and edition date.

(b) Unless prohibited by agency regulations, any data required to be submitted on an agency unique form prescribed by an agency supplement to the FAR may be submitted on a computer generated version of the form provided there is no change to the name, content, or sequence of the data elements on the form and provided the form carries the agency form number and edition date.

(c) If the Contractor submits a computer generated version of a form that is different than the required form, then the rights and obligations of the parties will be determined based on the content of the required form.

(End of clause)

87 252.203-7001 SPECIAL PROHIBITION ON EMPLOYMENT (JUN 1997)

(a) Definitions.

As used in this clause--

(1) "Arising out of a contract with the DoD" means any act in connection with--

(i) Attempting to obtain,

(ii) Obtaining, or

(iii) Performing a contract or first-tier subcontract of any agency, department, or component of the Department of Defense (DoD).

(2) "Conviction of fraud or any other felony" means any conviction for fraud or a felony in violation of state or Federal criminal statutes, whether entered on a verdict or plea, including a plea of nolo contendere, for which sentence has been imposed.

(3) "Date of conviction" means the date judgment was entered against the individual.

(b) 10 U.S.C. 2408 provides that any individual who is convicted after September 29, 1988, of fraud or any other felony arising out of a contract with the DoD is prohibited from:

(1) Working in a management or supervisory capacity on any DoD contract or first-tier subcontract;

(2) Serving on the board of directors of any DoD Contractor or first-tier subcontractor; or

(3) Serving as a consultant to any DoD Contractor or first-tier subcontractor.

(c) Unless waived, the prohibition in paragraph (b) applies for five years from the date of conviction.

(d) 10 U.S.C. 2408 further provides that a defense Contractor or first-tier subcontractor shall be subject to a criminal penalty of not more than \$500,000 if convicted of knowingly--

(1) Employing a person under a prohibition specified in paragraph (b) of this clause; or

(2) Allowing such a person to serve on the board of directors of the Contractor or first-tier subcontractor.

(e) In addition to the criminal penalties contained in 10 U.S.C. 2408, the Government may consider other available remedies, such as--

(1) Suspension or debarment;

(2) Cancellation of the contract at no cost to the Government; or

(3) Termination of the contract for default.

(f) The Contractor may submit written requests for waiver of the prohibitions in paragraph (b) of this clause to the Contracting Officer. Requests shall clearly identify--

(1) The person involved;

(2) The nature of the conviction and resultant sentence or punishment imposed;

(3) The reasons for the requested waiver; and,

(4) An explanation of why a waiver is in the interest of national security.

(g) The Contractor agrees to include the substance of this clause, appropriately modified to reflect the identity and relationship of the parties, in all first-tier subcontracts exceeding the simplified acquisition threshold in Part 2 of the Federal Acquisition Regulation, except those for commercial items or components.

(h) Pursuant to 10 U.S.C. 2408(c), defense contractors and subcontractors may obtain information as to whether a particular person has been convicted of fraud or any other felony arising out of a contract with the DoD by contacting The Office of Justice Programs, The Denial of Benefits Office, U.S. Department of Justice, telephone (202) 616-3507.

(End of clause)

88 252.205-7000 PROVISION OF INFORMATION TO COOPERATIVE AGREEMENT HOLDERS (DEC 1991)

(a) Definition.

"Cooperative agreement holder" means a State or local government; a private, nonprofit organization; a tribal organization (as defined in section 4(c) of the Indian Self-Determination and Education Assistance Act (Pub. L. 93-268; 25 U.S.C. 450(c))); or an economic enterprise (as defined in section 3(e) of the Indian Financing Act of 1974 (Pub. L. 93-362; 25 U.S.C. 1452(e))) whether such economic enterprise is organized for profit or nonprofit purposes; which has an agreement with the Defense Logistics Agency to furnish procurement technical assistance to business entities.

(b) The Contractor shall provide cooperative agreement holders, upon their request, with a list of those appropriate employees or offices responsible for entering into subcontracts under defense contracts. The list shall include the business address, telephone number, and area of responsibility of each employee or office.

(c) The Contractor need not provide the listing to a particular cooperative agreement holder more frequently than once a year.

(End of clause)

89 252.219-7003 SMALL, SMALL DISADVANTAGED AND WOMEN-OWNED SMALL BUSINESS SUBCONTRACTING

PLAN (DoD CONTRACTS) (APR 1996)

This clause supplements the Federal Acquisition Regulation 52.219-9, Small, Small Disadvantaged and Women-Owned Small Business Subcontracting Plan, clause of this contract.

(a) Definitions.

"Historically black colleges and universities," as used in this clause, means institutions determined by the Secretary of Education to meet the requirements of 34 CFR 608.2. The term also means any nonprofit research institution that was an integral part of such a college or university before November 14, 1986.

"Minority institutions," as used in this clause, means institutions meeting the requirements of section 1046(3) of the Higher Education Act of 1965 (20 U.S.C. 1135d-5(3)). The term also includes Hispanic-serving institutions as defined in section 316(b)(1) of such Act (20 U.S.C. 1059c(b)(1)).

(b) Except for company or division-wide commercial items subcontracting plans, the term "small disadvantaged business," when used in the FAR 52.219-9 clause, includes historically black colleges and universities and minority institutions, in addition to small disadvantaged business concerns.

(c) Work under the contract or its subcontracts shall be credited toward meeting the small disadvantaged business concern goal required by paragraph

(d) of the FAR 52.219-9 clause when:

(1) It is performed on Indian lands or in joint venture with an Indian tribe or a tribally-owned corporation, and

(2) It meets the requirements of 10 U.S.C. 2323a.

(d) Subcontracts awarded to workshops approved by the Committee for Purchase from People Who are Blind or Severely Disabled (41 U.S.C. 46-48), may be counted toward the Contractor's small business subcontracting goal.

(e) A mentor firm, under the Pilot Mentor-Protege Program established under Section 831 of Pub. L. 101-510, as amended, may count toward its small disadvantaged business goal, subcontracts awarded--

(1) Protege firms which are qualified organizations employing the severely handicapped; and

(2) Former protege firms that meet the criteria in Section 831(g)(4) of Pub. L. 101-510.

(f) The master plan approval referred to in paragraph (f) of the FAR 52.219-9 clause is approval by the Contractor's cognizant contract administration activity.

(g) In those subcontracting plans which specifically identify small,

small disadvantaged, and women-owned small businesses, the Contractor shall notify the Administrative Contracting Officer of any substitutions of firms that are not small, small disadvantaged, or women-owned small businesses for the firms listed in the subcontracting plan. Notifications shall be in writing and shall occur within a reasonable period of time after award of the subcontract. Contractor-specified formats shall be acceptable.

(End of clause)

90 252.223-7001 HAZARD WARNING LABELS (DEC 1991)

(a) "Hazardous material," as used in this clause, is defined in the Hazardous Material Identification and Material Safety Data clause of this contract.

(b) The Contractor shall label the item package (unit container) of any hazardous material to be delivered under this contract in accordance with the Hazard Communication Standard (29 CFR 1910.1200 et seq.). The Standard requires that the hazard warning label conform to the requirements of the standard unless the material is otherwise subject to the labelling requirements of one of the following statutes:

- (1) Federal Insecticide, Fungicide and Rodenticide Act;
- (2) Federal Food, Drug and Cosmetics Act;
- (3) Consumer Product Safety Act;
- (4) Federal Hazardous Substances Act; or
- (5) Federal Alcohol Administration Act.

(c) The Offeror shall list which hazardous material listed in the Hazardous Material Identification and Material Safety Data clause of this contract will be labelled in accordance with one of the Acts in paragraphs (b)(1) through (5) of this clause instead of the Hazard Communication Standard. Any hazardous material not listed will be interpreted to mean that a label is required in accordance with the Hazard Communication Standard.

Material (if none, insert "none.")	Act
_____	_____
_____	_____

(d) The apparently successful Offeror agrees to submit, before award, a copy of the hazard warning label for all hazardous materials not listed in paragraph (c) of this clause. The Offeror shall submit the label with the Material Safety Data Sheet being furnished under the Hazardous Material Identification and Material Safety Data clause of this contract.

(e) The Contractor shall also comply with MIL-STD-129, Marking for Shipment and Storage (including revisions adopted during the term of this contract).

(End of clause)

91 252.223-7004 DRUG-FREE WORK FORCE (SEP 1988)

(a) Definitions.

(1) "Employee in a sensitive position," as used in this clause, means an employee who has been granted access to classified information; or employees in other positions that the Contractor determines involve national security, health or safety, or functions other than the foregoing requiring a high degree of trust and confidence.

(2) "Illegal drugs," as used in this clause, means controlled substances included in Schedules I and II, as defined by section 802(6) of Title 21 of the United States Code, the possession of which is unlawful under Chapter 13 of that Title. The term "illegal drugs" does not mean the use of a controlled substance pursuant to a valid prescription or other uses authorized by law.

(b) The Contractor agrees to institute and maintain a program for achieving the objective of a drug-free work force. While this clause defines criteria for such a program, contractors are encouraged to implement alternative approaches comparable to the criteria in paragraph (c) that are designed to achieve the objectives of this clause.

(c) Contractor programs shall include the following, or appropriate alternatives:

(1) Employee assistance programs emphasizing high level direction, education, counseling, rehabilitation, and coordination with available community resources;

(2) Supervisory training to assist in identifying and addressing illegal drug use by Contractor employees;

(3) Provision for self-referrals as well as supervisory referrals to treatment with maximum respect for individual confidentiality consistent with safety and security issues;

(4) Provision for identifying illegal drug users, including testing on

a controlled and carefully monitored basis. Employee drug testing programs shall be established taking account of the following:

(i) The Contractor shall establish a program that provides for testing for the use of illegal drugs by employees in sensitive positions. The extent of and criteria for such testing shall be determined by the Contractor based on considerations that include the nature of the work being performed under the contract, the employee's duties, the efficient use of Contractor resources, and the risks to health, safety, or national security that could result from the failure of an employee adequately to discharge his or her position.

(ii) In addition, the Contractor may establish a program for employee drug testing--

(A) When there is a reasonable suspicion that an employee uses illegal drugs; or

(B) When an employee has been involved in an accident or unsafe practice;

(C) As part of or as a follow-up to counseling or rehabilitation for illegal drug use;

(D) As part of a voluntary employee drug testing program.

(iii) The Contractor may establish a program to test applicants for employment for illegal drug use.

(iv) For the purpose of administering this clause, testing for illegal drugs may be limited to those substances for which testing is prescribed by section 2.1 of Subpart B of the "Mandatory Guidelines for Federal Workplace Drug Testing Programs" (53 FR 11980 (April 11 1988)), issued by the Department of Health and Human Services.

(d) Contractors shall adopt appropriate personnel procedures to deal with employees who are found to be using drugs illegally. Contractors shall not allow any employee to remain on duty or perform in a sensitive position who is found to use illegal drugs until such times as the Contractor, in accordance with procedures established by the Contractor, determines that the employee may perform in such a position.

(e) The provisions of this clause pertaining to drug testing programs shall not apply to the extent they are inconsistent with state or local law, or with an existing collective bargaining agreement; provided that with respect to the latter, the Contractor agrees that those issues that are in conflict will be a subject of negotiation at the next collective bargaining session.

(End of clause)

(a) Definitions. As used in this clause--

(1) "Storage" means a non-transitory, semi-permanent or permanent holding, placement, or leaving of material. It does not include a temporary accumulation of a limited quantity of a material used in or a waste generated or resulting from authorized activities, such as servicing, maintenance, or repair of Department of Defense (DoD) items, equipment, or facilities.

(2) "Toxic or hazardous materials" means:

(i) Materials referred to in section 101(14) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 (42 U.S.C. 9601(14)) and materials designated under section 102 of CERCLA (42 U.S.C. 9602)(40 CFR Part 302);

(ii) Materials that are of an explosive, flammable, or pyrotechnic nature; or

(iii) Materials otherwise identified by the Secretary of Defense as specified in DoD regulations.

(b) In accordance with 10 U.S.C. 2692, the Contractor is prohibited from storing or disposing of non-DoD-owned toxic or hazardous materials on a DoD installation, except to the extent authorized by a statutory exception to 10 U.S.C. 2692 or as authorized by the Secretary of Defense or his designee.

(End of clause)

(a) Shop drawings for construction means drawings, submitted to the Government by the Construction Contractor, subcontractor or any lower-tier subcontractor pursuant to a construction contract, showing in detail (i) the proposed fabrication and assembly of structural elements and (ii) the installation (i.e., form, fit, and attachment details) of materials or equipment. The Government may duplicate, use, and disclose in any manner and for any purpose shop drawings delivered under this contract.

(b) This clause, including this paragraph (b), shall be included in all subcontracts hereunder at any tier.

(End of clause)

94 252.231-7000 SUPPLEMENTAL COST PRINCIPLES (DEC 1991)

When the allowability of costs under this contract is determined in accordance with Part 31 of the Federal Acquisition Regulation (FAR), allowability shall also be determined in accordance with Part 231 of the Defense FAR Supplement, in effect on the date of this contract.

(End of clause)

95 252.232-7006 REDUCTION OR SUSPENSION OF CONTRACT PAYMENTS UPON FINDING OF FRAUD (AUG 1992)

(a) 10 U.S.C. 2307(e) permits the head of the agency to reduce or suspend further payments to the Contractor upon a written determination by the agency head that substantial evidence exists that the Contractors request for advance, partial, or progress payments is based on fraud. The provisions of 10 U.S.C. 2307(e) are in addition to any other rights or remedies provided the Government by law or under contract.

(b) Actions taken by the Government in accordance with 10 U.S.C. 2307(e) shall not constitute an excusable delay under the Default clause of this contract or otherwise relieve the Contractor of its obligations to perform under this contract.

(End of clause)

96 252.236-7000 MODIFICATION PROPOSALS--PRICE BREAKDOWN (DEC 1991)

(a) The Contractor shall furnish a price breakdown, itemized as required and within the time specified by the Contracting Officer, with any proposal for a contract modification.

(b) The price breakdown--

(1) Must include sufficient detail to permit an analysis of profit, and of all costs for--

- (i) Material;
- (ii) Labor;
- (iii) Equipment;
- (iv) Subcontracts; and
- (v) Overhead; and

(2) Must cover all work involved in the modification, whether the work was deleted, added, or changed.

(c) The Contractor shall provide similar price breakdowns to support any

amounts claimed for subcontracts.

(d) The Contractor's proposal shall include a justification for any time extension proposed.

(End of clause)

97 252.242-7000 POSTAWARD CONFERENCE (DEC 1991)

The Contractor agrees to attend any postaward conference convened by the contracting activity or contract administration office in accordance with Federal Acquisition Regulation Subpart 42.5.

(End of clause)

98 252.243-7001 PRICING OF CONTRACT MODIFICATIONS (DEC 1991)

When costs are a factor in any price adjustment under this contract, the contract cost principles and procedures in FAR Part 31 and DFARS Part 231, in effect on the date of this contract, apply.

(End of clause)

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SECTION 00800
SPECIAL CONTRACT REQUIREMENTS

1 52.211-10 COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK (APR 1984)

The Contractor shall be required to (a) commence work under this contract within ten (10) calendar days after the date the Contractor receives the notice to proceed, (b) prosecute the work diligently, and (c) complete the entire work ready for use not later than 180 calendar days after Notice to Proceed. The time stated for completion shall include final cleanup of the premises.

(End of clause)

2 52.211-12 LIQUIDATED DAMAGES--CONSTRUCTION (APR 1984)

(a) If the Contractor fails to complete the work within the time specified in the contract, or any extension, the Contractor shall pay to the Government as liquidated damages, the sum of \$310.00 for each day of delay.

(b) If the Government terminates the Contractor's right to proceed, the resulting damage will consist of liquidated damages until such reasonable time as may be required for final completion of the work together with any increased costs occasioned the Government in completing the work.

(c) If the Government does not terminate the Contractor's right to proceed, the resulting damage will consist of liquidated damages until the work is completed or accepted.

(End of clause)

3 52.236-1 PERFORMANCE OF WORK BY THE CONTRACTOR (APR 1984)

The Contractor shall perform on the site, and with its own organization, work equivalent to at least twenty (20%) percent of the total amount of work to be performed under the contract. This percentage may be reduced by a supplemental agreement to this contract if, during performing the work, the Contractor requests a reduction and the Contracting Officer determines that the reduction would be to the advantage of the Government.

(End of clause)

(R 7-603.15 1965 JAN)

(R 1-18.104)

4 52.236-4 PHYSICAL DATA (APR 1984)

Data and information furnished or referred to below is for the Contractor's information. The Government shall not be responsible for any interpretation of or conclusion drawn from the data or information by the Contractor.

(a) The indications of physical conditions on the drawings and in the specifications are the result of site investigations by the methods identified in Division 1 of the specification.

(b) Weather conditions: See Division 1 of the specification.

(c) Transportation facilities: See Division 1 of the specification.

(d) Other Physical Data: See Division 1 of the specification.

(End of clause)

5 52.236-14 AVAILABILITY AND USE OF UTILITY SERVICES (APR 1984)

(a) The Government shall make all reasonably required amounts of utilities available to the Contractor from existing outlets and supplies, as specified in the contract. Unless otherwise provided in the contract, the amount of each utility service consumed shall be charged to or paid for by the Contractor at prevailing rates charged to the Government or, where the utility is produced by the Government, at reasonable rates determined by the Contracting Officer. The Contractor shall carefully conserve any utilities furnished without charge.

(b) The Contractor, at its expense and in a workmanlike manner satisfactory to the Contracting Officer, shall install and maintain all necessary temporary connections and distribution lines, and all meters required to measure the amount of each utility used for the purpose of determining charges. Before final acceptance of the work by the Government, the Contractor shall remove all the temporary connections, distribution lines, meters, and associated paraphernalia.

(End of clause)

(R 7-603.30 1967 APR)

(R 7-2102.4 1976 OCT)

6 52.249-5000 BASIS FOR SETTLEMENT OF PROPOSALS

Actual costs will be used to determine equipment costs for a settlement proposal submitted on the total cost basis under FAR 49.206-2(b). In evaluating a terminations settlement proposal using the total cost basis, the following principles will be applied to determine allowable equipment costs:

(1) Actual costs for each piece of equipment, or groups of similar serial or series equipment, need not be available in the contractor's accounting records to determine total actual equipment costs.

(2) If equipment costs have been allocated to a contract using predetermined rates, those charges will be adjusted to actual costs.

(3) Recorded job costs adjusted for unallowable expenses will be used to determine equipment operating expenses.

(4) Ownership costs (depreciation) will be determined using the contractor's depreciation schedule (subject to the provisions of FAR 31.205-11).

(5) License, taxes, storage and insurance costs are normally recovered as an indirect expense and unless the contractor charges these costs directly to contracts, they will be recovered through the indirect expense rate.

(End of Statement)

7 252.201-7000 CONTRACTING OFFICER'S REPRESENTATIVE (DEC 1991)

(a) Definition. "Contracting officer's representative" means an individual designated in accordance with subsection 201.602-2 of the Defense Federal Acquisition Regulation Supplement and authorized in writing by the Contracting Officer to perform specific technical or administrative functions.

(b) If the Contracting Officer designates a contracting officer's representative (COR), the Contractor will receive a copy of the written designation. It will specify the extent of the COR's authority to act on behalf of the Contracting Officer. The COR is not authorized to make any commitments or changes that will affect price, quality, quantity, delivery, or any other term or condition of the contract.

(End of clause)

8 IDENTIFICATION OF CORRESPONDENCE

All correspondence and data submitted by the contractor under this contract shall reference the contract number.

9

DEPARTMENT OF LABOR WAGE DECISION (CONSTRUCTION)

Any contract awarded as a result of this solicitation will be subject to the U.S. Department of Labor Wage Decision(s) provided following Section 00800, identified as General Decision No. VA970064 dated 04/04/97

10

REQUIRED INSURANCE

The contractor shall procure and maintain during the entire period of performance under this contract, the following minimum insurance:

TYPE	AMOUNT
Workers Compensation	As required by State law
Employer's Liability	\$100,000 per person
General Liability	\$500,000 per occurrence
Motor Vehicle Liability (for each motor vehicle):	
Bodily injury or death	\$200,000 per person \$500,000 per occurrence
Property damage	\$20,000 per occurrence

Prior to commencement of work hereunder, the contractor shall furnish to the Contracting Officer a certificate or written statement of the above required insurance. The policies evidencing required insurance shall contain an endorsement to the effect that cancellation or any material change in the policies adversely affecting the interests of the Government in such insurance shall not be effective for such period as may be

prescribed by the laws of the State in which this contract is to be performed and in no event less than 30 days after written notice thereof to the Contracting Officer.

11

PERFORMANCE OF WORK BY CONTRACTOR

Offeror's attention is directed to FAR 52.236-1, "Performance of Work by Contractor." Contractor is required to furnish a description of the work which will be performed by his own organization, (e.g., earthwork, paving, etc.), the percentage of the total work this represents, and the estimated cost thereof. Such description of work to be performed by the contractor's own organization shall be provided to the Contracting Officer within 10 days of contract award.

12

PERFORMANCE EVALUATION OF CONTRACTOR

As a minimum, the Contractor's performance will be evaluated upon final acceptance of the work. However, interim evaluations may be prepared at any time during contract performance when determined to be in the best interest of the Government.

The format for the evaluation will be DD Form 2626, and the Contractor will be rated either "Outstanding," "Satisfactory," or "Unsatisfactory" in the areas of Contractor Quality Control, Timely Performance, Effectiveness of Management, Compliance with Labor Standards, and Compliance with Safety Standards. The Contractor will be advised on any unsatisfactory rating, either in an individual element or in the overall rating, prior to completing the evaluation; all contractor comments will be made a part of the official record. In compliance with DOD FAR Supplement 236.201, Performance Evaluation Reports will be available to all DOD Contracting Offices for their future use in determining contractor responsibility.

13

LOCATION OF SITE ON A GOVERNMENT RESERVATION

The site of the work is on a government reservation and all rules and regulations issued by the Commanding Officer covering general safety, security, and sanitary requirements, etc., shall be observed by the contractor.

14

ACCIDENT PREVENTION PLAN

In accordance with the clause entitled "Accident Prevention," the contractor will not be allowed to commence work on the job site until an acceptable accident prevention plan has been submitted. The contractor will receive official notification of the acceptance of his accident prevention plan.

15

CONTRACT DRAWINGS, MAPS, AND SPECIFICATIONS

(a) The Government--

- (1) Will provide the Contractor, without charge, one set of large-scale reproducible contract drawings and specifications except publications incorporated into the technical provisions by reference; and
- (2) Additional sets are available on request from the Defense Printing Service, Norfolk, Virginia, (757)444-5968, at the solicitation document price. Document sets will be available from Defense Printing Service until 30 days after contract award.

(b) The Contractor shall--

- (1) Check all drawings furnished immediately upon receipt;
- (2) Compare all drawings and verify the figures before laying out the work;
- (3) Promptly notify the Contracting Officer of any discrepancies; and

(4) Be responsible for any errors which might have been avoided by complying with this paragraph (b).

(c) Large scale drawings shall, in general, govern small scale drawings. Figures marked on drawings shall, in general, be followed in preference to scale measurements.

(d) Omissions from the drawings or specifications or the misdescription of details of work which are manifestly necessary to carry out the intent of the drawings and specifications, or which are customarily performed, shall not relieve the Contractor from performing such omitted or misdescribed details of the work, but shall be performed as if fully and correctly set forth and described in the drawings and specifications.

(e) The work shall conform to the specifications and the contract drawings identified on the following index of drawings:

SEE INDEX OF DRAWINGS IN DIVISION 1 (SECTION 01850) OF THE SPECIFICATION.

END OF SECTION 00800

--- --

General Decision Number VA970064

General Decision Number **VA970064**

Superseded General Decision No. VA960064

State: Virginia

Construction Type:
HEAVY
SEWER AND WATER LINE

County(ies):

BLAND	GILES	RUSSELL
BUCHANAN	GRAYSON	SMYTH
CARROLL	LEE	TAZEWELL
CRAIG	MONTGOMERY	WISE
DICKENSON	NORTON*	WYTHE
FLOYD	PULASKI	
GALAX*	RADFORD*	

*INDEPENDENT CITIES

*INCLUDING THE RADFORD ARMY AMMUNITION PLANT

HEAVY CONSTRUCTION PROJECTS (Including Sewer and Water Lines)

Modification Number	Publication Date
0	02/14/1997
1	04/04/1997

COUNTY(ies):

BLAND	GILES	RUSSELL
BUCHANAN	GRAYSON	SMYTH
CARROLL	LEE	TAZEWELL
CRAIG	MONTGOMERY	WISE
DICKENSON	NORTON*	WYTHE
FLOYD	PULASKI	
GALAX*	RADFORD*	

* BOIL0045B 10/01/1996

	Rates	Fringes
BOILERMAKERS	19.75	8.88

PLUM0491B 12/01/1996

	Rates	Fringes
STEAMFITTERS	17.82	5.80

SUVA2021A 04/01/1989

	Rates	Fringes
CARPENTERS (Excluding Concrete Form Work)	7.69	
CEMENT MASONS	9.78	3.05
IRONWORKERS, REINFORCING	7.30	
LABORERS:		
Unskilled	5.37	
Pipelayers	6.17	.93
POWER EQUIPMENT OPERATORS:		

Backhoes	7.71
Bulldozers	7.84
Loaders	7.45
TRUCK DRIVERS	6.29

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR 5.5(a)(1)(v)).

In the listing above, the "SU" designation means that rates listed under that identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations indicate unions whose rates have been determined to be prevailing.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U. S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U. S. Department of Labor

200 Constitution Avenue, N. W.
Washington, D. C. 20210

4.) All decisions by the Administrative Review Board are final.
END OF GENERAL DECISION

-- - --

Specification No. 2955
ENDM-

Project No. 5952941

SPECIFICATIONS
FOR
BIO PLANT EQUALIZATION BASIN CLOSURE
RADFORD ARMY AMMUNITION PLANT
RADFORD, VIRGINIA

PREPARED BY
U.S. ARMY CORPS OF ENGINEERS
NORFOLK DISTRICT
NORFOLK, VIRGINIA

ISSUED BY
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
NORFOLK DISTRICT
803 FRONT STREET
NORFOLK, VIRGINIA 23510-1096

JULY 1997

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SECTION 01006

SPECIAL WORK RESTRICTIONS AND REQUIREMENTS for RAAP
Feb 94

PART 1 GENERAL

1.1 SUMMARY All project phasing and sequencing shall be coordinated with the Contracting Officer and the Operating Contractor.

1.2 DEFINITIONS:

The following definitions apply to the sections within this project:

- a. Facility: Radford Army Ammunition Plant, Radford, Virginia.
- b. CO: Contracting Officer or his designated representative.
- c. Operating Contractor: Alliant TechSystems Inc.
- d. Earth-disturbing activity: Any activity which has the potential to disturb the soil on the project site, including but not limited to clearing, grubbing, excavation, backfilling, grading, drilling, boring, and vehicle movement (either wheeled, tracked, skidded, or dragged).

1.3 SUBMITTALS (Not Applicable)

1.4 COOPERATION WITH USING AGENCY AND OTHER CONTRACTORS

Note that Operating Contractor, formerly Hercules Inc., is now Alliant TechSystem. During the period of this contract, other contracts may be in force for the construction of other features of work on or adjacent to the site of work being accomplished under this contract. It shall be the responsibility of the Contractor on this contract to be fully informed of the extent of the limits of work to be performed by other contractors. Should there be any conflict between these limits, it shall be brought to the attention of the CO and the CO's decision shall be final. Also, prior to completion of work under this contract, members of the Using Agency may be performing work or occupying facilities on or adjacent to the area. The Contractor shall arrange his plant and shall schedule and perform this work so as to effectively cooperate with all other Contractors and Government agencies.

1.5 COORDINATION BETWEEN CONTRACTORS

It shall be the responsibility of the Contractor on this contract to be fully informed of the extent of the limits of work to be performed by other Contractors. Should there be any conflict between these limits, it shall be brought to the attention of the Contracting Officer and the Contracting Officer's decision shall be final

1.6 PERSONNEL RESTRICTIONS

Personnel are limited to the immediate site areas and shall not enter buildings or facilities not involved in the work. All employees of the Contractor will be subject to all rules and regulations of Alliant TechSystem and which pertain to personnel. The Contractor shall erect fences and signs as specified. The Contractor's plans for restricting personnel access to the project site shall be submitted for approval as a part of the Job Hazard Analysis. This will include restrictions put in

place by the Contractor-supplied Archaeological Monitor (C-sAM) if such restrictions have to be put in place due to archaeological investigations.

1.7 TRANSPORTATION FACILITIES

The facility is served by an all weather surfaced road network. Road(s) within the military reservation proposed to be used by the Contractor shall be subject to prior approval of the Post authorities and such roads, if used, shall be maintained throughout construction and shall be restored to as good condition as existed prior to their use. The Contractor shall also construct, subject to approval, such temporary haul roads and bridges as may be necessary for conducting his work. Any such temporary construction shall be removed and the affected area restored to its original condition. All costs for the use of existing transportation facilities, for the construction of temporary facilities, and for maintenance, repair, removal and restoration shall be borne by the Contractor.

1.7.1 Road Restrictions

The movement of all vehicles within the Post shall be confined to the roads designated and shall comply with traffic regulations within the Post. Other roads may be used only with the approval of the Contracting Officer

1.7.2 Loading Limitations

Load limit for all roads within the boundaries of RAAP is 8 tons. For bidding purposes, the Contractor may exceed these limits to 8 tons per axle.

1.7.3 Cleated Vehicles

Cleated vehicles shall not be moved over surfaced roads except at the immediate site of the area where they are to be used.

1.7.4 Use of Roads

The Contractor shall keep all roads clear of all obstructions and free of mud and other foreign materials resulting from operations. The Contractor's vehicles shall at no time follow a vehicle closer than 50 feet, and all vehicles shall pull off the road and come to a complete stop when meeting emergency vehicles and vehicles with flashing lights. Post speed limits and traffic controls will be observed.

1.7.5 Bridge Limitations

The New River bridge in the Plant has an H-20 live load limit as designated by the American Association of State Highway Officials, and this limit shall not be exceeded. Loads wider than 10-1/2 feet or higher than 16 feet shall not be moved over the bridge without prior approval of the Contracting Officer.

1.7.6 Personnel Transportation Within the Plant

Contractor owned vehicles shall be used to transport workers from the entrance gates to the work sites, be equipped with approved fire extinguisher and first aid kits, and meet all laws and regulations for transporting person(s) on state of Virginia highways. Private owned vehicles will not be allowed in the Plant area within the security fence. Buses and other approved vehicles used for transport of workers only may be parked overnight inside the gate in the area to be designated at the time of construction.

1.7.7 Vehicle Passes

Only official Contractors' vehicles which are used in the performance of the work will be permitted within the Plant. Each Contractor vehicle utilized within the Plant shall be equipped with an approved fire extinguisher and first aid kit. A vehicle pass will be issued to approved vehicles upon request to the Plant Security Officer. No vehicles will be allowed to enter the Plant until such permits have been issued.

1.7.8 Use of Roads Within the Plant

Hard-surfaced roads from U.S. Highways 11 and 460 serve the plant. The movement of all vehicles within the Facility shall be confined to the roads designated and shall comply with traffic regulations within the Facility. Other roads may be used only with the approval of the CO. The Contractor shall keep all roads clear of all obstructions and free of mud and other foreign materials resulting from operations. The Contractor's vehicles shall at no time follow a vehicle closer than 50 feet, and all vehicles shall pull off the road and come to a complete stop when meeting emergency vehicles, vehicles with flashing lights, vehicles escorting heavy equipment. When approaching jeep tractor-trailers from the rear, vehicles shall not pass. Facility speed limits and traffic controls shall be observed.

1.7.9 Catalytic Converters

The use of catalytic converter equipped vehicles is restricted to limited areas of the plant, and must be approved for specific use and in specific locations by the Operating Contractor.

1.7.9.1 Operation

Catalytic converter equipped vehicles may be operated within explosives areas, but will not be permitted to stand or park within 50 feet of any structure containing explosives.

1.7.9.2 Transportation of Explosives

Vehicles equipped with catalytic converters will not be used for transporting explosives.

1.7.9.3 Parking of Vehicles with Catalytic Converters

Vehicles equipped with catalytic converters will not be permitted to stand or park in areas where vegetation or other combustible materials beneath the vehicle may catch fire from converter heat. Fire fighting and security vehicles may leave hardstands or paved roads during an actual emergency, but this will be held to a minimum.

1.7.9.4 Flammable Hazards

Catalytic converter equipped vehicles may not stand or park within 50 feet of any fuel or other flammable materials, or dispensing unit, except for servicing of such vehicles with fuels at motor pools or service stations.

1.7.10 Roadways and Rail Service

Railroad shipments may be made by Norfolk Southern Railway directly into Radford Army Ammunition Plant. Such shipments shall be made to Pepper, Virginia. Hard-surfaced roads from U.S. Highways 11 and 460 serve the plant

1.8 COORDINATION AND WORK PHASING

1.8.1 Work in Unoccupied Area(s)

The area where the Contractor is scheduled to perform the work will not be occupied during the work, however, the Contractor's work activities may affect other area(s) that are occupied. All work shall be in accordance with the Contractor's approved work plan.

1.8.1.1 Work Location:

Refer to Drawing No. T-2, Orientation and Access Map, Norfolk District File No. RAD 256-1.2.

1.8.1.2 Coordination with Government Using Service

Prior to beginning operations at the site of the work, the Contractor shall contact the appropriate representative of the Government Using Service to receive information concerning more specific details and instructions with respect to Radford AAP regulations and procedures.

1.8.2 Nature of The Work

1.8.2.1 The work to be performed by the Contractor shall include but not be limited to the following items. Refer to the drawings and technical specifications for a detailed description of the work required.

1.8.2.2 Demolition of concrete floodwall, Inlet Channel, Effluent Pump Station, (including overhead pipe system from pump station to main building and all pertinent electrical demolition), and concrete trench. Removal of rip-rap along the north side of the basin and hauling material to the on-site Rip-Rap Storage Area and cleaning and removal of 20" steel pipe along south end of the basin.

1.8.2.3 Excavation, removal, and disposal of basin's soil/cement liner. Note that soil/cement liner was originally constructed from a mixture of asphaltic emulsion and soil. Note that should the Contractor be required by the receiving Landfill Owner to show that the demolition debris is not hazardous the Contractor will first attempt to demonstrate this proof using the results of the TCLP analysis from Table 3-3 of the February 1997 Site Investigation/Evaluation Study (Contractor may review this document from the Norfolk District, POC, Marc Gutterman). Should these results not satisfy the Landfill Owner's Permit and further testing is required, the Contracting Officer shall be immediately notified and a sampling protocol agreed upon for further testing. Should the Contractor's initial test results show contamination in the demolition debris then the government shall require verification testing. If verification testing is positive for contamination, then all work will cease until a Change Order is approved for removing and disposing the contaminated demolition debris. All negative test results shall be paid by the Contractor and all positive test results shall be paid by the Government.

1.8.2.4 Backfilling and grading of Equalization Basin to original grades as shown on drawings.

1.8.2.5 The Contractor shall provide a properly trained archaeologist (referred to herein as Contractor-supplied Archaeological Monitor or C-sAM) to monitor the earth-disturbing work within the area identified on the drawings. This individual shall meet the Secretary of Interior's Standards for Professional Archaeologists (Appendix A to 36CFR61), and be subject to approval by RFAAP, Norfolk District, and the Virginia State

8. A report on all monitoring activity and data recovery meeting the standards for such reports as dictated by the Virginia Department of Historic Resources will be prepared by the C-sAM, on behalf of RAAP. This report will be prepared even if no significant archaeological resources are encountered, to document this negative finding. A report of negative finding shall be considered the baseline report.
 9. The C-sAM, in agreement with RFAAP, the Norfolk District and the SHPO, will arrange for the curation of discovered archaeological remains as required and will prepare curation agreement documents as appropriate.
 10. Should the SHPO object within 30 days to any plans or proposed actions pursuant to this agreement, RFAAP shall consult with the SHPO to resolve the objection. If the RFAAP determines the objection cannot be resolved, the RFAAP shall request the further comments of the Advisory Council pursuant to 36 CFR 800.6(b). Any Council comment provided in response to such a request will be taken into account by the RFAAP in accordance with 36 CFR 800.6(c)(2) with reference only to the subject of the dispute; the RFAAP's responsibility to carry out all actions under this agreement not the subject of the dispute will remain unchanged.
 11. Time extensions for Contractor's archaeological staff and archaeological downtime will be in accordance with paragraph 1.13 of this Section.
- 1.8.2.6 The Corps of Engineers, Installation Operating Contractor and the construction Contractor will establish a schedule for demolition and backfilling at the site during the Preconstruction Conference.
- 1.8.2.6.1 Begin demolition of concrete floodwall and removal of the 12" soil/cement liner. Note that liner material was originally constructed from a mixture of asphaltic emulsion and soil. Liner material shall be excavated, removed, and disposed of properly offsite.
- 1.8.2.6.2 All equipment shall be washed down prior to leaving RAAP.

1.8.3 Maintenance of Utilities

Any active utilities, including but not limited to electricity, gas, water, sewer, heating, air conditioning, or any like service, that will require interruption or replacement in any occupied area affected as a result of the Contractors scheduled work activities, shall be temporarily provided by the Contractor at his own expense until the affected service is fully and permanently restored. All temporary method(s) of service replacement the Contractor proposes for use on this contract shall be approved by the Contracting Officer prior to commencing the work. No process lines will be disconnected by the Contractor unless approval has been granted by Alliant Techsystems.

1.8.4 Hours of Work

The normal work day for construction shall be from 7:30 a.m. to 4:00 p.m., Monday through Friday of each week. Any request to change these hours shall be made in writing to the Contracting Officer at least two calendar days prior to the desired day on which the change is to go into effect. The changed hours shall not go into effect until written permission has been received from the Contracting Officer.

1.9 SPECIAL RADFORD AAP REQUIREMENTS

1.9.1 Hot Work Permit

Heat or spark producing devices such as welding machines, power actuated anchoring devices, drills, and flashlights shall not be used either inside or outside working areas until a hot work permit has been issued by the Operating Contractor. Request for hot work permits shall be made in writing to the Contracting Officer not less than five working days prior to the request of the permit. All heat producing devices shall be attended at all times. Contractor and his Subs are responsible to assure that the area is wet with water while all work is being performed.

1.9.2 Blasting

Blasting will not be permitted on this project.

1.9.3 Mobile Radio Equipment

The Contractor shall obtain approval for certain frequencies while using any mobile radio equipment within the fenced area of the Plant

1.9.4 Contaminated Areas

Notice is hereby given that some of the areas in which the work is to be performed may have been used for the processing of explosive materials. The Government does not in any way warrant that the areas are entirely free of all explosives and no representation of any kind whatsoever is made that all explosives have been removed, nor will the Government be liable for any damage to persons or property should any damage be occasioned as a result of any explosive material that may not have been removed. The Contractor will be held responsible for making these facts known to all personnel during the performance of this work.

1.9.5 Security

1.9.5.1 Property Passes Property passes for the entry and removal of property will be issued by the Contracting Officer. All materials and tools, including hand tools, must be itemized on the property pass for entry into the Plant, and property to be removed from the Plant must be itemized on a pass signed by a Government representative. Any property to be removed that is not on the pass will not be allowed to be removed.

1.9.5.2 Area Entry Permit

The Contractor shall sign Form RA-603 before Contractor employees will be allowed to enter the Plant area within the security fence. This form will be completed by the Operating Contractor and a copy of the signed form furnished to the Contracting Officer.

1.9.5.3 Notification Letter

Within 5 calendar days of receipt of his Notice to Proceed the Contractor shall forward a letter through the Area Engineer, Southwestern Virginia Area Office, Norfolk District, Corps of Engineers, Radford, Virginia 24141, to the plant security officer (Commander, Radford Army Ammunition Plant, ATTN: SARRA-SS, Radford, Virginia 24141) providing general data about the project. Required information is shown in the following "INITIAL CONTRACTOR REPORT". Significant changes will be reported as they occur and documented as a part of the Daily Report.

INITIAL CONTRACTOR REPORT

- ON SITE SUPERINTENDENT

-
- * LOCAL ADDRESS
-
- * LOCAL TELEPHONE NUMBER
-
- * WORK AREA/BUILDING
-
- * BRIEF DESCRIPTION OF WORK
-
- * NUMBER OF PERSONNEL EMPLOYED ON PROJECT (approx.)
-
- * LENGTH OF CONTRACT
-
- * SUBCONTRACTORS
-
- * NORMAL WORKING HOURS
-
- * LOCATION OF OFFICE TRAILER(S) ON PLANT (if any)
-
- * Changes in this information will be reported in the Daily Report of operations as they occur.

1.9.5.4 Daily Report

A daily report shall be provided by the Contractor which shall indicate which employees are working that day and what area/building they will be working in. This report shall be provided to Alliant Tech Systems Security Department, Badge and Decal Section (Building 229), not later than 8:00 a.m. daily. Contractors shall document in the Daily Report and notify Alliant Tech Systems Security Department whenever they have personnel working in an area before or after their regularly established working hours. Any request to work at other than regularly established hours may require using a gate not normally open at that time. The request shall be in writing and will be processed through the plant security office at least 24 hours prior to performance of the work. A copy of the approved request shall be furnished to the Contracting Officer and noted in the Daily Report of operations. Alliant Tech Systems, the operating Contractor, will have their security department check work sites periodically to verify the accuracy of the daily reports provided by the Contractor.

1.10 INTERRUPTIONS OF UTILITIES

1.10.1 Approval

Utility services shall not be interrupted by the Contractor to relocate, make connections, or interrupt for any purpose, without written approval of the Contracting Officer.

1.10.2 Request

Request for permission to shut down services shall be submitted in writing to the Contracting Officer not less than 10 calendar days prior to date of proposed interruption. The request shall give the following information:

- (a) Nature of Utility (Gas, L.P. or H.P., Water, Elec.)
- (b) Size of line and location of shutoff.
- (c) Buildings and services affected.

(d) Hours and date of shutoff.

(e) Estimated length of time service will be interrupted.

1.10.3 Service Interruptions

Services shall not be shut off until receipt of approval of the proposed hours and date from the Contracting Officer.

1.10.4 Timely Disconnections

Shutoffs which will cause interruption of Government work operations as determined by the Contracting Officer shall be accomplished during regular non-work hours or non-work days of the Using Agency without any additional cost to the Government.

1.10.5 Utilities Operation

Operation of valves on water mains will be by Government personnel. Where shutoff of water lines interrupts service to fire hydrants or fire sprinkler systems, the Post Fire Department shall be notified by the Contractor in writing 72 hours prior to the proposed interruption. The Contractor shall arrange his operations and have sufficient material and personnel available to complete the work without undue delay and shall restore service without delay in event of emergency.

1.10.6 Gas

Flow in gas mains which have been shut off shall not be restored until the Government inspector has determined that all items serviced by the gas line have been shut off.

1.11 PHYSICAL DATA

The physical conditions indicated on the drawings and in the specifications are the result of site investigations.

1.12 TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER

This provision specifies the procedure for the determination of time extensions for unusually severe weather in accordance with the Contract Clause entitled "Default: (Fixed Price Construction)". In order for the Contracting Officer to award a time extension under this clause, the following conditions must be satisfied:

- (a) The weather experienced at the project site during the contract period must be found to be unusually severe, that is, more severe than the adverse weather anticipated for the project location during any given month.
- (b) The unusually severe weather must actually cause a delay to the completion of the project. The delay must be beyond the control and without the fault or negligence of the contractor.

1.12.1 Schedule

The following schedule of monthly anticipated adverse weather delays is based on National Oceanic and Atmospheric Administration (NOAA) or similar data for the project location and will constitute the base line for monthly weather time evaluations. The contractor's progress schedule must reflect

these anticipated adverse weather delays in all weather dependent activities.

MONTHLY ANTICIPATED ADVERSE WEATHER DELAY
WORK DAYS BASED ON (5) DAY WORK WEEK

		JAN	FEB	MAR	APR	MAY	JUNE	JUL	AUG	SEP	OCT	NOV	DEC	RFAAP
11	9	9	6	8	8	9	7	6	5	6	10			

1.12.2 Records

Upon acknowledgement of the Notice to Proceed and continuing throughout the contract, the contractor will record on the daily CQC report, the occurrence of adverse weather and resultant impact to normally scheduled work. Actual adverse weather delay days must prevent work on critical activities for 50 percent or more of the contractor's scheduled work day.

1.12.3 Impacted Days

The number of actual adverse weather days shall include days impacted by actual adverse weather (even if adverse weather occurred in previous month), be calculated chronologically from the first to the last day in each month, and be recorded as full days. If the number of actual adverse weather delay days exceeds the number of days anticipated in the schedule of monthly anticipated adverse weather delays, above, the contracting officer will convert any qualifying delays to calendar days, giving full consideration for equivalent fair weather work days, and issue a modification in accordance with the Contract Clauses entitled "Default (Fixed Price Construction)".

1.13 TIME EXTENSIONS FOR ARCHEOLOGICAL DELAY

1.13.1 This provision specifies the procedure for the determination of time extensions for archeological delay in accordance with the contract clause entitled "Default (Fixed Price Construction)". The schedule below defines the anticipated archeological delay for the contract period. The contract completion time includes 60 days for archeological delays.

1.13.2 The above schedule of anticipated archeological delay will constitute the base line for archeological delay evaluations. Upon acknowledgement of the Notice to Proceed and continuing throughout the contract on a monthly basis, actual archeological delay days will be recorded on a work day basis and compared to the anticipated archeological delay in the schedule above. The term actual archeological delay days shall include days impacted by actual archeological delay.

1.13.3 The number of actual archeological delay days shall be calculated chronologically. Once the number of actual archeological delay days anticipated in the schedule above have been incurred, the Contracting Officer will examine any subsequently occurring archeological delay days to determine whether a contractor is entitled to a time extension. All archeological delay days must prevent work for 50 percent or more of the contractor's work day and delay work critical to the timely completion of the project. The Contracting Officer will issue a modification in accordance with the contract clause entitled "Default (Fixed Price Construction)".

1.13.4 The maximum shut down period for the Archaeological Investigation shall be 60 working days. The first day of the shutdown will be such date when the C-sAM discovers a significant find. The Contracting Officer shall have the final authority for ordering a shutdown. The reason for shut down is to accommodate the archaeological investigation to determine the historical significance of the Native American cultural items unearthed.

1.14 SCHEDULING AND DETERMINATION OF PROGRESS

In accordance with the Contract Clauses, the Contractor shall within five calendar days after date of commencement of work or as otherwise determined by the Contracting Officer, submit for approval a practicable progress schedule. The progress schedule shall be in the form of a chart graphically indicating the sequence proposed to accomplish each work feature or operation. The chart shall be prepared to show the starting and completion dates of all work features on a linear horizontal time scale beginning with date of Notice to Proceed and indicating calendar days to completion. Each activity in the construction shall be represented by an arrow. The head to tail arrangement of arrows shall flow from left to right and shall show the order and interdependence of activities and the sequence in which the work is to be accomplished as planned by the Contractor. Each arrow representing an activity shall be annotated to show the activity description and duration. Contractor shall indicate on the chart the important work features or operations that are critical to the timely overall completion of the project. Key dates for such important work features and portions of work features are milestone dates and shall be so indicated on the chart. This schedule will be the medium through which the timeliness of the Contractor's construction efforts is appraised.

When changes are authorized that result in contract time extensions, Contractor shall submit a modified chart for approval by the Contracting Officer. The Contract Clause entitled "SCHEDULE FOR CONSTRUCTION CONTRACTS" with reference to overtime, extra shifts, etc., may be invoked when the Contractor fails to start or complete work features or portions of same by the time indicated by the milestone dates of the approved progress chart, or when it is apparent to the Contracting Officer from the Contractor's actual progress that these dates will not be met. Neither on this chart nor on the periodic chart which the Contractor is required to prepare and submit, as described in "SCHEDULE FOR CONSTRUCTION CONTRACTS" of the Contract Clauses, shall the actual progress to be entered include or reflect any materials which may be on the site, but are not yet installed or incorporated in the work. For payment purposes only, an allowance will be made by the Contracting Officer of 100 percent of the invoiced cost of materials or equipment delivered to the site but not incorporated into the construction, pursuant to Contract Clause "PAYMENTS UNDER FIXED-PRICE CONSTRUCTION CONTRACTS". The Contractor's progress schedule shall include a chart of the scheduled work activities plotting scheduled completion percentage based on dollar value on one axis and time on the other axis. The actual progress shall be plotted on the required periodic chart submittals to indicate the percentage of work scheduled and actually completed.

1.15 PURCHASE ORDERS

To ensure proper expediting of orders the Contractor and his subcontractors shall furnish to the Contracting Officer, one copy of each purchase order covering supplies or services required for performance of the work. Each purchase order shall clearly indicate the date of placement, the date delivery is required in order to avoid delay in the scheduled progress of the work, and the date delivery is promised by the supplier or producer. Copies of purchase orders shall be forwarded on the date issued.

1.19 SALVAGE MATERIALS AND EQUIPMENT

The Contractor shall maintain adequate property control records for all materials or equipment specified to be salvaged. These records may be in accordance with the Contractor's system of property control, if approved by the Contracting Officer. The Contractor shall be responsible for the

adequate storage and protection of all salvaged materials and equipment and shall replace, at no cost to the Government, all salvage materials and equipment which are broken or damaged during salvage operations as the result of his negligence, or while in his care. Salvage material to include lift station pumps

1.20 HISTORICAL AND ARCHEOLOGICAL FINDS

All articles of historical or archeological value, including, but not limited to, coins, fossils, and articles of antiquity which may be uncovered by the Contractor during the progress of the work, shall remain the property of the Government. Such findings shall be reported immediately to the Contracting Officer who will determine, in consultation with the C-sAM, the method of removal, where necessary, and the final disposition thereof.

1.20.1 GENERAL ARCHEOLOGICAL REQUIREMENTS

Construction of this project will take place in areas where significant archeological features may exist. Close coordination between the contractor and the Contracting Officer will be necessary to insure compliance with state and federal historical preservation regulations. Several steps have been taken to minimize the impact of archeological finds on progress of this contract

1.20.2 Based on archeological surveys, locations of possible archeological sites are identified on the plans and in the specifications. The contractor shall provide the Contracting Officer a minimum of 48 hours advance notice prior to starting work in these areas.

1.20.3 The Contractor is advised that archaeological features may be discovered at the project location and that he must provide an archaeologist to monitor all earth-disturbing activities as indicated in Paragraph 1.8.2.5 above. If significant archaeological remains are observed by the C-sAM, then the Contracting Officer must be notified. If the Contracting Officer, in consultation with the C-sAM, determines that archeological finds require review and preservation to the extent that a significant work stoppage at that site is necessary, the Contractor shall, at no additional cost to the Government, move his operations to another portion of the contract. If, in the opinion of the Contracting Officer it is impractical for the Contractor to move his operations to another portion of the contract and archeological conditions prevent work for 50 percent or more of the Contractor's work day and delay work critical to the timely completion of the project, the delay will be evaluated in accordance with paragraph "Time Extensions for Archeological Delays".

1.20.4 The Contractor may occasionally encounter minor archeological features which will require 5 to 60 minutes for the Contracting Officer's authorized representative to inspect. To the extent possible, these inspections will be conducted during the contractor's scheduled breaks; however, the contractor can expect occasional brief work stoppages to allow necessary examination of unearthed features.

1.20.5 At the direction of the Contracting Officer, after consultation with the C-sAM, the Contractor shall provide additional archeological support services as specified. The archeological support personnel shall have previously received and completed the necessary training and on-site experience requirements as established in 29 CFR 1926.65(e), the OSHA standard for hazardous waste operations and emergency response (HazWOPER). Services shall be provided within 24 hours of notification. Any contract delays due to slow response of contractor shall be the contractor's responsibility. Payment will be determined by the actual hours of each

service provided and hourly unit prices bid by the contractor are subject to the approval of the Contracting Officer and shall be under the supervision of the Contracting Officer or his authorized representative.

Job Description are as follows:

1. Archeological Crew Chief, Education, Experience: Completion of an Undergraduate degree in Anthropology, History, Museum Sciences or a related field, AND 6 months experience supervising archeological technicians on an excavation site; OR at least 1 year's experience supervising archeological technicians on an excavation site. Graduate training in anthropology, history, etc. is preferred but not required.
2. Archeological Technician, Education: No special qualifications. Must be able to read and write. Experience: At least 6 weeks previous experience in archeological excavation under the supervision of a professional archaeologist is preferred. This can include employment, high-school or college field training courses, or some combination. Participation in training and certification programs sponsored by amateur societies may be an acceptable substitute in individual cases.
3. Common labor - no specialized experience required.
4. Night Watchmen - private security guard (subject to approval of Contracting Officer) or off-duty policeman.

1.20.6 Monitoring of excavations will be by the C-sAM.

1.21 EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE

1.21.1 Allowable Costs

Allowable cost for construction and marine plant equipment in sound workable condition owned or controlled and furnished by a Contractor or subcontractor at any tier shall be based on actual cost data when the Government can determine both ownership and operating costs for each piece of equipment or equipment groups of similar serial and series from the Contractor's accounting records. When both ownership and operating costs cannot be determined from the Contractor's accounting records, equipment costs shall be based upon the applicable provisions of EP 1110-1-8, "Construction Equipment Ownership and Operating Expense Schedule," Region II. Work conditions shall be considered to be average for determining equipment rates using the schedule unless specified otherwise by the Contracting Officer. For equipment not included in the schedule, rates for comparable pieces of equipment may be used or a rate may be developed using the formula provided in the schedule. For forward pricing, the schedule in effect at the time of negotiations shall apply. For retrospective pricing, the schedule in effect at the time the work was performed shall apply.

1.21.2 Rental Costs

Equipment rental costs are allowable, subject to the applicable provisions of the Federal Acquisition Regulations, and shall be substantiated by certified copies of paid invoices. Rates for equipment rented from an organization under common control, lease-purchase or sale-leaseback arrangements will be determined using the schedule except that rental costs leased from an organization under common control that has an established practice of leasing the same or similar equipment to unaffiliated lessees are allowable. Costs for major repairs and overhaul are unallowable.

1.21.3 Equipment Costs

When actual equipment costs are proposed and the total amount of the pricing action is over \$25,000, cost or pricing data shall be submitted on the

Standard Form 1411, "Contract Pricing Proposal Cover Sheet". By submitting cost or pricing data, the Contractor grants to the Contracting Officer or an authorizing representative the right to examine those books, records, documents and other supporting data that will permit evaluation of the proposed equipment costs. After price agreement the Contractor shall certify that the equipment costs or pricing data submitted are accurate, complete and current.

1.22 SUBCONTRACTS AND WORK COORDINATION

Contract Clauses "SUBCONTRACTS", "PERMITS AND RESPONSIBILITIES", and "MATERIAL AND WORKMANSHIP" are supplemented as follows:

- (a) Divisions or sections of specifications are not intended to control the Contractor in dividing the work among subcontractors, or to limit work performed by any trade.
- (b) Contractor shall be responsible for coordination of the work of the trades, subcontractors, and materials.
- (c) The Government or its representative will not undertake to settle any difference between the Contractor and Contractor's subcontractors, or between subcontractors.
- (d) The Government reserves the right to refuse to permit employment on the work or require dismissal from the work of any subcontractor who, by reason of previous unsatisfactory work on Corps of Engineers projects, or for any other reason is considered by the Contracting Officer to be incompetent or otherwise objectionable.

1.23 CONSTRUCTION MANPOWER AND EQUIPMENT REPORT

The Contractor shall submit executed CENAO Form 987, Construction Manpower and Equipment Report daily. The report shall include manpower and equipment for the general and subcontractors. Forms are available from the Contracting Officer's Representative.

1.24 SITE CONTAMINATION

1.24.1 Category III

This site is designated a Category III site. A Category III site is defined as a site which is located in an area known or suspected to be contaminated.

1.24.2 Compliance Requirements

The Contractor shall comply with applicable Federal, state and local laws, codes, ordinances and regulations (including the obtaining of licenses and permits) in connection with hazardous material.

1.24.3 Requirements

The requirements of this clause and any act or failure to act by the Government shall not relieve the Contractor of any responsibility or liability for the safety of Government, Contractor or subcontractor personnel or property.

1.24.4 Contamination

In the event that contamination is encountered, the Contracting Officer shall be advised immediately. The contamination shall either be removed as directed and replaced with satisfactory material. Payment therefor will be made in conformance with the CHANGES clause of the CONTRACT CLAUSES.

1.24.5 WORK IN QUARANTINED AREA

The work called for by this contract involves activities in counties quarantined by the Department of Agriculture to prevent the spread of certain plant pests which may be present in the soil. The Contractor agrees that all construction equipment and tools to be moved from such counties shall be thoroughly cleaned of all soil residues at the construction site with water under pressure and that hand tools shall be thoroughly cleaned by brushing or other means to remove all soil. In addition, if this contract involves the identification, shipping, storage, testing, or disposal of soils from such a quarantined area, the Contractor agrees to comply with the provisions of ER 1110-1-5 and attachments, a copy of which will be made available by the Contracting Officer upon request. The Contractor agrees to assure compliance with this obligation by all subcontractors.

1.24.6 Specific Site Contamination

The U.S. Army Corps of Engineers (USACE), Norfolk District has recently completed construction of a new equalization concrete basin system during the expansion project to the Biological Treatment Plant (Bio-Plant). The new basin system replaced the old basin which is to be backfilled and closed under this project. An Environmental Site Investigation/Evaluation has recently been completed (February 1997) which determined that contaminants of concern were below background and/or health based criteria levels, thereby rendering the basin clean for closure.

1.24.6.1 OSHA Monitoring Advisement

The Contractor is advised that because the proposed construction activities at the Equalization Basin are associated with or proximate to the Bio-Plant treatment facility which results in the production of a listed hazardous waste (K044), characterization of soil in and around the area was previously performed. The K044 sediment and sludge from the old equalization basin has been removed and disposed of as of July, 1995. For the surrounding soils the characterization results previously performed indicated that the arsenic concentrations appeared to be more indicative of background concentrations due to general natural sources than site-related. Otherwise, the area does not appear to be impacted by site activities and no remedial action appears warranted for these areas. Because total concentrations of arsenic detected in soils in the area exceed U.S. EPA HBNS as outlined in the RAAP Permit, special considerations may be necessary during construction activities. To ensure that field workers are properly protected against inhalation hazards associated with arsenic contaminated dust, action levels to be used in conjunction with real time monitors were developed and are provided as an example. It shall be the responsibility of the Contractor to develop the air monitoring protocols and site-specific action levels for arsenic. Arsenic is covered by a specific standard by OSHA (29 CFR 1910.1018), and has specifically established exposure monitoring requirements. The Contractor's competent person shall determine if the standard applies and monitor employee's exposures as required.

1.24.6.2 Nuisance Dust Levels

Monitoring of fugitive dust levels during excavation and backfilling is recommended to determine the level of personal protection required because the OSHA permissible exposure limit (PEL) for respirable dust (5 mg/m³) is less than the calculated inhalation exposure limit for workers performing construction activities for arsenic (530 mg/m³). If fugitive dust levels are not exceeded, arsenic should not be of concern to worker health and safety. However, it is recommended that the contractor provide a minimum Level D protection to all employees involved in the proximity of soil

disturbing activities. The OSHA protective measures for nuisance dust levels which will be protective for a maximum arsenic concentrations detected in soils are listed below. Increased levels of protection beyond Level D will be required if particulates exceed action levels as listed in the following table.

HAZARD	MONITORING METHOD	ACTION LEVEL	MONITORING SCHEDULE	PROTECTIVE MEASURES
Arsenic	Particulate	Up to 2.5 mg/m3 above background in the breathing zone	Periodically (every 30 minutes during invasive/construction activities)	Level D
		2.5 - 25 mg/m3 (every 30 minutes during invasive/construction activities)	Periodically	Level C*

- * Level C personal protective equipment (PPE) includes a minimum 1/2 facepiece respirator with high efficiency particulate air (HEPA) cartridges. Although skin protection is not necessary in this situation, workers may wish to wear protective garments to afford protection against nuisance particulates.

1.25 PROFIT

1.25.1 Weighted Guidelines

Weighted guidelines method of determining profit shall be used on any equitable adjustment change order or modification issued under this contract. The profit factors shall be as follows:

Factor	Rate	Weight	Value
Degree of Risk	20		
Relative difficulty of work	15		
Size of Job	15		
Period of performance	15		
Contractor's investment	05		
Assistance by Government	05		
Subcontracting	25		
	100		

1.25.2 Value

Based on the circumstances of each procurement action, each of the above factors shall be weighted from .03 to .12 as indicated below. The value shall be obtained by multiplying the rate by the weight. The value column when totalled indicates the fair and reasonable profit percentage under the circumstances of the particular procurement.

1.25.3 Degree of Risk

Where the work involves no risk or the degree of risk is very small, the weighting should be .03; as the degree of risk increases, the weighting should be increased up to a maximum of .12. Lump sum items will have, generally, a higher weighted value than the unit price items for which quantities are provided. Other things to consider: the portion of the work

to be done by subcontractors, nature of work, where work is to be performed, reasonableness of negotiated costs, amount of labor included in costs, and whether the negotiation is before or after performance of work.

1.25.4 Relative Difficulty of Work

If the work is most difficult and complex, the weighting should be .12 and should be proportionately reduced to .03 on the simplest of jobs. This factor is tied in to some extent with the degree of risk. Some things to consider: the nature of the work, by whom it is to be done, where, and what is the time schedule.

1.25.5 Size of Job

All work not in excess of \$100,000 shall be weighted at .12. Work estimated between \$100,000 and \$5,000,000 shall be proportionately weighted from .12 to .05.

1.25.6 Periods of Performance

Jobs in excess of 24 months are to be weighted at .12. Jobs of lesser duration are to be proportionately weighted to a minimum of .03 for jobs not to exceed 30 days. No weight where additional time not required.

1.25.7 Contractor's Investment

To be weighted from .03 to .12 on the basis of below average, average, and above average. Things to consider: amount of subcontracting, mobilization payment item, Government furnished property, equipment and facilities, and expediting assistance.

1.25.8 Assistance by Government

To be weighted from .12 to .03 on the basis of average to above average. Things to consider: use of Government owned property, equipment and facilities, and expediting assistance.

1.25.9 Subcontracting

To be weighted inversely proportional to the amount of subcontracting. Where 80 percent or more of the work is to be subcontracted, the weighting is to be .03 and such weighting proportionately increased to .12 where all the work is performed by the Contractor's own forces.

PART 2 Not Used

PART 3 Not Used

-End of Section-

SECTION 01090

SOURCES FOR REFERENCE PUBLICATIONS
12/96

PART 1 GENERAL

1.1 REFERENCES

Various publications are referenced in other sections of the specifications to establish requirements for the work. These references are identified in each section by document number, date and title. The document number used in the citation is the number assigned by the sponsoring organization, e.g.

UL 1 (1993; Rev thru Jan 1995) Flexible Metal Conduit. However, when the sponsoring organization has not assigned a number to a document, an identifying number has been assigned for convenience, e.g. UL's unnumbered 1995 edition of their Building Materials Directory is identified as UL-01 (1995) Building Materials Directory. The sponsoring organization number (UL 1) can be distinguished from an assigned identifying number (UL-1) by the dash mark (-).

1.2 ORDERING INFORMATION

The addresses of the organizations whose publications are referenced in other sections of these specifications are listed below, and if the source of the publications is different from the address of the sponsoring organization, that information is also provided. Documents listed in the specifications with numbers which were not assigned by the sponsoring organization should be ordered from the source by title rather than by number.

ACI INTERNATIONAL (ACI)

P.O. Box 9094
Farmington Hills, MI 48331
Ph: 810-848-3700
Fax: 810-848-3766

AGRICULTURAL MARKETING SERVICE (AMS)

Seed Regulatory and Testing Branch
USDA, AMS, LS Div.
Bldg. 506, BARC-East
Soil Conservation Rd.
Beltsville, MD 20705
Ph: 301-504-9430

AMERICAN ASSOCIATION OF NURSERYMEN (AAN)

1250 I St., NW, Suite 500
Washington, DC 20005
Ph: 202-789-2900
FAX: 202-789-1893

AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS (ACGIH)

1330 Kemper Meadow Dr.
Cincinnati, OH 45240
Ph: 513-742-2020
Fax: 513-742-3355

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

11 West 42nd St
New York, NY 10036
Ph: 212-642-4900
Fax: 212-302-1286
Internet: <http://www.ansi.org/>

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

100 Barr Harbor Drive
West Conshohocken, PA 19428-2959
Ph: 610-832-9500
Fax: 610-832-9555
Internet: <http://www.astm.org>

CODE OF FEDERAL REGULATIONS (CFR)

Order from:
Government Printing Office
Washington, DC 20402
Ph: 202-512-1800
Fax: 202-275-7703
Internet: <http://www.pls.com:8001/his/cfr.html>

COMMERCIAL ITEM DESCRIPTIONS (CID)

Order from:
General Services Administration
Federal Supply Service Bureau
470 E L'Enfant Plaza, S.W.
Washington, DC 20407
Ph: 202-619-8925
Internet: <http://pub.fss.gsa.gov/h1-pub.html>

CORPS OF ENGINEERS (COE)

Order from:
U.S. Army Engineer Waterways Experiment Station
ATTN: Technical Report Distribution Section, Services
Branch, TIC
3909 Halls Ferry Rd.
Vicksburg, MS 39180-6199
Ph: 601-634-2355
Fax: 601-634-2506

ENGINEERING MANUALS (EM)

USACE Publications Depot
Attn: CEIM-SP-D
2803 52nd Avenue
Hyattsville, MD 20781-1102
Ph: 301-394-0081

ENGINEERING PAMPHLETS

USACE Publications Depot
Attn: CEIM-SP-D

2803 52nd Avenue
Hyattsville, MD 20781-1102
Ph: 301-394-0081

ENGINEERING REGULATIONS (ER)

USACE Publications Depot
Attn: CEIM-SP-D 2803 52nd Avenue
Hyattsville, MD 20781-1102
Ph: 301-394-0081

ENVIRONMENTAL PROTECTION AGENCY (EPA)

Public Information Center
401 M St., SW
Washington, DC 20460
Ph: 202-260-7751
FAX: 202-260-6257
Internet: <http://www.epa.gov>
NOTE: Some documents are available only from National Technical
Information Services (NTIS)
5285 Port Royal Rd.
Springfield, VA 22161
Ph: 703-487-4600
Fax: 703-321-8547
Internet: <http://www.gov/ntis.gov>

FEDERAL SPECIFICATIONS (FS)

Order from:
General Services Administration
Federal Supply Service Bureau
470 L'Enfant Plaza, S.W.

Washington, DC 20407

Ph: 202-619-8925
Internet: <http://pub.fss.gsa.gov/hl-pub.html>

FEDERAL STANDARDS (FED-STD)

Order from:
General Services Administration
Federal Supply Service Bureau
470 E L'Enfant Plaza, S.W.
Washington, DC 20407
Ph: 202-619-8925
Internet: <http://pub.fss.gsa.gov/hi-pub.html>

FEDERAL TEST METHOD STANDARDS (FTM-STD)

Order from:
Standardization Documents Order Desk
Bldg 4D
700 Robbins Av
Philadelphia, PA 19111-5094
Ph: 215-697-2179
Fax: 215-697-2978

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH)

Mail Stop C-13

4676 Columbia Parkway
Cincinnati, OH 45226-1998
Ph: 800-356-4676
Internet: <http://www.cdc.gov/niosh/homepage.html>
To order pubs for which a fee is charged, order from:
Superintendent of Documents
Government Printing Office
Washington, DC 20402-9325
Ph: 202-783-3238
Fax: 202-275-7703
Internet: <http://www.osha-slc.gov>

-- End of Section --

SECTION 01110

SAFETY, HEALTH, AND EMERGENCY RESPONSE (HTRW/UST)

04/94

MOD 3/96

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS (ACGIH)

ACGIH-02 (1993) 1993-1994 Threshold Limit Values
for Chemical Substances and Physical
Agents and Biological Exposure Indices

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z358.1 (1990) Emergency Eyewash and Shower
Equipment

CODE OF FEDERAL REGULATIONS (CFR)

10 CFR 20 Standards for Protection Against Radiation

29 CFR 1904 Recording and Reporting Occupational
Injuries and Illnesses

29 CFR 1910 Occupational Safety and Health Standards

29 CFR 1926 Safety and Health Regulations for
Construction

49 CFR 171 Gen Info, Regulations, and Definitions

49 CFR 172 Hazardous Materials Table, Special
Provisions, Hazardous Materials
Communications, Emergency Response
Information, and Training Requirements

ENGINEERING MANUALS

EM 385-1-1 (1996) US Army Corps of Engineers Safety
and Health Requirements Manual

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH)

NIOSH Pub No. 85-115 (1985) Occupational Safety and Health
Guidance Manual for Hazardous Waste Site
Activities

NIOSH Pub No. 94-113 (1994) NIOSH Manual of Analytical Methods,
4th Ed

1.2 DESCRIPTION OF WORK

This section provides additional requirements for implementing the accident prevention provisions of EM 385-1-1, and specifies a Site Safety and Health Plan (SSHP) which shall satisfy the requirements for submission of a separate Accident Prevention Plan (APP) as required by EM 385-1-1. The requirements shall apply to work performed within the Limits of Construction as shown on the drawings. See Section 02072, DEMOLITION DEBRIS DISPOSAL for further specifics.

1.4 REGULATORY REQUIREMENTS

Work performed under this contract shall comply with EM 385-1-1, applicable Federal, state, and local safety and occupational health laws and regulations. This includes, but is not limited to, Occupational Safety and Health Administration (OSHA) standards, 29 CFR 1910, especially Section .120, "Hazardous Waste Site Operations and Emergency Response" and 29 CFR 1926, especially Section .65, "Hazardous Waste Site Operations and Emergency Response". Matters of interpretation of standards shall be submitted to the appropriate administrative agency for resolution before starting work. Where the requirements of this specification, applicable laws, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirements shall apply.

1.5 PRECONSTRUCTION SAFETY CONFERENCE

The Preconstruction Safety Conference shall be a part of the Preconstruction Meeting as specified in SECTION 01200.

1.6 SAFETY AND HEALTH PROGRAM

OSHA Standards 29 CFR 1910, Section .120 (b) and 29 CFR 1926, Section .65 (b) require employers to develop and implement a written Safety and Health Program for employees involved in hazardous waste operations. The site-specific program requirements of the OSHA Standards shall be integrated into one site-specific document, the Site Safety and Health Plan (SSHP). The SSHP shall interface with the employer's overall Safety and Health Program. Any portions of the overall Safety and Health Program that are referenced in the SSHP shall be included as appendices to the SSHP.

1.7 SITE SAFETY AND HEALTH PLAN

1.7.1 Preparation and Implementation

A Site Safety and Health Plan (SSHP) shall be prepared covering onsite work to be performed by the Contractor and all subcontractors. The Safety and Health Manager shall be responsible for the development, implementation and oversight of the SSHP. The SSHP shall establish, in detail, the protocols necessary for the anticipation, recognition, evaluation, and control of hazards associated with each task performed. The SSHP shall address site-specific safety and health requirements and procedures based upon site-specific conditions. The level of detail provided in the SSHP shall be tailored to the type of work, complexity of operations to be performed, and hazards anticipated. The SSHP shall incorporate the Contractor's Accident Prevention Plan (APP) and shall, at a minimum, address the APP requirements established in Appendix A, EM 385-1-1. Details about some activities may not be available when the initial SSHP is prepared and submitted. Therefore, the SSHP shall address, in as much detail as possible, anticipated tasks, their related hazards and anticipated control measures. Additional details shall be included in the activity hazard

analyses as described in paragraph ACTIVITY HAZARD ANALYSES.

1.7.2 Acceptance and Modifications

Prior to submittal, the SSHP shall be signed and dated by the Safety and Health Manager and the Site Superintendent. The SSHP shall be submitted for review 14 days prior to the Preconstruction Safety Conference. Deficiencies in the SSHP will be discussed at the preconstruction safety conference, and the SSHP shall be revised to correct the deficiencies and resubmitted for acceptance. Onsite work shall not begin until the plan has been accepted. A copy of the written SSHP shall be maintained onsite. As work proceeds, the SSHP shall be adapted to new situations and new conditions. Changes and modifications to the accepted SSHP shall be made with the knowledge and concurrence of the Safety and Health Manager, the Site Superintendent, and the Contracting Officer. Should any unforeseen hazard become evident during the performance of the work, the Site Safety and Health Officer (SSHO) shall bring such hazard to the attention of the Safety and Health Manager, the Site Superintendent, and the Contracting Officer, both verbally and in writing, for resolution as soon as possible. In the interim, necessary action shall be taken to re-establish and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public, and the environment. Disregard for the provisions of this specification or the accepted SSHP shall be cause for stopping of work until the matter has been rectified.

1.7.3 Availability

The SSHP shall be made available in accordance with 29 CFR 1910, Section .120 (b)(1)(v) and 29 CFR 1926, Section .65 (b)(1)(v).

1.7.4 Elements

Topics required by 29 CFR 1910, Section .120 (b)(4) 29 CFR 1926, Section .65 (b)(4) and the Accident Prevention Plan as described in Table 1-1 of EM 385-1-1 and those described in this section shall be addressed in the SSHP.

Where the use of a specific topic is not applicable to the project, the SSHP shall include a statement to justify its omission or reduced level of detail and establish that adequate consideration was given the topic.

1.8 SITE DESCRIPTION AND CONTAMINATION CHARACTERIZATION

1.8.1 Project/Site Conditions

A Closure Plan and a February 1997 Site Investigation/Evaluation Study was prepared for and approved by DEQ. The Equalization Basin has been determined to be uncontaminated. Contractor may view the contents of both documents at the Norfolk District. The documents contain a history of the site, a record of site contaminants, and a description of the site. The information in both documents may be useful to assist the Contractor in preparing the SSHP.

1.8.1.1 Site Information

The Equalization Basin was used as a holding basin to equalize the wastewater flows from the industrial processes at RAAP. The sludges generated from the biological treatment have been listed as a KO44 hazardous waste. Therefore, the basin was considered a hazardous waste facility, but as a result of site closure activities by the Operating Contractor, and as verified by the recent site investigation study, the

site has been determined to be uncontaminated and has been approved for clean closure by the VA DEQ.

1.8.2 Ordnance and Explosive Waste (OEW)

All wastewater and sludges have been removed and the soil cement liner has been cleaned. However, if explosives, chemical surety and warfare materials (CSM/CWM), or unexploded ordnance (UXO) are discovered at any time during operations, the Contractor shall immediately stop operations in the affected area, mark the location, notify onsite personnel of the OEW hazard and the area's restrictions, and notify the Contracting Officer. The Government will make appropriate arrangements for evaluation and proper disposal of each device. The SSHP shall specifically address procedures to be followed, if known or potential CSM/CWM, ordnance, or other such items are encountered during any phase of field work.

1.9 HAZARD/RISK ANALYSIS

The SSHP shall include a safety and health hazard/risk analysis for each site task and operation to be performed. The hazard/risk analysis shall provide information necessary for determining safety and health procedures, equipment, and training to protect onsite personnel, the environment, and the public. Available site information shall be reviewed when preparing the "Hazard/Risk Analysis" section of the SSHP. The following elements, at a minimum, shall be addressed.

1.9.1 Site Tasks and Operations

The SSHP shall include a comprehensive section that addresses the tasks and objectives of the site operations and the logistics and resources required to reach those tasks and objectives. The main objective of this project is to "clean close" the basin by removing all demolition debris and then restoring the area to its original grades. The major site tasks and operations to be performed based on this type of remediation are listed in SECTION 01006- SPECIAL WORK RESTRICTIONS AND REQUIREMENTS. This is not a complete list of site tasks and operations, therefore, it shall be expanded and/or revised, during preparation of the SSHP as necessary.

1.9.2 Hazards

The following potential hazards may be encountered during site work. These are not complete lists, therefore, they shall be expanded and/or revised as necessary during preparation of the SSHP.

1.9.2.1 Safety Hazards

Potential safety hazards would include but not be limited to employee exposures to excavations/trenches; slip, trip and fall hazards; electricity or underground utilities; heavy mobile equipment or machinery; possible arsenic contaminated dust, (see Section 01005, Paragraph 1.24.5 etc.

1.9.2.2 Physical Agents

Potential physical hazards would include excessive noise levels, heat and cold stress conditions and excessive vibrations.

1.9.3 Action Levels

1.9.3.1 General

Action levels shall be established for the situations listed below, at a minimum. The action levels and required actions (engineering controls, changes in PPE, etc.) shall be presented in the SSHP in both text and tabular form.

- a. Implementation of engineering controls and work practices.
- b. Upgrade or downgrade in level of personal protective equipment.
- c. Work stoppage and/or emergency evacuation of onsite personnel.
- d. Prevention and/or minimization of public exposures to hazards created by site activities.

1.9.3.2 Confined Space Entry

The basin itself is not considered a confined space. Any questionable areas shall be brought to the attention of the CO. Entry into and work in a confined space will not be allowed when oxygen readings are less than 19.5% or greater than 23.5% or if the Lower Flammable Limit (LFL) reading is greater than 10%, unless these conditions are adequately addressed in the confined space entry program. In addition, action levels for toxic atmospheres shall be determined.

1.10 ACTIVITY HAZARD ANALYSES

Prior to beginning each major phase of work, an Activity Hazard Analysis shall be prepared by the Contractor performing that work and submitted for review and acceptance. The format shall be in accordance with EM 385-1-1, figure 1-1. A major phase of work is defined as an operation involving a type of work presenting hazards not experienced in previous operations or where a new subcontractor or work crew is to perform. The analysis shall define the activities to be performed and identify the sequence of work, the specific hazards anticipated, and the control measures to be implemented to eliminate or reduce each hazard to an acceptable level. Work shall not proceed on that phase until the activity hazard analysis has been accepted and a preparatory meeting has been conducted by the Contractor to discuss its contents with everyone engaged in the activities, including the government onsite representatives. The activity hazard analyses shall be continuously reviewed and when appropriate modified to address changing site conditions or operations, with the concurrence of the SSHP, the Site Superintendent, and the Contracting Officer. Activity hazard analyses shall be attached to and become a part of the SSHP.

1.11 STAFF ORGANIZATION, QUALIFICATIONS, AND RESPONSIBILITIES

An organizational structure shall be developed that sets forth lines of authority (chain of command), responsibilities, and communication procedures concerning site safety, health, and emergency response. This organizational structure shall cover management, supervisors and employees of the Contractor and subcontractors. The structure shall include the means for coordinating and controlling work activities of subcontractors and suppliers. The SSHP shall include a description of this organizational structure as well as qualifications and responsibilities of each of the following individuals. The Contractor shall obtain Contracting Officer's

acceptance before replacing any member of the Safety and Health Staff. Requests shall include the names, qualifications, duties, and responsibilities of each proposed replacement.

1.11.1 Site Superintendent

A Site Superintendent, who has responsibility to implement the SSHP, the authority to direct work performed under this contract and verify compliance, shall be designated.

1.11.2 Site Safety and Health Officer (SSHO)

1.11.2.1 Qualifications

An individual and one alternate shall be designated the Site Safety and Health Officer (SSHO). The name, qualifications (education and training summary and documentation), and work experience of the Site Safety and Health Officer and alternate shall be included in the SSHP. The SSHO shall have the following qualifications:

- a. A minimum of 2 year experience in implementing safety and health programs at hazardous waste sites.
- b. Documented experience in construction techniques and construction safety procedures.
- c. Working knowledge of Federal and state occupational safety and health regulations.
- d. Specific training in personal and respiratory protective equipment program implementation, confined space program oversight, and in the proper use of air monitoring instruments, and air sampling methods.

1.11.2.2 Responsibilities

The Site Safety and Health Officer shall:

- a. Assist and represent the Safety and Health Manager in onsite training and the day to day onsite implementation and enforcement of the accepted SSHP,
- b. Be assigned to the site on a full time basis for the duration of field activities. The SSHO shall have no duties other than Safety and Health related duties. If operations are performed during more than one work shift per day, a site Safety and Health Officer shall be present for each shift.
- c. Have authority to ensure site compliance with specified safety and health requirements, Federal, state and OSHA regulations and all aspects of the SSHP including, but not limited to, activity hazard analyses, air monitoring, use of PPE, decontamination, site control, standard operating procedures used to minimize hazards, safe use of engineering controls, the emergency response plan, confined space entry procedures, spill containment program, and preparation of records by performing a daily safety and health inspection and documenting results on the Daily Safety Inspection Log.

- d. Have authority to stop work if unacceptable health or safety conditions exist, and take necessary action to re-establish and maintain safe working conditions.
- e. Consult with and coordinate any modifications to the SSHP with the Safety and Health Manager, the Site Superintendent, and the Contracting Officer.
- f. Serve as a member of the Contractor's quality control staff on matters relating to safety and health.
- g. Conduct accident investigations and prepare accident reports.
- h. Review results of daily quality control inspections and document safety and health findings into the Daily Safety Inspection Log.
- i. In coordination with site management and the Safety and Health Manager, recommend corrective actions for identified deficiencies and oversee the corrective actions.
- j. Sign and date the SSHP prior to submittal.
- k. Conduct initial site-specific training.
- l. Be responsible for evaluating air monitoring data and recommending changes to engineering controls, work practices, and PPE
- m. Review accident reports and results of daily inspections.

1.12 TRAINING

Personnel shall receive training in accordance with the Contractor's written safety and health training program and 29 CFR 1910 Section .120, 29 CFR 1926 Section .65, and 29 CFR 1926 Section .21. The SSHP shall include a section describing training requirements. Training shall be provided by qualified persons.

1.12.1 Site-specific Training

Site-specific training sessions shall be documented in accordance with Section 01.B.03.b of EM 385-1-1.

1.12.1.1 Initial Session (Preentry Briefing)

Prior to commencement of onsite field activities, all site employees, shall attend a site-specific safety and health training session of at least 4 hours duration. This session shall be conducted by the Site Safety and Health Officer to ensure that all personnel are familiar with requirements and responsibilities for maintaining a safe and healthful work environment.

Procedures and contents of the accepted SSHP and Sections 01.B.02 and 28.D.03 of EM 385-1-1 shall be thoroughly discussed. The Contracting Officer shall be notified at least 5 days prior to the initial site-specific training session so government personnel involved in the project may attend.

1.12.1.2 Other Training

The SSHP shall provide training as specified by 29 CFR 1910 Section .146, for employees who are required to supervise, standby, or enter permit-required confined spaces. Persons involved in any aspect of the transportation of hazardous materials shall be trained in accordance with 49 CFR 172 Subpart H.

1.13 PERSONAL PROTECTIVE EQUIPMENT

1.13.1 General

In accordance with 29 CFR 1910 Section .120 (g)(5) and 29 CFR 1926 Section .65 (g)(5), a written Personal Protective Equipment (PPE) program which addresses the elements listed in that regulation, and which complies with respiratory protection program requirements of 29 CFR 1910 Section .134, is to be included in the employer's Safety and Health Program. The Site Safety and Health Plan shall detail the minimum PPE ensembles (including respirators) and specific materials from which the PPE components are constructed for each site-specific task and operation to be performed, based upon the hazard/risk analysis. Components of levels of protection (B, C, D and modifications) must be relevant to site-specific conditions, including heat and cold stress potential and safety hazards. Only respirators approved by NIOSH shall be used. Onsite personnel shall be provided with appropriate personal protective equipment. Protective equipment and clothing shall be kept clean and well maintained. The PPE section of the SSHP shall include site-specific procedures to determine PPE program effectiveness and for onsite fit-testing of respirators, cleaning, maintenance, inspection, and storage of PPE.

1.13.2 Levels of Protection

The Safety and Health Manager shall establish appropriate levels of protection for each work activity based on review of historical site information, existing data, an evaluation of the potential for exposure (inhalation, dermal, ingestion, and injection) during each task, past air monitoring results, and a continuing safety and health monitoring program. The Safety and Health Manager shall also establish action levels for upgrade or downgrade in levels of PPE from the following specified minimum levels of protection. Protocols and the communication network for changing the level of protection shall be described in the SSHP. The PPE reassessment protocol shall address air monitoring results, potential for exposure, changes in site conditions, work phases, job tasks, weather, temperature extremes, individual medical considerations, etc.

1.13.2.1 Components of Levels of Protection

The following items constitute minimum protective clothing and equipment ensembles to be utilized during this project:

Level D

Hardhats, hearing protection, safety glasses or goggles, and protective footwear (shoes/boots).

Modified Level D

Hardhats, hearing protection, safety glasses or goggles, and protective footwear (shoes/boots) and HEPA Masks.

Level C

All the components of the Level D ensemble, plus air-purifying respirators, chemical-resistant coveralls, chemical-resistant gloves, and chemical-resistant protective footwear (shoe/boot covers).

Level B

N/A

1.13.2.2 Initial Minimum Levels of PPE by Task

Based on available information, the initial minimum protective equipment requirements for each major task and operation are listed below. Available site information shall be reviewed and the list of tasks and operations and these levels of protection shall be expanded and/or revised during preparation of the SSHP.

TASK/OPERATION	INITIAL LEVEL OF PROTECTION
Excavation	MOD D

1.14 SAFETY PROCEDURES, ENGINEERING CONTROLS AND WORK PRACTICES

The SSHP shall describe the standard operating safety procedures, engineering controls and safe work practices to be implemented for the work covered. These shall include, but not be limited to, the following:

1.14.1 General Site Rules/Prohibitions

General site rules/prohibitions (buddy system, eating, drinking, and smoking restrictions, etc.): See SECTION 01006 for further restrictions at RAAP.

1.14.2 Work Permit Requirements

Radioactive work, excavation, hot work, confined space, etc.: See SECTION 01006 for further restrictions at RAAP.

1.14.3 Material Handling Procedures

Soils, liquids, radioactive materials: See SECTION 01006 for further restrictions at RAAP.

1.14.5 Confined Space Entry Procedures

All confined space entry (for existing facilities) requirements shall be properly permitted by RAAP.

1.14.6 Hot Work

Hot work shall not be permitted on or within the equalization basin except as outlined herein. Prior to conducting hot work, a hot work permit shall be prepared and submitted. An example format for a hot work permit shall be included in the SSHP and shall adhere to the requirements of RAAP (see Section 01006). Hot work shall not be performed unless monitoring indicates atmospheres within and immediately surrounding the areas are within the required limits for oxygen; continuous monitoring shall continue

until the hot work is completed. The hot work prohibition includes welding, cutting, grinding, sawing, or other similar operations which could be expected to potentially generate combustion-producing temperatures or sparks, or which could produce potentially hazardous fumes or vapors. An individual at each hot work site shall be designated as a fire watch. This person's sole responsibility shall be to monitor the hot work and have immediate access to the fire extinguisher located at each hot work site. A new permit shall be obtained at the start of each work shift during which hot work will be conducted.

1.15 SITE CONTROL MEASURES

The SSHP shall include procedures for the implementation and enforcement of safety and health rules for all persons on the site, including employers, employees, outside Contractors, government representatives, and visitors.

1.16 EQUIPMENT WASH DOWN

Vehicles and equipment used within the Construction Limits shall be cleaned off prior to leaving the site. The procedures shall be addressed in the SSHP.

1.17 INSPECTIONS

The SSHO shall perform daily inspections of the jobsite and the work in progress to ensure compliance with EM 385-1-1, the Safety and Health Program, the SSHP and other occupational health and safety requirements of the contract, and to determine the effectiveness of the SSHP. Procedures for correcting deficiencies (including actions, timetable and responsibilities) shall be described in the SSHP. Follow-up inspections to ensure correction of deficiencies shall be conducted and documented. Daily safety inspection logs shall be used to document the inspections, noting safety and health deficiencies, deficiencies in the effectiveness of the SSHP, and corrective actions taken. The SSHO's Daily Inspection Logs shall be attached to and submitted with the Daily Quality Control reports. Each entry shall include the following: date, work area checked, employees present in work area, PPE and work equipment being used in each area, special safety and health issues and notes, and signature of preparer. In the event of an accident, the Contracting Officer shall be notified according to EM 385-1-1. Within 2 working days of any reportable accident, an Accident Report shall be completed on ENG Form 3394 and submitted.

1.18 SAFETY AND HEALTH PHASE-OUT REPORT

A Safety and Health Phase-Out Report shall be submitted within 10 working days following completion of the work, prior to final acceptance of the work. The following minimum information shall be included:

- a. Summary of the overall performance of safety and health (accidents or incidents including near misses, unusual events, lessons learned, etc.).

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

-- End of Section --

SECTION 01111
SAFETY AND HEALTH REQUIREMENTS01/96
MOD 3/96

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ENGINEERING MANUALS

EM 385-1-1 (1996) Safety and Health Requirements Manual

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01300 SUBMITTAL DESCRIPTIONS:

SD-01 SD Data

Accident Prevention Plan; GA.

1.3 SAFETY REQUIREMENTS AND ACCIDENT PREVENTION:

1.3.1 Standards:

The Contractor shall comply with Occupational Safety and Health Act (OSHA) Standards, the Corps of Engineers Manual EM 385-1-1, "Safety and Health Requirements Manual," NFPA 101, and state, local, and facility safety requirements.

1.7 SAFETY AND HEALTH PLAN

1.7.1 Preparation and Implementation

An Accident Prevention Plan (AAP) (SHP) shall be prepared covering onsite work to be performed by the Contractor and all subcontractors. The Safety and Health Manager shall be responsible for the development, implementation and oversight of the APP. The APP shall establish, in detail, the protocols necessary for the anticipation, recognition, evaluation, and control of hazards associated with each task performed. The APP shall address general safety and health requirements and procedures. The level of detail provided in the APP shall be tailored to the type of work, complexity of operations to be performed, and hazards anticipated. Details about some activities may not be available when the initial APP is prepared and submitted. Therefore, the APP shall address, in as much detail as possible, anticipated tasks, their related hazards and anticipated control measures.

1.7.2 Acceptance and Modifications

Prior to submittal, the APP shall be signed and dated by the Contractor's Safety and Health Manager and the Site Superintendent. The APP [including the Site Safety and Health Plan, for HTRW/UST projects, required by Section 01110] shall be submitted for review at least 10 days prior to the Prework Safety Conference. Deficiencies in the APP will be discussed at the Prework Safety Conference, and the APP shall be revised to correct the deficiencies and resubmitted for acceptance. Onsite work shall not begin until the plan

has been accepted. A copy of the written APP shall be maintained onsite. As work proceeds, the APP shall be adapted to new situations and new conditions. Changes and modifications to the accepted APP shall be made with the knowledge and concurrence of the Safety and Health Manager, the Site Superintendent, and the Contracting Officer. Should any unforeseen hazard become evident during the performance of the work, shall bring such hazard to the attention of the Safety and Health Manager, the Site Superintendent, and the Contracting Officer, both verbally and in writing, for resolution as soon as possible. In the interim, necessary action shall be taken to re-establish and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public, and the environment. Disregard for the provisions of this specification or the accepted APP shall be cause for stopping of work until the matter has been rectified to the satisfaction of the Contracting Officer.

1.7.3 Availability

The APP shall be made available in accordance with 29 CFR 1910, Section .120 (b) (1) (v) and 29 CFR 1926, Section .65 (b) (1) (v).

1.3.2 Corps of Engineers Standards:

Corps of Engineers Manual EM 385-1-1, referred to in "ACCIDENT PREVENTION" article of Contract Clauses, is hereby supplemented or revised as follows:

1.3.2.2 Conflicts:

When a conflict exists between the Corps of Engineers Safety and Health Requirements Manual, other safety requirements, or the contract plans and/or specifications, the most stringent requirement shall prevail. (NAOSA 5 FEB 87).

1.3.2.3 Front End Loader - Backhoe Machines:

1.3.2.3.1 Non-compliance Safety Check:

All front end loader-backhoe machines and other machines, such as tractors that utilize a backhoe attachment, shall be checked for:

- a. Exposed backhoe boom swing foot pedals.
- b. Backhoe boom swing lever which can be reached by a man standing on the ground or on the outrigger support bracket.

1.3.2.3.2 Correction and Fabrication of Non-compliance Safety Items:

Where these conditions exist, guards shall be fabricated to:

- a. Cover over exposed foot pedals to prevent someone from accidentally stepping on them.
- b. Inclose the swing lever so as to preclude operation from the ground or from the outrigger support bracket.

1.3.2.4 Attendance at Safety Meetings:

In order to allow for maximum attendance at weekly tool box meetings and monthly supervisor meetings by Corps of Engineers personnel, the Contractor shall advise the CO's Office, a minimum of 48 hours before the start of each meeting, of the date, time and location of Safety Meetings.

1.3.2.5 Minutes of Safety Meetings

Minutes shall be prepared by the Contractor and forwarded to the Contracting Officer by close of business the next work day.

1.3.2.5 Protective Footwear:

Protective footwear as defined by American National Standards Institute Z41 shall be worn by all working personnel on site.

1.3.2.6 Ground Fault Circuit Interrupters (GFCI):

GFCI's are required for work on this contract in accordance with EM 385-1-1. GFCI's are also required when using electric power extension cords.

1.3.2.7 Crawler-, Truck-, and Wheel-Mounted Cranes

Implementation of paragraph 16.D.01.e(1) shall include the following:

a. When a crane is performing duty cycle work (such as clamshell, dragline, grapple, or pile driving) it does not require anti-two block equipment. If the crane is required to make a non-duty cycle lift (for example, to lift a piece of equipment, a tool box, or supplies), it will be exempt from the anti-two block equipment requirements if the following procedures are implemented:

(1) an international orange warning device (warning flag, warning tape, or warning ball) is properly secured to the hoist line at a distance of 8 to 10 feet above the hoist rigging;

(2) the signalperson (or an individual designated as the signalperson) acts as a spotter to alert the crane operator with a "STOP" signal when the warning device approaches the boom tip and the crane operator ceases hoisting functions when alerted of this; and

(3) while the non-duty cycle lift is underway, the signal person shall not stand under the load, shall have no duties other than signalperson, and shall comply with the signaling requirements of EM 385-1-1;

b. Anti-two block devices are always required when hoisting personnel by crane or derrick.

1.3.2.8

Safety Indoctrination Certificates

The Contractor shall obtain from each of his employees, prior to his employment at the Radford Army Ammunition Plant, a signed certificate indicating that the employee has read and understands a statement prepared by the Plant Commander setting forth the hazards and restrictions incident to construction operations in buildings used for powder production. The certificates shall be delivered to the CO on the first day the employee is admitted to the Radford Army Ammunition Plant.

PART 2 PRODUCTS (This Part Not Used)

PART 3 EXECUTION (This Part Not Used)

-- End of Section --

MASTER SPECIFICATION FOR MILITARY CONSTRUCTION

SECTION 01200
PROJECT MEETINGS

03/96

PART 1 GENERAL

1.1 SUBMITTALS (Not Applicable)

1.2 PRECONSTRUCTION CONFERENCE

1.2.1 Scheduling

After award of the construction contract and prior to the start of any construction work, the Contracting Officer (CO) will schedule and conduct a preconstruction conference. The Contractor's Project Manager, Superintendent and Quality Control System Manager shall attend this meeting. The Contractor is encouraged to have an officer of his company (Project Manager could be this person) and representation from each of his sub-contractors at the conference. This conference will be held at a location and time as specified by the CO.

1.2.2 Purpose

The purpose of this preconstruction conference is to enable the CO to outline the procedures that will be followed by the Government in its administration of this construction contract and to discuss the performance that will be expected from the Contractor. This conference will allow the Contractor an opportunity to ask questions about the Government's supervision and inspection of contract work, about security requirements, regulations, etc. The CO may invite Using Service personnel and any other Government personnel to attend this conference.

1.2.3 Discussion Items

The following is a list of items for discussion during the preconstruction conference. However, the Contracting Officer may include additional items for discussion as conditions and the work require.

- a. Authority of the Area/Resident Engineer and organization of the Area/Resident office.
- b. Contractor's Progress Schedule.
- c. Correspondence Procedures.
- d. Contractor Labor Standards Provisions.
- e. Contract Modifications and Administrative Procedures.
- f. Contractor's Administrative, Laydown and Storage Areas.
- g. Procedures for Processing Submittals.
- h. Payment Estimate Data and Procedures.
- i. Contractor Utilities.
- j. Security Requirements and Other Regulations, if applicable.
- k. Government Furnished Equipment, if applicable.

- l. Disposition of Salvage Property.
- m. Contractor Insurance Requirements.
- n. Value Engineering Program.
- o. Contractor Performance Evaluation.
- p. As-Built Drawings.
- q. Single Point of Contact for Warranty of Construction.
- r. Turnover of Completed Facilities.

1.3 NOT USED

1.4 OTHER MEETINGS

Other meetings are or may be scheduled to be held after the Preconstruction Conference, and such meetings may include the following:

- a. Accident Prevention Safety Plan
- b. Quality Control Plan.
- c. Environmental Protection Plan.

1.5 FACILITY MEETINGS

The Facility may also schedule meetings with the Contractor through the CO during the progress of construction work.

1.6 MINUTES OF MEETINGS

The Government will prepare minutes of the meeting and will provide the Contractor with a signed original for review and concurrence. The minutes shall include all items discussed at the meeting and the Government will make all corrections provided by the Contractor and resubmit the corrected minutes to the Contractor within seven days.

PART 2 PRODUCTS (This Part Not Used)

PART 3 EXECUTION (This Part Not Used)

-- End of Section --

SECTION 01300
SUBMITTAL PROCEDURES12/94
MOD 03/96

PART 1 GENERAL

1.1 SUBMITTAL CLASSIFICATION

Submittals are classified as follows:

1.1.1 Government Approved (GA)

Governmental approval (GA) is required for extensions of design, critical materials, deviations and/or departure from the contract documents, items of equipment whose compatibility with the entire system must be checked, and other items as designated by the Contracting Officer. Within the terms of the Contract Clause entitled "Specifications and Drawings for Construction," they are considered to be "shop drawings."

1.1.2 For Information Only (FIO)

All submittals not requiring Government approval will be for information only (FIO). They are not considered to be "shop drawings" within the terms of the Contract Clause referred to above.

1.2 APPROVED SUBMITTALS

The Contracting Officer's approval of submittals shall not be construed as a complete check, but will indicate only that the general method of construction, materials, detailing and other information are satisfactory. Approval will not relieve the Contractor of the responsibility for any error which may exist, as the Contractor under the CQC requirements of this contract is responsible for dimensions, the design of adequate connections and details, and the satisfactory construction of all work. After submittals have been approved by the Contracting Officer, no resubmittal for the purpose of substituting materials or equipment will be considered unless accompanied by an explanation of why a substitution is necessary.

1.3 DISAPPROVED SUBMITTALS

The Contractor shall make all corrections required by the Contracting Officer and promptly furnish a corrected submittal in the form and number of copies specified for the initial submittal. If the Contractor considers any correction indicated on the submittals to constitute a change to the contract, a notice in accordance with the Contract Clause "Changes" shall be given promptly to the Contracting Officer.

1.4 WITHHOLDING OF PAYMENT

Payment for materials incorporated in the work will not be made if required approvals have not been obtained.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL

The Contractor shall make submittals as required by the specifications, and as indicated on the Submittal Register (ENG FORM 4288-R), attached hereto. The Contracting Officer may request submittals in addition to those specified when deemed necessary to adequately describe the work covered in the respective sections. Units of weights and measures used on all

submittals shall be the same as those used in the contract drawings. Each submittal shall be complete and in sufficient detail to allow ready determination of compliance with contract requirements. Prior to submittal, all items shall be checked and approved by the CQC representative and each respective transmittal form (ENG FORM 4025-R) shall be stamped, signed, and dated by the CQC representative indicating action taken, and certifying that the accompanying submittal complies with the contract requirements. Proposed deviations from the contract requirements shall be clearly identified. Submittals shall include items such as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; O&M manuals (including parts list); certifications; warranties; and other such required submittals. Submittals requiring Government approval shall be scheduled and approved prior to the acquisition of the material or equipment covered thereby. FIO submittals shall be submitted at least 15 days prior to scheduled installation of the item(s). Samples remaining upon completion of the work shall be picked up and disposed of in accordance with manufacturer's Material Safety Data Sheets (MSDS) and in compliance with existing laws and regulations.

3.2 SUBMITTAL REGISTER (ENG FORM 4288-R, Mar 95)

At the end of this section is one set of ENG Form 4288-R listing items of equipment and materials for which submittals are required by the specifications; this list may not be all inclusive and additional submittals may be required. The Contractor will also be given the submittal register as a diskette containing the computerized ENG Form 4288 and instructions on the use of the diskette. Columns "d" through "p" have been completed by the Government; column "q" is reserved for use by the government; the Contractor shall complete columns "a", "b", "c", and "r" through "w" and submit the forms (hard copy) plus associated electronic file to the Contracting Officer for approval within thirty calendar days after Notice to Proceed. The Contractor shall keep this diskette up-to-date and shall submit it to the Government together with the monthly payment request. The approved submittal register will become the scheduling document and will be used to control submittals throughout the life of the contract. The submittal register and the progress schedules shall be coordinated. An updated Submittal Register shall be submitted no less than every sixty calendar days.

3.3 SCHEDULING

Submittals covering component items forming a system or items that are interrelated shall be scheduled to be coordinated and submitted concurrently. Certifications to be submitted with the pertinent drawings shall be so scheduled. Adequate time (a minimum of [thirty][] calendar days exclusive of mailing time) shall be allowed and shown on the register for review and approval. No delay damages or time extensions will be allowed for time lost in late submittals. [An additional fifteen calendar days (total [forty-five][] calendar days) shall be allowed and shown on the register for review and approval of submittals for [food service equipment] [and] [refrigeration and HVAC control systems].]

3.4 TRANSMITTAL FORM (ENG FORM 4025-R, Mar 95)

The transmittal form (ENG Form 4025-R) shall be used for submitting both GA and FIO submittals in accordance with the instructions on the reverse side of the form. These forms will be furnished to the Contractor by the CO after award of the contract. This form shall be properly completed by filling out all the heading blank spaces and identifying each item submitted. Special care shall be exercised to ensure proper listing of the specification paragraph and/or sheet number of the contract drawings pertinent to the data submitted for each item. Submittals pertaining to different specifications sections shall not be submitted on the same transmittal form. A separate form shall be used for each specification

section.

3.5 SUBMITTAL PROCEDURE

Submittal procedures shall be as follows:

3.5.1 Procedures

Procedures shall be incorporated into the Quality Control Plan required in Section 01440.

3.5.5 Procedures for Submittal of Samples

All samples of materials submitted as required by these specifications shall be properly identified and labeled for ready identification, and upon being certified, stored at the site of the work for jobsite use until all work has been completed and accepted by the CO.

3.5.6 Contractor Certification

Certification by the Contractor shall be accomplished by using Action Codes A or B in column "g" of ENG Form 4025-R. The Contractor shall sign and date Section II for Contractor certified submittals as well as sign the certification and Section I. Contractor certified drawings will be subject to quality assurance review by the Government at any time during the duration of the contract. No adjustment for time or money will be allowed for corrections required as a result of non-compliance with the contract documents.

3.5.6 Deviations

For submittals which include proposed deviations requested by the Contractor, the column "variation" of ENG Form 4025 shall be checked. The Contractor shall set forth in writing the reason for any deviations and annotate such deviations on the submittal. The Government reserves the right to rescind inadvertent approval of submittals containing unnoted deviations.

3.6 CONTROL OF SUBMITTALS

The Contractor shall carefully control his procurement operations to ensure that each individual submittal is made on or before the Contractor scheduled submittal date shown on the approved "Submittal Register."

3.7 GOVERNMENT APPROVED SUBMITTALS

Upon completion of review of submittals requiring Government approval, the submittals will be identified as having received approval by being so stamped and dated. Four copies of the submittal will be retained by the Contracting Officer and two copies of the submittal will be returned to the Contractor.

3.8 INFORMATION ONLY SUBMITTALS

Normally submittals for information only will not be returned. Provide four copies of FIO submittals. Approval of the CO is not required on FIO submittals. These submittals will be used for information purposes by the Government. The Government reserves the right to require the Contractor to resubmit any item found not to comply with the contract documents. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications and will not prevent the CO from requiring removal and replacement if nonconforming material is incorporated in the work. This does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or check testing

by the Government in those instances where the technical specifications so prescribe.

3.9 STAMPS

Rubber stamps used by the Contractor on the submittal data to certify that the submittal meets contract requirements shall be similar to the following:

<p>CONTRACTOR</p> <p>(Firm Name)</p> <p>_____ Approved-(A) Certified to comply with the Contract documents.</p> <p>_____ Approved-(B) Certified to comply with Contract documents with exceptions or corrections as specifically noted on the Submittal data and/or attached sheets.</p> <p>SIGNATURE: _____</p> <p>TITLE: _____</p> <p>DATE: _____</p>
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-- End of Section --

(ER 415 1-10)

SPECIFICATION	FUNCTION
1. The system shall be able to process data from multiple sources simultaneously.	1. Data Integration
2. The system shall ensure data integrity and security at all times.	2. Data Security
3. The system shall provide real-time monitoring and reporting capabilities.	3. Real-time Monitoring
4. The system shall be scalable to handle increasing volumes of data.	4. Scalability
5. The system shall support various data formats and protocols.	5. Data Interoperability
6. The system shall have a user-friendly interface for data management.	6. User Interface
7. The system shall be able to generate detailed reports and analytics.	7. Reporting and Analytics
8. The system shall be able to integrate with existing enterprise systems.	8. System Integration
9. The system shall have a robust backup and recovery mechanism.	9. Backup and Recovery
10. The system shall be able to handle high-volume data processing.	10. High-volume Processing

Bio Plant Old Equalization Basin Closure

C O D E x.	DATE
	y.

TRANS-
MITTAL
NO.

b.

ITEM NO. C.

**SPECIFICATION
PARAGRAPH
NUMBER**

d.

**DESCRIPTION OF
ITEM SUBMITTED**

TYPE OF SUBMITTAL

**CLASSI-
FICATION**

CONTRACTOR SCHEDULE DATES

**CONTRACT
ACTION**

GOVERNMENT ACTION	
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REVIEWER.

r.

APPROVAL
NEEDED
BY

S.

**MATERIAL
NEEDED
BY**

CODE

DATE _____

v. _____

**SUBMIT
TO
GOVERN-
MENT**

W.

**C
O
D
E
X**

DATE _____

Y. _____

REMARKS

PAGE 1 OF 4 PAGES

SUBMITTAL REGISTER

(ER 415 1-10)

CONTRACT NO.

TITLE AND LOCATION

Bio Plant Old Equalization Basin Closure

CONTRACTOR	
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SPECIFICATION SECTION

02050

[illegible]

SUBMITTAL REGIST.

CONTRACT NC

TITLE AND LOCATION

Bio Plant Old Equalization Basin Closure

CONTRACTOR	
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SPECIFICATION	ION
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02072

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(ER 415 1-10)

CONTRACT NO.

TITLE AND LOCATION

Bio Plant Old Equalization Basin Closure

CONTRACTOR

SPECIFICATION SECTION								
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02210

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SECTION 01440
CONTRACTOR QUALITY CONTROL10/94
MOD 3/96

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 3740	(1994a) Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
ASTM E 329	(1993b) Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

1.2 PAYMENT

Separate payment will not be made for providing and maintaining an effective Quality Control program, and all costs associated therewith shall be included in the applicable unit prices or lump-sum prices contained in the Bidding Schedule.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Contract Clause entitled "Inspection of Construction." The quality control system shall consist of plans, procedures, and organization necessary to produce an end product which complies with the contract requirements. The system shall cover all construction operations, both onsite and offsite, and shall be keyed to the proposed construction sequence. The Contractor's highest ranking manager on site shall be held responsible for the quality of work on the job and is subject to removal by the Contracting Officer for non-compliance with quality requirements specified in the contract. This individual shall be the person with the responsibility for the overall management of the project including quality and production.

3.2 QUALITY CONTROL PLAN

3.2.1 General

The Contractor shall furnish for review by the Government, not later than 30 days after receipt of notice to proceed, the Contractor Quality Control (CQC) Plan proposed to implement the requirements of the Contract Clause entitled "Inspection of Construction." The plan shall identify personnel, procedures, control, instructions, test, records, and forms to be used. The Government will consider an interim plan for the first 30 days of operation. Construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of work to be started. Work outside of the features of work included in an accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional features of work to be started.

3.2.2 Content of the CQC Plan

The CQC Plan shall include, as a minimum, the following to cover all construction operations, both onsite and offsite, including work by subcontractors, fabricators, suppliers, and purchasing agents:

- a. A description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff shall implement the three phase control system for all aspects of the work specified. The staff shall include a CQC System Manager.
- b. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function.
- c. A copy of the letter to the CQC System Manager signed by an authorized official of the firm which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop work which is not in compliance with the contract. The CQC System Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities. Copies of these letters will also be furnished to the Government.
- d. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers, and purchasing agents. These procedures shall be in accordance with Section 01300 SUBMITTAL PROCEDURES.
- e. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. (Laboratory facilities will be approved by the Contracting Officer.)
- f. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.
- g. Procedures for tracking construction deficiencies from identification through acceptable corrective action. These procedures will establish verification that identified deficiencies have been corrected.
- h. Reporting procedures, including proposed reporting formats.
- i. A list of the definable features of work. A definable feature of work is a task which is separate and distinct from other tasks and has separate control requirements. It could be identified by different trades or disciplines, or it could be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there are frequently more than one definable feature under a particular section. This list will be agreed upon during the coordination meeting.
- j. For each definable feature of work, the preparatory and initial controls planned for that feature shall be identified in the form of a list. The list shall be in the same order as the technical specification section. The planned preparatory and initial meetings will be reviewed and agreed upon by both the Government and Contractor at the coordination meeting, although revisions may be required.

3.2.3 Acceptance of Plan

Acceptance of the Contractor's plan is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. The Government reserves the right to require the Contractor to make changes in his CQC Plan and operations including removal of personnel, as necessary, to obtain the quality specified.

3.2.4 Notification of Changes

After acceptance of the CQC Plan, the Contractor shall notify the Contracting Officer in writing of any proposed change. Proposed changes are subject to acceptance by the Contracting Officer.

3.3 COORDINATION MEETING

After the Preconstruction Conference, before start of construction, and prior to acceptance by the Government of the CQC Plan, the Contractor shall meet with the Contracting Officer or Authorized Representative and discuss the Contractor's quality control system. The CQC Plan shall be submitted for review a minimum of 14 calendar days prior to the Coordination Meeting. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. Minutes of the meeting shall be prepared by the Government and signed by both the Contractor and the Contracting Officer. The minutes shall become a part of the contract file. There may be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures which may require corrective action by the Contractor.

3.4 QUALITY CONTROL ORGANIZATION

3.4.1 General

The requirements for the CQC organization are a CQC System Manager and sufficient number of additional qualified personnel to ensure contract compliance. The Contractor shall provide a CQC organization which shall be at the site at all times during progress of the work and with complete authority to take any action necessary to ensure compliance with the contract. All CQC staff members shall be subject to acceptance by the Contracting Officer.

3.4.2 CQC System Manager

The Contractor shall identify as CQC System Manager an individual within his organization at the site of the work who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC System Manager shall be a graduate engineer, graduate architect, or a graduate of construction management, each with a minimum of 3 years construction experience on construction similar to this contract or a construction person with a minimum of 5 years in related work. This CQC System Manager shall be on the site at all times during construction and will be employed by the prime Contractor. The CQC System Manager shall be assigned no other duties except he/she may act as the C-SAM. An alternate for the CQC System Manager will be identified in the plan to serve in the event of the System Manager's absence. The requirements for the alternate will be the same as for the designated CQC System Manager, except for completion of the course.

3.4.3 CQC Personnel

The Contractor shall maintain sufficient staff to ensure adequate coverage of all work. Any additional staff shall be at no additional expense to the Government.

In addition to CQC personnel specified elsewhere in the contract, the Contractor shall provide as part of the CQC organization specialized personnel to assist the CQC System Manager for the environmental area.

3.4.4 Additional Requirement

In addition to the above experience and education requirements the CQC System Manager shall have completed the course entitled "Construction Quality Management For Contractors" no later than 60 days after the Contractors receipt of the Notice To Proceed. This course is periodically offered by the Corps of Engineers. Specific times and locations are available from the Contracting Officer.

3.4.5 Interview

All CQC personnel are subject to interview prior to acceptance by the Contracting Officer.

3.4.6 Organizational Changes

The Contractor shall maintain his CQC staff at full strength at all times. When it is necessary to make changes to the CQC staff the Contractor shall revise the CQC Plan to reflect the changes and submit the changes to the Contracting Officer for acceptance.

3.5 SUBMITTALS

Submittals shall be made as specified in Section 01300 SUBMITTAL PROCEDURES. The CQC organization shall be responsible for certifying that all submittals are in compliance with the contract requirements.

3.6 CONTROL

Contractor Quality Control is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. At least three phases of control shall be conducted by the CQC System Manager for each definable feature of work as follows:

3.6.1 Preparatory Phase

This phase shall be performed prior to beginning work on each definable feature of work, after all required plans/documents/materials are approved/accepted, and after copies are at the work site. This phase shall include:

- a. A review of each paragraph of applicable specifications.
- b. A review of the contract drawings.
- c. A check to assure that all materials and/or equipment have been tested, submitted, and approved.
- d. Review of provisions that have been made to provide required control inspection and testing.
- e. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the contract.
- f. A physical examination of required materials, equipment, and

sample work to assure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.

- g. A review of the appropriate activity hazard analysis to assure safety requirements are met.
- h. Discussion of procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that feature of work.
- i. A check to ensure that the portion of the plan for the work to be performed has been accepted by the Contracting Officer.
- j. Discussion of the initial control phase.
- k. The Government shall be notified at least [48] hours in advance of beginning the preparatory control phase. This phase shall include a meeting conducted by the CQC System Manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. The results of the preparatory phase actions shall be documented by separate minutes prepared by the CQC System Manager and attached to the daily CQC report. The Contractor shall instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.

3.6.2 Initial Phase

This phase shall be accomplished at the beginning of a definable feature of work. The following shall be accomplished:

- a. A check of work to ensure that it is in full compliance with contract requirements. Review minutes of the preparatory meeting.
- b. Verify adequacy of controls to ensure full contract compliance. Verify required control inspection and testing.
- c. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with required sample panels as appropriate.
- d. Resolve all differences.
- e. Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.
- f. The Government shall be notified at least 48 hours in advance of beginning the initial phase. Separate minutes of this phase shall be prepared by the CQC System Manager and attached to the daily CQC report. Exact location of initial phase shall be indicated for future reference and comparison with follow-up phases.
- g. The initial phase should be repeated for each new crew to work onsite, or any time acceptable specified quality standards are not being met.

3.6.3 Follow-up Phase

Daily checks shall be performed to assure control activities, including control testing, are providing continued compliance with contract requirements, until completion of the particular feature of work. The checks shall be made a matter of record in the CQC documentation. Final follow-up checks shall be conducted and all deficiencies corrected prior to the start of additional features of work which may be affected by the deficient work. The Contractor shall not build upon or conceal non-conforming work.

3.6.4 Additional Preparatory and Initial Phases

Additional preparatory and initial phases shall be conducted on the same definable features of work if the quality of on-going work is unacceptable, if there are changes in the applicable CQC staff, onsite production supervision or work crew, if work on a definable feature is resumed after a substantial period of inactivity, or if other problems develop.

3.7 TESTS

3.7.1 Testing Procedure

The Contractor shall perform specified or required tests to verify that control measures are adequate to provide a product which conforms to contract requirements. Upon request, the Contractor shall furnish to the Government duplicate samples of test specimens for possible testing by the Government. Testing includes operation and/or acceptance tests when specified. The Contractor shall procure the services of a Corps of Engineers approved testing laboratory or establish an approved testing laboratory at the project site. The Contractor shall perform the following activities and record and provide the following data:

- a. Verify that testing procedures comply with contract requirements.
- b. Verify that facilities and testing equipment are available and comply with testing standards.
- c. Check test instrument calibration data against certified standards.
- d. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.
- e. Results of all tests taken, both passing and failing tests, will be recorded on the CQC report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test will be given. If approved by the Contracting Officer, actual test reports may be submitted later with a reference to the test number and date taken. An information copy of tests performed by an offsite or commercial test facility will be provided directly to the Contracting Officer. Failure to submit timely test reports as stated may result in nonpayment for related work performed and disapproval of the test facility for this contract.

3.7.2 Testing Laboratories

3.7.2.1 Capability Check

The Government reserves the right to check laboratory equipment in the proposed laboratory for compliance with the standards set forth in the contract specifications and to check the laboratory technician's testing procedures and techniques. Laboratories utilized for testing soils, concrete, asphalt, and steel shall meet criteria detailed in ASTM D 3740 and ASTM E 329.

3.7.2.2 Capability Recheck

If the selected laboratory fails the capability check, the Contractor will be assessed a charge of the cost of the recheck to reimburse the Government for each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the contract amount due the Contractor.

3.7.3 On-Site Laboratory

The Government reserves the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Government.

3.7.4 Furnishing or Transportation of Samples for Testing

Costs incidental to the transportation of samples or materials will be borne by the Contractor. Samples of materials for test verification and acceptance testing by the Government shall be delivered to the Corps of Engineers Division Laboratory, f.o.b., at an address to be identified for each type of test. Coordination for each specific test, exact delivery location, and dates will be made through the Contracting Officer at the Area Office.

3.8 COMPLETION INSPECTION

3.8.1 Punch-Out Inspection

Near the completion of all work or any increment thereof established by a completion time stated in the Special Clause entitled "Commencement, Prosecution, and Completion of Work," or stated elsewhere in the specifications, the CQC System Manager shall conduct an inspection of the work and develop a "punch list" of items which do not conform to the approved drawings and specifications. Such a list of deficiencies shall be included in the CQC documentation, as required by paragraph DOCUMENTATION below, and shall include the estimated date by which the deficiencies will be corrected. The CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected. Once this is accomplished the Contractor shall notify the Government that the facility is ready for the Government "Pre-Final" inspection.

3.8.2 Pre-Final Inspection

The Government will perform this inspection to verify that the facility is complete and ready to be occupied. A Government "Pre-Final Punch List" may be developed as a result of this inspection. The Contractor's CQC System Manager shall ensure that all items on this list have been corrected and so notify the Government so that a "Final" inspection with the customer can be scheduled. Any items noted on the "Pre-Final" inspection shall be corrected in a timely manner. These inspections and any deficiency corrections required by this paragraph will be accomplished within the time slated for completion of the entire work or any particular increment thereof if the project is divided into increments by separate completion dates.

3.8.3 Final Acceptance Inspection

The Contractor's Quality Control Inspection personnel, his superintendent or other primary management person and the contracting Officer's representative will be in attendance at this inspection. Additional Government personnel including, but not limited to, those from Base/Post Civil Facility Engineer user groups, and major commands may also be in attendance. The final acceptance inspection will be formally scheduled by the Contracting Officer based upon results of the Pre-Final inspection. Notice will be given to the Contracting Officer at least 14 days prior to the final acceptance inspection and must include the Contractor's assurance that all specific items previously identified to the Contractor as being unacceptable, along with all remaining work performed under the contract, will be complete and acceptable by the date scheduled for the final acceptance inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with the contract clause entitled "Inspection of Construction".

3.9 DOCUMENTATION

The Contractor shall maintain current records providing factual evidence that required quality control activities and/or tests have been performed. These records shall include the work of subcontractors and suppliers and shall be on an acceptable form that includes, as a minimum, the following information:

- a. Contractor/subcontractor and their area of responsibility.
- b. Operating plant/equipment with hours worked, idle, or down for repair.
- c. Work performed each day, giving location, description, and by whom. When Network Analysis (NAS) is used, identify each phase of work performed each day by NAS activity number.
- d. Test and/or control activities performed with results and references to specifications/drawings requirements. The control phase should be identified (Preparatory, Initial, Follow-up). List deficiencies noted along with corrective action.
- e. Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications/drawings requirements.
- f. Submittals reviewed, with contract reference, by whom, and action taken.
- g. Off-site surveillance activities, including actions taken.
- h. Job safety evaluations stating what was checked, results, and instructions or corrective actions.
- i. Instructions given/received and conflicts in plans and/or specifications.
- j. Contractor's verification statement.

These records shall indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. The original and one copy of these records in report form shall be furnished to the Government daily within [24] hours after the date(s) covered by the report, except that reports need not be submitted for days on which no work is performed. As a minimum, one report shall be prepared and submitted for every seven days of no work and on the last day of a no work period. All calendar days shall be accounted for throughout the life of the contract. The first report following a day of no work shall be for that day only. Reports shall be signed and dated by the CQC System Manager. The report from the CQC System Manager shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel.

3.9.1 Deficiency Tracking Log

The Contractor shall establish and maintain, a daily formal deficiency tracking log that shall be kept at the job site. The log shall include, as a minimum, the following:

- a. Contract title and number.
- b. Date reported.

- c. Reported by.
- d. Deficient work (By an identification number).
- e. Type of Deficiency (Construction = C, Safety = A).
- f. Description of corrective action(s).
- g. Date corrected.
- h. Verified by.

3.10 SAMPLE FORMS - ATTACHMENTS

Sample forms enclosed at the end of this section include:

- a. Attachment No. 1 - Sample of a Listing for the Definable Features of Construction Work.
- b. Attachment No. 2 - Preparatory Phase Checklist.
- c. Attachment No. 3 - Initial Phase Checklist.
- d. Attachment No. 4 - Construction Quality Control Reports.
- e. Attachment No. 5 - Test Report.
- f. Attachment No. 6 - Deficiency Tracking Log.

3.11 NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the foregoing requirements. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the worksite, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

SECTION 01440 ATTACHMENT NO.1

GUIDE FOR LISTING DEFINABLE FEATURES OF CONSTRUCTION WORK

***** Contractor shall modify this guide to accommodate the project *****

DIVISION 1 - GENERAL REQUIREMENTS

- (a) Special Project procedures to include coordination of work, Project meetings, Submittals and Quality Control
- (b) Administrative Requirements
- (c) Environmental Protection
- (d) Historic Preservation
- (e) Job Conditions

DIVISION 2 - SITE WORK

- (a) Demolition
- (b) Removal and Disposal of Asbestos Materials
- (c) Excavation, Trenching and Backfilling for Utilities Systems to include sewer gravity drainage and water lines
- (d) Clearing and Grubbing, Backfilling for Buildings
- (e) Grading
- (f) Fence, Chain-Link
- (g) Concrete for sidewalks and Curbs
- (h) Drilled Pile Foundation
- (i) Bituminous Paving
- (j) Underground Sprinkler Systems

DIVISION 3 - CONCRETE

- (a) Concrete Materials, Concrete Procedures, Concrete Formwork, Forms, Form Ties and Accessories, Concrete Reinforcement, Concrete Accessories to Include Cast-in-Place Concrete, Specially Placed Concrete, Concrete Finishing, Concrete Curing and Grouting
- (b) Concrete Restoration and Cleaning
- (c) Precast Concrete
- (d) Electrical and Mechanical Inserts
- (e) Testing
- (f) Approval of Samples

DIVISION 4 - MASONRY

- (a) Masonry Procedures, Mortar, Mortar Accessories, Unit Masonry, Cavity Wall Construction to Include Bringing Inner and Outer Wythes Up Simultaneously, Reinforcement, Wall Ties, Flashing, Masonry Restoration and Cleaning
- (b) Acceptance of Sample Panel for Cavity Wall Construction
- (c) Composite Wall Construction
- (d) Acceptance of Sample Panel for Composite Wall Construction
- (e) CMU Partition Wall Construction to Include Prepared Openings for Ducts, Fire Dampers, Door Frames, Lintels and Bond Beams
- (f) Acceptance of CMU Partition Wall Sample Panel
- (g) Insulation and Waterproofing
- (h) Testing

ATTACHMENT NO.1 (continued)
DIVISION 5 - METALS

- (a) Structural Steel Framing To Include Metal Materials and Methods, Metal Fastening, Metal Joints, Welding, Expansion Control and Miscellaneous Metals
- (b) Steel Roof Decking
- (c) High Strength Bolts

DIVISION 6 - WOODS AND PLASTICS

- (a) Rough Carpentry To Include Framing, Prefabricated Structural Wood, Fasteners and Supports, Roof Sheeting, Siding and Sub-Flooring, Insulation and Flashing (b) Finish Carpentry To Include Wood Treatment, Finish Flooring, Cabinets and Closets

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

- (a) Dampproofing and Waterproofing
- (b) Fireproofing
- (c) Insulation, Flashing and Sheet Metal, Roof Accessories, Sealants, Shingles, Roof Tiles and Membrane Roofing (Built-Up and EPDM)

DIVISION 8 - DOORS AND WINDOWS

- (a) Metal Doors and Frames, Wood and Plastic Doors, Special Doors, Door Opening Assemblies, Metal Windows, Wood and Plastic Windows, Special Windows, Glazing and Miscellaneous Hardware, Caulking

DIVISION 9 - FINISHES

- (a) Ceramic Tile
- (b) Gypsum Wallboard To Include Special Framing, Shaft Wall Framing System, Ceiling and Wall Opening
- (c) Acoustical Treatment to include Metal Suspension System for Acoustical Tile and Lay-In-Panel Ceiling
- (d) Wall Covering
- (e) Carpeting
- (f) Resilient Flooring
- (g) Painting
- (h) Furring (Metal)
- (i) Plastering

DIVISION 10 - SPECIALTIES

- (a) Metal Toilet Partitions
- (b) Raised Floor System
- (c) Movable Partitions
- (d) Wardrobe
- (e) Fire Extinguisher Cabinets
- (f) Toilet Accessories

ATTACHMENT NO.1 (continued)
DIVISION 11 - EQUIPMENT

- (a) Fueling System for Motor Vehicles
- (b) Adjustable Loading Ramps
- (c) Incinerator, Packaged Controlled Air
- (d) Incinerator, Medical Waste, General Purpose, Field Erected
- (e) Food Service Equipment
- (f) Government Furnished Equipment

DIVISION 12 - FURNISHINGS

- (a) Theater Chairs
- (b) Blinds
- (c) Drapes
- (d) Lockers
- (e) Training Equipment
- (f) Furniture and Accessories
- (g) Rugs and Mats
- (h) Fabrics

DIVISION 13 - SPECIAL CONSTRUCTION

- (a) RF Shielding
- (b) Sky Lights
- (c) Swimming Pool
- (d) Energy Monitoring and Control System (EMCS)
- (e) Pre-Engineered Structures
- (f) Liquid and Gas Storage Tanks
- (g) Vaults

DIVISION 14 - CONVEYING SYSTEMS

- (a) Shaft Construction To Include Guides and Guide Rails
- (b) Car Assembly
- (c) Machine Room Layout
- (d) Entrances
- (e) Operating and Signal Devices
- (f) Fire/Emergency Power Operations
- (g) Lighting, Power and Wiring
- (h) Elevator Power Unit
- (i) Acceptance Testing To Include Communications, Safety, Weights, Emergency and Fire Operations, Dispatch System

DIVISION 15 - MECHANICAL

- (a) Insulation to Include:
 - (1) Pipes
 - (2) Ducts
 - (3) Equipment
 - (4) High Density Inserts, Insulation Protective Shields, Clips or U Bolt Supports for Multiple Pipe Hanger Supports
 - (5) Perimeter Insulation

ATTACHMENT NO. 1 (continued)

- (b) Plumbing Systems
 - (1) Waste/Vent Piping To Include: Underground Soil Piping, Above Ground Soil Piping
 - (2) Interior Piping Rough-In To Include: Galvanized Black Iron and Copper Including Drains, Fittings, Valves and Piping Supports
 - (3) Plumbing Fixtures To Include Flush Valves, Faucets and Accessories
 - (4) Cleaning, Balancing and Operational Testing
- (c) Heating systems
 - (1) Equipment and System Accessories
 - (2) Hot Water/Steam Piping Supports
 - (3) Fuel Oil/Gas Piping and Supports
 - (4) System Testing and Balancing
- (d) Air Distribution Systems
 - (1) Equipment and Accessories
 - (2) Duct Work To Include Galvanized, Aluminum, Flexible and Fiberglass, Supports, Dampers, Louvers, Diffusers, Duct Line Supports and Fire-Dampers
- (e) Refrigeration Systems
 - (1) Equipment and Accessories
 - (2) Chilled Water/Condenser Water Piping and Supports
 - (3) Refrigerant Piping and Supports
 - (4) System Testing
- (f) Automatic Temperature Control Systems
 - (1) Equipment and Materials
 - (2) Installation of Materials and Equipment
 - (3) System Testing
- (g) Underground Heat Distribution Systems
 - (1) Manholes
 - (2) Piping and Supports
 - (3) Cathodic Protection
- (h) Sprinkler Systems
 - (1) Equipment
 - (2) Piping and Supports
 - (3) Accessories
- (i) Water Treatment Systems
- (j) Welding - Piping Systems

DIVISION 16 - ELECTRICAL

- (a) Exterior Electrical Distribution, Aerial
 - (1) Pole Setting
 - (2) Placement of Crossarms, Pins, Insulators, Pole Line Hardware and Conductors
 - (3) Placement of Fuse Cutouts, Surge Arresters, Reclosers, Potheads, Pole Mounted Transformers to Include Grounding Conductors, Testing and Cable Terminations
- (b) Exterior Electrical Distribution, Underground
 - (1) Duct Line Excavation, Placement of Ducts and Misc. Materials
 - (2) Placement of In Ground Junction or Pull Boxes and Manholes
 - (3) Placement of Duct Bank Concrete Encasement
 - (4) Transformer Pad Placement
 - (5) Mounting of Pad Mounted Transformers

ATTACHMENT NO.1 (continued)

- (6) Cable Placement to Include Splicing, Fire-Proofing and Cable Terminations
- (7) Grounding Conductors and Testing
- (c) Electrical Distribution, Interior
 - (1) Wiring Methods to Include Conduit Rough-in, Raceway Boxes, Outlet Boxes, Panelboard Cabinets, Placement of Conductors and Conduit Placement Below the Slab for Slab-On-Grade Construction
 - (2) Wiring Devices, Panelboards, Switch-Boards and Lighting Fixtures
 - (3) Motors and Transformers
 - (4) Testing
- (d) Fire Detection and Alarm System
 - (1) Wiring Methods to Include Conduit, Ground Rods, Detectors, Control Panels, Power Supply, Door Holders, Audible Fire Alarm and Annunciator Panel
 - (2) Testing

---End of Attachment No.1---

SECTION 01440 ATTACHMENT NO.2
PREPARATORY PHASE CHECKLIST

CONTRACTOR'S NAME (Address)

Contract No.: _____ Date Preparatory Held: _____

Title: _____ Spec Section: _____

_____ Drawing No(s): _____

Definable Feature of Work: _____

A. PERSONNEL PRESENT:

Name	Position	Company
1. _____	_____	_____
2. _____	_____	_____
3. _____	_____	_____
4. _____	_____	_____
5. _____	_____	_____
6. _____	_____	_____
7. _____	_____	_____
8. _____	_____	_____

(List additional personnel on reverse side)

B. DRAWINGS AND SPECS:

I. Has each spec paragraph, contract drawing, and shop drawing been
studied? YES _____ NO _____II. Do all parties have up-to-date drawings and specifications?
YES _____ NO _____

C. SHOP DRAWINGS INVOLVED:

Transmittal/Item	Code	Contractor or Gov't Approval
1. _____	_____	_____
2. _____	_____	_____
3. _____	_____	_____
4. _____	_____	_____

ATTACHMENT NO.2 (continued)

D. MATERIALS:

I. Are all materials on hand? YES _____ NO _____

II. Have all materials been checked for contract compliance against approved shop drawings? YES _____ NO _____

III. Items not on hand or not in accordance with transmittals (if not on hand, check during initial phase):

1. _____
2. _____
3. _____
4. _____

E. TESTS required in accordance with contract requirements:

Test/Paragraph	Frequency
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____
6. _____	_____

F. ACCIDENT PREVENTION: Has Hazard Analysis been completed?

YES _____ NO _____

If yes, attach a copy, if no, explain:

ATTACHMENT NO.2 (continued)

G. EQUIPMENT Requiring Operational Check:

1. _____
2. _____
3. _____
4. _____

H. WORKMANSHIP: Have procedures for accomplishing work been reviewed with appropriate people? YES _____ NO _____

I. PREVIOUS WORK: Has all preliminary work been accomplished in accordance with contract requirements and is this feature of work ready to start? YES _____ NO _____

Explain any problems: _____

J. HI-LIGHTING SPECIFIC ITEMS: Hi-light specific items noted during the Preparatory Phase inspection. ie, (Med. Voltage cable shall be hi-pot tested).

K. OTHER COMMENTS: _____

Quality Control Representative
Signature

SECTION 01440 ATTACHMENT NO.3
INITIAL PHASE CHECKLIST

CONTRACTOR'S NAME (Address)

Contract No.: _____ Date Initial Held: _____

Title: _____ Spec Section: _____

Drawing No(s) .: _____

Definable Feature of Work: _____

A. PERSONNEL PRESENT:

Name	Position	Company
------	----------	---------

1. _____		
----------	--	--

2. _____		
----------	--	--

3. _____		
----------	--	--

4. _____		
----------	--	--

5. _____		
----------	--	--

6. _____		
----------	--	--

B. MATERIALS being used are in strict accordance with the contract plans
and
specifications? YES _____ NO _____

If not, explain: _____

ATTACHMENT NO.3 (continued)

C. WORKMANSHIP:

I. Procedures and/or work methods witnessed are in strict compliance with the requirement of the contract specifications? YES _____ NO _____

If not, explain: _____

II. Workmanship is acceptable? YES _____ NO _____

State area where improvement is needed: _____

D. SAFETY violations and corrective action taken: _____

E. COMMENTS: _____

Quality Control Representative
Signature

SECTION 01440 ATTACHMENT NO.4
DAILY CONSTRUCTION QUALITY CONTROL REPORT
(Sample of Typical Contractor Daily Quality Control Report)

CONTRACTORS NAME (Address)

Date _____ Report No. _____ Contract No. DAC()
65-__-C-_____ Project Name and Location of work:

Weather:[Clear] [P.Cloudy] [Cloudy] [Rain: __ inches]
[Temp. __ min. __ max.] Other Weather Conditions

1. Contractor (C) or Sub-contractor (S), and Area of Responsibility:

a. ()

) _____ b. (

() _____ c.

d. ()

) _____ e. (

2. Equipment Data. (Indicate items of construction equipment, other than hand tools, at the job site and whether or not used):

3. Work Performed Today (Indicate identity of Contractor and Sub-contractors, location, and description of work:

4. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken):

a. Preparatory

Phase: _____

b. Initial

Phase: _____

c. Follow-up

Phase: _____

DAILY CONSTRUCTION QUALITY CONTROL REPORT (Continued)

5. Tests performed as required by plans and specifications and the results:

6. Verbal instructions received (List instructions given by Government personnel on construction deficiencies, retesting required, etc. Include the name of Government person, time and place instructions given, and action taken to comply:

7. Job Safety (Include deficiencies and corrective action taken:

8. Equipment Data (Indicate items of construction equipment, other than hand tools, at the job site, and whether or not used):

9. Material and equipment items that arrived at the job site. Indicate compliance or non-compliance of these items with approved shop drawings, the contract plans and specifications, and the storage of the item is required prior to the time of installation, indicate how this storage was provided and whether or not it is adequate:

10. Remarks (Cover any conflicts in the plans and specifications, instructions, or delays):

CONTRACTOR'S VERIFICATION: THE ABOVE REPORT IS COMPLETE AND ALL DATA LISTED IS CORRECT. ALL MATERIALS PROVIDED, EQUIPMENT USED, AND WORKMANSHIP FOR THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT PLANS AND SPECIFICATIONS EXCEPT AS NOTED ABOVE.

SIGNED

CONTRACTOR'S QC SYSTEM MANAGER

SECTION 01440 ATTACHMENT NO.5
TEST REPORT

CONTRACTOR'S NAME (Address)

STRUCTURE OR
BUILDING _____ CONTRACT
NO. _____

DESCRIPTION OF ITEM, SYSTEM OR PART OF SYSTEM
TESTED: _____

DESCRIPTION OF
TEST: _____

NAME AND TITLE OF PERSON IN CHARGE OF PERFORMING TESTS FOR CONTRACTOR:

NAME _____

TITLE _____

SIGNATURE _____

I HEREBY CERTIFY THAT THE ABOVE DESCRIBED ITEM, SYSTEM OR PART OF SYSTEM HAS
BEEN TESTED AS INDICATED ABOVE AND FOUND TO BE ENTIRELY SATISFACTORY AS
REQUIRED IN THE CONTRACT SPECIFICATIONS.

SIGNATURE OF CONTRACTOR QUALITY CONTROL INSPECTOR

DATE _____

REMARKS: _____

SECTION 01440 ATTACHMENT NO. 6
DEFICIENCY TRACKING LOG

Construction Deficiency

Contract No.

Safety Deficiency

Project Title

[illegible]

SECTION 01500
TEMPORARY CONSTRUCTION FACILITIES09/93
MOD 3/96

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

1.1.1 Site Plan

The Contractor shall prepare a site plan indicating the proposed location and dimensions of any area to be fenced and used by the Contractor, the number of trailers to be used, entrance(s), utilities, and details of the fence installation. Any areas which may have to be graveled to prevent the tracking of mud shall also be identified. The Contractor shall also indicate any supplemental or other staging area.

1.1.2 Identification of Employees

The Contractor shall be responsible for furnishing to each employee and for requiring each employee engaged on the work to display identification as approved and directed by the Contracting Officer. Prescribed identification shall immediately be delivered to the Contracting Officer for cancellation upon release of any employee. When required, the Contractor shall obtain and provide fingerprints of persons employed on the project. Contractor and subcontractor personnel shall wear identifying markings on hard hats clearly identifying the company for whom the employee works.

1.1.3 Employee Parking

Contractor employees shall park privately owned vehicles in an area designated by the Contracting Officer. This area will not necessarily be within reasonable walking distance of the construction site. The Contractor shall provide transportation between the parking area and the construction site. Contractor employee parking shall not interfere with existing and established parking requirements of the facility.

1.2 SUBMITTALS (Not Applicable)

1.3 AVAILABILITY AND USE OF UTILITY SERVICES

1.3.1 Payment for Utility Services

The Government will make all reasonably required utilities available to the Contractor from existing outlets and supplies, as specified in the contract. Unless otherwise provided in the contract, the amount of each utility service consumed shall be charged to or paid for by the Contractor at prevailing rates charged to the Government or, where the utility is produced by the Government, at reasonable rates determined by the Contracting Officer. The Contractor shall carefully conserve any utilities furnished without charge.

1.3.2 Meters and Temporary Connections

The Contractor, at its expense and in a workmanlike manner satisfactory to the Contracting Officer, shall provide and maintain all necessary temporary connections, distribution lines, and meter bases (Government will provide meters) required to measure the amount of each utility used for the purpose of determining charges. The Contractor shall notify the Contracting Officer, in writing, 5 working days before final electrical connection is desired so that a utilities contract can be established. The Government will provide a meter after inspection and approval of the Contractor's

temporary wiring installation. The Contracting Officer will then inform the Facility to make the final hot connection and install the meter(s). Under no circumstance shall the Contractor make the final electrical connection. Other utility connections shall be made by the Contractor as directed by the Contracting Officer.

1.3.3 Advance Deposit

An advance deposit for utilities consisting of an estimated month's usage or a minimum of \$50.00 will be required. The last monthly bills for the Federal fiscal year (01 Oct through 30 Sep of the following year) will normally be offset by the deposit and adjustments will be billed or returned as appropriate. Services to be rendered for the next Federal fiscal year, beginning 1 October, will require a new deposit. Notification of the due date for this deposit will be mailed to the Contractor prior to the end of the current Federal fiscal year.

1.3.4 Final Meter Reading

Before completion of the project work and final acceptance of the work by the Government, the Contractor shall notify the Contracting Officer, in writing, 5 working days before termination is desired. The Government will take a final meter reading, disconnect service, remove the meter(s) and notify the Contractor of the final amount due, if any. The Contractor shall then remove all the temporary distribution lines, meter base(s), and associated paraphernalia, and restore all disturbed areas to original condition or better prior to final acceptance of the work by the Government.. The Contractor shall pay all outstanding utility bills before final acceptance of the work by the Government.

1.3.5 Sanitation

The Contractor shall provide and maintain within the construction area minimum field-type sanitary facilities approved by the Contracting Officer. Government toilet facilities will not be available to Contractor's personnel.

1.3.6 Telephone

The Contractor shall make arrangements and pay all costs for telephone facilities desired.

1.4 BULLETIN BOARD, PROJECT SIGN, AND PROJECT SAFETY SIGN

1.4.1 Bulletin Board

Within fifteen days after receipt of the Notice To Proceed, the Contractor shall provide a weatherproof bulletin board not less than 36 by 48 inches in size for displaying the Equal Employment Opportunity poster, a copy of the wage decision contained in the contract documents, Wage Rate Information poster, and other information required or approved by the Contracting Officer. The bulletin board shall be located at the project site in a conspicuous place, on the outside adjacent to the entrance of the job-site trailer(office), easily accessible to all employees, as approved by the Contracting Officer. Legible copies of the aforementioned data shall be displayed until work under this contract is completed. Upon completion of work the bulletin board shall be removed by and remain the property of the Contractor.

1.4.2 Project and Safety Signs

The requirements for the signs, their content, and location shall be provided at a location designated by the Contracting Officer. The signs shall be erected within 15 days after receipt of the Notice to Proceed. The data required by the safety sign shall be corrected daily, with light

colored metallic or non-metallic numerals. Upon completion of the project, the signs shall be removed and disposed of by the Contractor.

1.4.2.1 Project Sign:

The project sign shall conform to the requirements as indicated on Attachment No.1, attached hereto.

1.4.2.2 Safety Sign:

The safety sign shall conform to the requirements as indicated on Attachment No.2, attached hereto. The data required by the sign shall be corrected daily, with light colored metallic or non-metallic numerals. Numerals, including mounting hardware, shall be subject to the approval of the CO.

1.4.2.3 Payment:

No separate payment will be made for the sign work covered under this section of the specifications and all costs in connection therewith will be considered as a subsidiary obligation of the Contractor, covered by the contract prices in this contract.

1.5 PROTECTION AND MAINTENANCE OF TRAFFIC

During construction the Contractor shall provide access and temporary relocated roads as necessary to maintain traffic. The Contractor shall maintain and protect traffic on all affected roads during the construction period except as otherwise specifically directed by the Contracting Officer. Measures for the protection and diversion of traffic, including the provision of watchmen and flagmen, erection of barricades, placing of lights around and in front of equipment and the work, and the erection and maintenance of adequate warning, danger, and direction signs, shall be as required by the State and local authorities having jurisdiction. The traveling public shall be protected from damage to person and property. The Contractor's traffic on roads selected for hauling material to and from the site shall interfere as little as possible with public traffic. The Contractor shall investigate the adequacy of existing roads and the allowable load limit on these roads. The Contractor shall be responsible for the repair of any damage to roads caused by construction operations.

1.5.1 Haul Roads

The Contractor shall, at its own expense, construct access and haul roads necessary for proper prosecution of the work under this contract. Haul roads shall be constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic shall be avoided. The Contractor shall provide necessary lighting, signs, barricades, and distinctive markings for the safe movement of traffic. The method of dust control shall be adequate to ensure safe operation at all times. Location, grade, width, and alignment of construction and hauling roads shall be subject to approval by the Contracting Officer. Lighting shall be adequate to assure full and clear visibility for full width of haul road and work areas during any night work operations. Upon completion of the work, haul roads designated by the Contracting Officer shall be removed.

1.5.2 Barricades

The Contractor shall erect and maintain temporary barricades to limit public access to hazardous areas. Such barricades shall be required whenever safe public access to paved areas such as roads, parking areas or sidewalks is prevented by construction activities or as otherwise necessary to ensure the safety of both pedestrian and vehicular traffic. Barricades shall be securely placed, clearly visible with adequate illumination to provide sufficient visual warning of the hazard during both day and night.

Barricades and other physical protection shall be in accordance with EM 385-1-1.

1.6 CONTRACTOR'S TEMPORARY FACILITIES

1.6.1 Administrative Field Offices and Storage Areas

The Contracting Officer will designate an area within which the Contractor shall be permitted to place administrative or storage trailers for equipment and limited construction materials other than in trailers. The Contractor shall provide and maintain administrative field office facilities within the construction area at the designated site. Government office and warehouse facilities will not be available to the Contractor's personnel.

1.6.1.2 Storage Area(s):

The Contractor may construct a temporary 6-foot high chain link fence around all trailers and materials. Fence posts may be driven in lieu of concrete bases where soil conditions permit. No trailers, materials, or equipment shall be placed or stored outside the fenced area unless such trailers, materials or equipment are assigned a separate and distinct storage area by the CO away from the vicinity of the construction site but within the boundaries of the Post. At no time shall trailers, equipment or materials be open to public view with the exception of those items which are in support of ongoing work on any given day. Materials shall not be stockpiled outside the fence in preparation for the next day's work. At the end of each work day, mobile equipment such as tractors, wheeled lifting equipment, cranes, trucks and like equipment shall be parked within the fenced area.

1.6.1.3 Supplemental Storage Area(s):

Upon request of the Contractor, the CO will designate another or supplemental area for the Contractor's use and storage of trailers, equipment and materials. This area may not be in close proximity to the construction site, but shall be within the boundaries of the Post. Fencing of materials or equipment [will] [will not] be required at this site; however, the Contractor shall be responsible for cleanliness and orderliness of the storage area used. The Contractor shall be responsible for the security of any materials or equipment stored in this area. No utilities will be provided to this area by the Government.

1.6.1.4 Appearance of Trailers:

Trailers utilized by the Contractor, whether for the purpose of administrative use or materials storage, shall present a clean and neat exterior appearance and be in a state of good repair. Trailers which, in the opinion of the CO, are not in good repair shall not be allowed on the Post.

1.6.1.5 Equipment:

Any item of construction equipment, with the exception of hand tools, which becomes inoperable shall be repaired within five (5) working days or removed from the construction site.

1.6.1.6 Maintenance of Storage Area(s):

It shall be the responsibility of the Contractor to keep all fencing in a state of good repair and proper alignment. Should the Contractor elect to traverse grassed or other areas without paving that are not established roadways, with construction equipment or other vehicles, such grassed or other areas shall be covered with a layer of gravel as necessary to prevent rutting and to prevent the tracking of mud onto paved or established

roadways. Gradation of the gravel shall be at the discretion of the Contractor. The Contractor shall be responsible for the cutting of grass located within the boundaries of the construction site for the duration of the project. Grass and vegetation along fences, buildings, under trailers and in areas not accessible to mowers shall be edged or trimmed neatly.

1.6.1.7 Sanitation:

It shall be the responsibility of the Contractor to provide and maintain minimum field-type sanitary facilities, approved by the CO, within the construction area. Present Government toilet facilities will not be available to the Contractor's personnel.

1.6 Telephone:

The Contractor shall be responsible for making all arrangements and paying all cost for telephone facilities he may require.

1.6.2 NOT USED

1.6.3 Security Provisions

Adequate outside security lighting shall be provided at the Contractor's temporary facilities. The Contractor shall be responsible for the security of its own equipment; in addition, the Contractor shall notify the appropriate law enforcement agency requesting periodic security checks of the temporary project field office.

1.7 NOT USED

1.10 CLEANUP

Construction debris, waste materials, packaging material and the like shall be removed from the work site daily. Any dirt or mud which is tracked onto paved or surfaced roadways shall be cleaned away. Materials resulting from demolition activities which are salvageable shall be stored within the fenced area described above or at the supplemental storage area. Stored material not in trailers, whether new or salvaged, shall be neatly stacked when stored.

1.11 RESTORATION OF STORAGE AREA

Upon completion of the project and after removal of trailers, materials, and equipment from within the fenced area, the fence shall be removed and will become the property of the Contractor. Areas used by the Contractor for the storage of equipment or material, or other use, shall be restored to the original or better condition. Gravel used to traverse grassed areas shall be removed and the area restored to its original condition, including top soil and seeding as necessary.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

-- End of Section --

SECTION 01560
ENVIRONMENTAL PROTECTION (PROJECT SITE)

03/96

PART 1 GENERAL

1.1 DEFINITIONS

For the purpose of this specification environmental pollution is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare, unfavorably alter ecological balances of importance to human life, and may affect other species and natural resources of importance to man.

1.2 REFERENCES:

The publications listed below form a part of this specification to the extent referenced. The publications are listed in the text by basic designation only.

CODE OF FEDERAL REGULATIONS (CFR)

29 CFR 1910.94-SUBPART G	Occupational Health and Environmental Control
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Generators of Hazardous Waste
40 CFR 263	Transporters of Hazardous Waste
40 CFR 264	Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
49 CFR 178	Shipping Container Specifications

CORPS OF ENGINEERS (COE)

EP-1165-2-304	Perspective on Flood Plain Regulations for Flood Plain Management (1976)
ER-1165-2-26	Implementation of Executive Order 11988 on Flood Plain Management (March 1984)
EM 385-1-1	Safety and Health Requirements Manual (September 1996)

VIRGINIA SOIL AND WATER CONSERVATION COMMISSION (VSWCC)

VESCH	Virginia Erosion and Sediment Control Handbook (1992)
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VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

VR 680-14-19	Virginia Pollutant Discharge Elimination System
VR 680-14-19 Permit	(VPDES) General Permit For Storm Water Discharges From Construction Sites

1.3 SUBMITTALS

The contractor shall submit the following in accordance with Section 01300 SUBMITTAL PROCEDURES.

SD-01 Data

Preconstruction Survey; GA

Prior to commencement of work the Contractor shall perform a preconstruction survey of the project site with the Contracting Officer and take photographs showing existing environmental conditions in and adjacent to the site. A brief report of the results of this survey shall be prepared by the contractor and copies furnished to the Contracting Officer. The contractor shall certify that he has read and understands regulations 29 CFR 1910.94-SUBPART G, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 49 CFR 178, EP-1165-2-304, ER-1165-2-26, VR 680-14-19, and VESCH, and provide proof that he has performed work in accordance with these regulations.

Environmental Protection Plan; GA

The Contractor shall submit for approval within 10 days after Notice to Proceed, and prior to any work on the site, his written Environmental Protection Plan. The Contractor shall meet with the Contracting Officer, to discuss the proposed Environmental Protection Plan and to develop mutual understanding relative to the details of environmental protection, including measures for protecting natural resources, required reports, and other measures to be taken. The plan shall demonstrate compliance with 29 CFR 1910.94-SUBPART G, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 49 CFR 178, EM 385-1-1, EP-1165-2-304, ER-1165-2-26, VR 680-14-19, and VESCH.

Erosion Control Plan; GA

The contractor shall, within 10 days after the Notice to Proceed, submit an Erosion Control Plan in accordance with VESCH and as otherwise specified for approval of the Contracting Officer, showing the Contractor's scheme for controlling erosion and disposing of wastes. The Erosion Control Plan shall include as a minimum the following items indicating adequate measures to:

- a. Reduce by the greatest extent practicable the area and duration of exposure of readily erodible soils.
- b. Protect the soils by use of temporary vegetation, or seeding and mulch, or by accelerating the establishment of permanent vegetation. Complete and protect segments of work as rapidly as is consistent with construction schedules.
- c. Retard the rate of runoff from the construction site and control disposal of runoff.
- d. Sprinkle or apply dust suppressors, or otherwise keep dust within tolerable limits on haul roads and at the site.
- e. Borrow areas furnished by the contractor shall be at a location where pollution from the operation can be minimized. Locations should be avoided where pollution would be inevitable.
- f. Provide temporary measures for the control of erosion in the event construction operations are suspended for any appreciable length of time.
- g. Provide protection against discharge of pollutants such as chemicals, fuel, lubricants, or sewage into any stream.
- h. Locate sanitary facilities away from streams, wells, or springs.

Hazardous Waste Disposal Permit; FIO

Submit copies of state and local permit or license showing such agencies' approval of the disposal plan.

VR 680-14-19 Permit; FIO

The Contractor shall provide a copy of his application for the VR 680-14-19 Permit at least five days prior to submittal to appropriate office of the Commonwealth of Virginia. The Contractor shall obtain the VR 680-14-19 Permit in accordance with Virginia Pollutant Discharge Elimination System (VPDES) General Permit For Storm Water Discharges From Construction Sites and provide a copy to the Contracting Officer prior to any work on the site.

1.4 GENERAL REQUIREMENTS

1.4.1 General

The work covered by this section consists of furnishing all labor, materials and equipment and performing all work required for the prevention of environmental pollution during and as the result of construction operations under this contract. In the event the measures set forth in other Technical Provisions of these specifications and this Section conflict, the most stringent standard shall apply. The control of environmental pollution requires consideration of air, water, and land.

1.4.2 Provisions

Provide and maintain, during the life of the contract, environmental protection.
Plan for and provide environmental protective measures to control pollution that develops during normal construction practice. Plan for and provide environmental protective measures required to correct conditions that develop during the construction of permanent or temporary environmental features associated with the project.

1.4.3 Compliance

The contractor shall comply with Federal, state, and local regulations pertaining to the environmental pollution control and abatement, including but not limited to water, air, land, and noise pollution. All applicable provisions of the Corps of Engineers Manual, EM 385-1-1, entitled "Safety and Health Requirements Manual" in effect on the date of solicitation, as well as the specific requirements stated elsewhere in the contract specifications shall be strictly observed and enforced.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 NOTIFICATION

The Contracting Officer will notify the contractor in writing of any non-compliance with the foregoing provisions and the action to be taken. The contractor shall, after receipt of such notice, immediately take corrective action. Such notice, when delivered to the contractor or his authorized representative at the site of the work, shall be deemed sufficient for the purpose. If the contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to any such stop orders shall be made the subject of a claim for extension of time or for excess costs or damages by the contractor unless it was later determined that the contractor was in compliance.

3.2 SUBCONTRACTORS

Compliance with the provisions of this section by subcontractors will be the responsibility of the contractor.

3.3 PROTECTION OF WATER RESOURCES:

The contractor shall not pollute streams, lakes or reservoirs with fuels, oils, bitumens, calcium chloride, acid construction wastes or other harmful materials. It is the responsibility of the contractor to investigate and comply with all applicable Federal, State, County and Municipal laws concerning pollution of rivers and streams. All work under this contract shall be performed in such a manner that objectionable conditions will not be created in streams through or adjacent to the project areas.

3.4 INDUSTRIAL POLLUTION HAZARDS

Hazardous substances as defined in 40 CFR 261 or as defined by applicable state and local regulations, and dust which poses air pollution hazards shall be controlled as approved to comply with all applicable laws which govern the work.

3.4.1 DUST CONTROL

The contractor shall maintain all work areas free from dust which would contribute to air pollution. Approved temporary methods of stabilization consisting of sprinkling, chemical treatment, light bituminous treatment or similar methods will be permitted to control dust. Sprinkling, to be approved, must be repeated at such intervals as to keep all parts of the disturbed area at least damp at all times, and the contractor must have sufficient competent equipment on the job to accomplish this if sprinkling is used. Dust control shall be performed as the work proceeds and whenever a dust nuisance or hazard occurs.

3.5 MAINTENANCE OF POLLUTION CONTROL FACILITIES DURING CONSTRUCTION:

During the life of this contract the contractor shall maintain all facilities constructed for pollution control under this contract as long as the operations creating the particular pollutant are being carried out or until the material concerned has become stabilized to the extent that pollution is no longer being created.

3.6 MAINTENANCE OF PERMITS

The Contractor shall immediately provide to the Contracting Officer two copies of any modification, revocation or reissuance of any applicable permit required to complete the work. The Contractor shall provide two copies of all correspondence with Federal, State or Local Government offices regarding any applicable permit within 5 days. The Contractor shall notify the Contracting Officer in writing at least 5 days prior to any visit to the site by any Federal, State or Local Government office, other than those scheduled by the Contracting Officer, scheduled to observe compliance with applicable permits provided the Contractor receives at least 5 days notice. Otherwise the Contractor shall immediately provide the Contracting Officer written notice of the date, time, office(s) participating and features to be observed by the most expeditious means available.

-- End of Section --

SECTION 01700
AS-BUILT RECORD DRAWINGS AND SHOP DRAWINGS

03/96

PART 1 GENERAL

1.1 GENERAL:

The Contractor shall, upon completion of each facility under this contract, provide the Contracting Officer as-built record contract drawings and as-built reproducible shop drawings.

1.2 AS-BUILT CONTRACT DRAWINGS:

1.2.1 Record of Job Progress Changes and Corrections

During the progress of the job, the Contractor shall keep a careful record at the job site of all construction changes and corrections from the layouts and details and conditions shown on the drawings. These as-built contract drawings shall be a record of the construction as installed and completed by the Contractor. They shall include all the information shown on the contract set of drawings, and all deviations, modifications, or changes from those drawings, however minor, which were incorporated in the work, including all additional work not appearing on the contract drawings, and all changes which are made after any final inspection of the contract work. The as-built drawings changes shall be annotated in a single color (RED) and shall indicate in addition to all changes and corrections, the actual location, kinds and sizes of all subsurface utility lines. In order that the location of these lines and appurtenances may be determined in the event the surface openings or indicators become covered over or obscured, the as-built drawings shall show, by offset dimensions to two permanently fixed surface features, the end of each run including each change in direction. Valves, splice boxes and similar appurtenances shall be located by dimensioning along the utility run from a reference point. The depth below the surface of each run shall also be recorded at each high and low point.

1.2.2 Additional Work:

In the event the Contractor accomplished additional work which changes the as-built conditions of the facility after submission of the final as-built drawings, the Contractor shall furnish revised and/or additional drawings as required to depict final as-built conditions. The requirements for these additional drawings will be the same as for the as-built drawings specified in this paragraph.

1.2.3 Daily Record of As-Built Conditions:

The Contractor shall maintain a full-size set of contract drawings for depicting the record of as-built conditions. These as-built drawings shall be maintained in a current condition at all times during the entire contract period and shall be readily available for review by the CO at all times. All changes from the contract plans which are made in the work, or additional information which might be uncovered in the course of construction, shall be recorded on the prints accurately and neatly by means of details and notes using clearly contrasting single colored (RED) pen to permit ready identification of the change to the print. The as-built drawings shall reflect correctly scaled drawings of the construction as actually performed, and include but not be limited to as-built features showing:

- a. Complete and accurate scaled drawings of as-built conditions that are changed from the contract drawings.

- b. Layout and schematic drawings of electrical circuits, pole lines, and piping, etc.
- c. Correct dimensions and details transferred from shop drawings and contract changes.
- d. Correction of alignment, cross section, and layout of earthwork, roadways, etc.
- e. Actual location of anchors, embedded items, construction and control joints, depth of footings, etc., for concrete and masonry work.
- f. Changes in location of equipment and architectural features.
- g. Deletion of phrases such as "optional requirement," or "or equal," etc., with a listing of the specific items of material or equipment provided.
- h. Unusual or uncharted obstructions encountered in the contract work area during construction.
- i. Location, extent, thickness, and size of stone protection, particularly where it will be covered by water.
- j. Actual invert locations and elevations, where different from those shown on the contract drawings, for utility and process pipelines.
- k. The Contractor shall complete the AS-BUILT DRAWING CHECKLIST, attached hereto, and submit it with the as-built drawings.

1.2.4 Submittal to the Contracting Officer for Review and Approval:

Two sets of the as-built marked-up drawings shall be delivered to the CO, at the time of beneficial occupancy of each structure or facility involved under this contract, for review and approval. This submittal shall include a copy of the AS-BUILT DRAWING CHECKLIST signed by the CQC Manager. If, upon review of the as-built drawings, errors and/or omissions are found, the as-built marked-up prints will be returned to the Contractor for correction. The Contractor shall complete the corrections and return the drawings to the CO upon transfer of the facility.

1.3 AS-BUILT SHOP DRAWINGS:

Upon completion of each separate facility or phase of work under this contract, the Contractor shall provide a complete reproducible set of all shop drawings as finally approved and one set of prints. These shop drawings shall show all changes made up to the time the equipment, materials or general construction was completed and accepted. This requirement applies only to those features that are extensions of design (including but not limited to pre-engineered metal buildings and similar), designs provided by the contractor (including but not limited to sprinkler systems and similar), and approved deviations from the contract drawings. Reproducible drawings shall be on Mylar drafting media or approved equal.

1.4 PAYMENT FOR AS-BUILTS CONTRACT/SHOP DRAWINGS:

No separate payment shall be made to the Contractor for preparation of either As-Built Contract Drawings or As-Built Shop Drawings. If the Contractor fails to maintain the in-progress as-built contract/shop drawings as required herein, the CO will deduct from the monthly progress payment, an amount representing the estimated monthly cost of maintaining the record drawings, and will continue deduction of the 10% retainage even after 50% completion of the contract. In addition, final payment with

respect to separately priced facilities or the contract as a whole, will be withheld until proper as-built contract/shop drawings have been provided to the CO.

AS-BUILT DRAWINGS CHECKLIST

Project	Contract #		
Contractor	Date		

Check one of the following:	YES	NO	N/A
1. Revisions to site layout plans indicated.	—	—	—
2. Site Grading Plan:	—	—	—
a. Finish grade change indicated.	—	—	—
b. Manhole location & invert elevations shown correct.	—	—	—
c. Finish floor elevations of building(s) shown correct.	—	—	—
d. Road locations with turn outs, drainage, etc.	—	—	—
3. Exterior utility lines, locations (actual routing), type of material and heat tracing, size & type of valves, drain cocks, air rents, etc., all shown correct for the following:			
a. Gas	—	—	—
b. Water	—	—	—
c. Steam	—	—	—
d. Condensate	—	—	—
e. Sanitary Sewer	—	—	—
f. Electrical Power	—	—	—
g. Communications, Fire alarms, etc.	—	—	—
4. All road layouts & detail revisions noted.	—	—	—
5. Record temporary water, power, or any other utility or structural appurtenance abandoned in place.	—	—	—

Check one of the following:	YES	NO	N/A
6. Architectural:			
a. Floor plans dimensional changes noted.	—	—	—
b. Door locations size & swing revisions indicated.	—	—	—
c. Interior finish schedule changes noted.	—	—	—
d. All wall section and detail changes noted.	—	—	—
e. Roof plan drain locations, scuppers, roof mounted equipment and slope shown correct.	—	—	—
f. All Equipment Schedules corrected to reflect actual equipment installed or furnished.	—	—	—
g. Reflected ceiling plan shows actual mechanical and electrical access panels, grill opening locations.	—	—	—
7. Structural:			
a. Footing plan revisions noted. Elevation of bottom of footings and type of material (soil).	—	—	—
b. All schedules for footings columns, beams and girders shown as actually constructed.	—	—	—
c. Concrete equipment pads shown in correct location, size and reinforcement.	—	—	—
d. Floor framing plan dimensions, section cuts, expansion joints, construction joints, and floor openings shown correct.	—	—	—
e. Concrete structural details indicate actual steel reinforcement provided.	—	—	—
f. All miscellaneous structural supports for architectural, mechanical & electrical items shown as erected.	—	—	—

Check one of the following:	YES	NO	N/A
8. Mechanical:			
a. Plumbing layout correct as shown.	—	—	—
b. Riser diagrams correct as shown.	—	—	—
c. Interior roof drain shown in correct locations.	—	—	—
d. Fire sprinkler system installed as shown.	—	—	—
e. Heating and air conditioning layout correct as shown.	—	—	—
f. Equipment connections shown in actual locations.	—	—	—
g. Equipment sizes & data shown on schedules are as installed.	—	—	—
h. Sequence of operations, controls, etc, revised to reflect system installed.	—	—	—
9. Electrical:			
a. Conduit layout for receptacles.	—	—	—
b. All changes to riser and one line diagrams noted.	—	—	—
c. Panel board configuration shown correct.	—	—	—
d. Changes in equipment control circuits.	—	—	—
e. Relocations of telephone outlets (paging outlets) and fire detectors shown on plans.	—	—	—
f. Panel board circuit diagrams & schedules revision noted on drawings.	—	—	—
g. Distribution system changes (wire sizes, type & routing) indicated on drawings.	—	—	—
h. Street lighting layout shown as installed.	—	—	—
i. Switchgear configuration changes reflected on drawings.	—	—	—

Check one of the following:	YES	NO	N/A
10. Cross out such work as "optional requirement", "or equal", etc. and list specifically the items of material provided	___	___	___
11. When catalog cuts, schematic drawings, parts lists, etc. are necessary to supplement marked-up contract drawings, clearly delineate what is actually installed if more than one size or model is illustrated. If more than one size or model is used on the job, indicate locations where each model is used.	___	___	___
12. All executed contract modifications have been incorporated as appropriate.	___	___	___
13. In some cases as-built shop drawings will be required. If required by the contract, the same procedure should be followed for as-built drawings. Note that a complete set of shop drawings are submitted to the user, therefore, shop drawing data must also reflect as-built conditions.	___	___	___

CERTIFICATION OF AS-BUILT CHECKLIST

Date Contractor Quality Control
Manager Signature

Bio Plant Old Equalization Basin Closure

2941

PART 2 PRODUCTS (This Part Not Used)

PART 3 EXECUTION (This Part Not Used)

END>

SECTION 01850

CONTRACT DRAWINGS
03/96

NORFOLK DISTRICT

FILE NUMBER	REVISION	TITLE
RAD 256-1.1	-	T-1 TITLE SHEET
RAD 256-1.2	-	T-2 ORIENTATION AND ACCESS MAP
RAD 256-1.3	-	C-1 EXISTING SITE PLAN
RAD 256-1.4	-	C-2 DEMOLITION AND SALVAGE PLAN
RAD 256-1.5	-	C-3 FINAL GRADING PLAN
RAD 256-1.6	-	C-4 EROSION/SEDIMENT CONTROL AND FENCE NOTES AND DETAILS

PART 2 (Not Applicable)

PART 3 (Not Applicable)

-- End of Section --

SECTION 02050

DEMOLITION
09/91

PART 1 GENERAL

1.2 GENERAL REQUIREMENTS

The work includes demolition or removal of all construction indicated or specified. All materials resulting from demolition work, except as indicated or specified otherwise, shall remain the property of the Government and shall be removed from the limits of Government property as directed by the Contracting Officer. Rubbish and debris shall be taken to the proper disposal site, off of the plant, daily unless otherwise directed so as to not allow accumulation inside or outside the building. Materials that cannot be removed daily shall be stored in areas specified by the Contracting Officer.

1.3 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01300 SUBMITTAL DESCRIPTIONS:

SD-01 Data

Work Plan; GA.

This Work Plan may be incorporated in the Work Plan requirements of Section 02072. This Work Plan shall consist of the procedures proposed for the accomplishment of the work. The procedures shall provide for safe conduct of the work, careful removal and disposition of materials, protection of property which is to remain undisturbed, coordination with other work in progress, and timely disconnection of utility services. The procedures shall include a detailed description of the methods and equipment to be used for each operation, and the sequence of operations.

1.4 DUST CONTROL

The amount of dust resulting from demolition shall be controlled to prevent the spread of dust to occupied portions of the construction site and to avoid creation of a nuisance in the surrounding area. Use of water will not be permitted when it will result in, or create, hazardous or objectionable conditions such as ice, flooding and pollution. See Section 01005 Paragraph 1.24.5 for protection of workers from potentially contaminated dust.

1.5 PROTECTION

1.5.1 Protection of Existing Property

Before beginning any demolition work, the Contractor shall carefully survey the site and examine the drawings and specifications to determine the extent of the work. The Contractor shall take all necessary precautions to avoid damage to existing items to remain in place, to be reused, or to remain the property of the Government, and any damaged items shall be repaired or replaced as approved by the Contracting Officer at no additional cost to the Government. The Contractor shall carefully coordinate the work of this section with all other work and shall construct

and maintain shoring, bracing and supports, as required. The Contractor shall ensure that structural elements are not overloaded and shall be responsible for increasing structural supports or adding new supports as may be required as a result of any cutting, removal, or demolition work performed under this contract.

1.5.2 Protection of Salvageable Material from the Weather

The salvageable materials and equipment shall be protected from the weather at all times.

1.5.4 Environmental Protection

The work shall comply with the requirements of Section 01560 "Environmental Protection."

1.6 BURNING

The use of burning at the project site for the disposal of refuse and debris will not be permitted.

1.7 USE OF EXPLOSIVES

Use of explosives will not be permitted.

1.8 AVAILABILITY OF WORK AREAS

Areas in which the work is to be accomplished will be available in accordance with the "Special Clauses" Section.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

3.2 UTILITIES

Disconnections of utility services, are as specified in the "Special Clauses" Section of 01006.

3.4 DISPOSITION OF MATERIAL

Title to pumps, motors, valves to be demolished, is vested in the Government. The Government will not be responsible for the condition, loss or damage to such property after notice to proceed. The Government has the right to maintain all property as needed to maintain plant production. The Contractor shall take Government salvaged items (pumps and motors) to a location within RAAP limits as directed by the Contracting Officer. Contractor shall also unload Government salvage at this specified location.

3.4.1 Material Salvaged for the Contractor

Material salvaged for the Contractor shall be stored as approved by the Contracting Officer and shall be removed from Government property before completion of the contract. Material salvaged for the Contractor shall not be sold on the site. All material removed from RAAP shall be checked through Receiving during normal work hours. Bagged trash shall be removed from the plant in clear plastic bags.

3.4.2 Unsalvageable Materials

Large non-hazardous items of concrete and masonry shall be disposed of

offsite.

3.5 CLEAN-UP

Debris and rubbish shall be removed from all work areas daily. Debris shall be removed and transported in a manner that prevents spillage on streets or adjacent areas. Local regulations regarding hauling and disposal shall apply. Vehicles for hauling debris shall be covered.

-- End of Section --

SECTION 02072
DEMOLITION DEBRIS DISPOSAL

12/94

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this section to the extent referenced. The publications are referenced in the text by basic designation only.

CODE OF FEDERAL REGULATIONS (CFR)

CFR 29 Part 1910.120	Hazardous Waste Operations and Emergency Response
CFR 40 Part 261	Identification and Listing of Hazardous Waste
CFR 40 Part 262	Standards Applicable to Generators of Hazardous Waste
CFR 40 Part 263	Standards Applicable to Transporters of Hazardous Waste
CFR 40 Part 264	Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
CFR 40 Part 265	Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
CFR 40 Part 266	Standards for the Management of Specific Hazardous Waste and Specific Types of Hazardous Waste Management Facilities
40 CFR 401	Effluent Guidelines and Standards
40 CFR 403	General Pretreatment Regulations for Existing and New sources of Pollution
CFR 49 Part 172	Hazardous Materials Tables
49 CFR 178	Specifications for Packaging
CFR 49 Part 302	List of Hazardous Substances and Reportable Quantities

ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA SW-846	(Nov 1986, 3rd Ed) Test Methods for Evaluating Solid Waste (Vol IA, IB, IC, and II)
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U.S. ARMY CORPS OF ENGINEERS (COE)

ER 1110-1-263	(1 Apr 1996) Chemical Data Quality Management for Hazardous Waste Remedial Activities
EM 200-1-3	(1 Sept 1994) Requirements for the Preparation of Sampling and Analysis Plans

ER 385-1-92 Safety and Occupational Health Document Requirements for Hazardous, Toxic, and Radioactive Waste (HTRW) Activities

EM 385-1-1 (Sept 1996) Safety and Health Requirements Manual

COMMONWEALTH OF VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

VR 672-10-1 Hazardous Waste Management Regulations

VR 672-20-10 Solid Waste Management Regulations

VR 680-21-00 Virginia Water Quality Standards

VR 625-02-00 Virginia Erosion and Sediment Control Regulations, Sept 1990 - VA Erosion and Sediment Control Handbook

1.2 MEASUREMENT AND PAYMENT

1.2.1 Measurement

Disposal of demolition debris (floodwall/miscellaneous concrete and soil/cement liner) shall be measured in lump sum of material delivered to the appropriate disposal facility.

1.2.2 Payment

Compensation for work covered by this section will be in accordance with the bid schedule.

1.3 SUBMITTALS

The following shall be submitted in accordance with Section 01300 SUBMITTAL DESCRIPTIONS and Section 01305 SUBMITTAL PROCEDURES.

SD-01 Data

Work Plan; GA

The Contractor shall develop, implement, maintain, and supervise as part of the work, a comprehensive plan for demolition debris removal and disposal, and related operations. The Work Plan shall demonstrate compliance with the contract clauses, referenced standards, this specification, ER 1110-1-263, EM 200-1-3, ER 385-1-92, EM 385-1-1, VR 672-10-1, VR 672-20-10, VR 680-21-00, and CFR 29 Part 1910.120. The Work Plan requirements of Section 02050 DEMOLITION may be incorporated into this plan.

No work at the site, with the exception of site inspections and mobilization, shall be performed until the plan is approved. At a minimum the Work Plan shall include:

- a. Scheduling and operational sequencing.
- b. Description of the removal and disposal procedures including the "Equipment Washdown Area".
- c. If additional analysis is required by the disposal facility, the Contractor shall prepare a Sampling and Analysis Plan (SAP), in accordance with EM 200-1-3, which describes sampling procedures and lists analysis parameters, methods, laboratory or laboratories.
- d. Identification of applicable regulatory requirements and permits.

- e. Methods to be employed for water removal to the on-site Bio Treatment Facility.
- f. Identification of transporters, means of transportation and a copy of all State and/or Federal License for hauling .
- g. Disposal facilities and a copy of all State and/or Federal Permits indicating the disposal facility is permitted to accept the waste.
- h. Borrow source.
- i. Spill prevention plan.
- j. Spill contingency plan.
- k. Methods of measuring volume of demolition debris.
- l. A statement of agreement from the transporter and disposal facility operators to accept the specific waste from this work.

SD-08 Statements

Qualifications; GA.

A statement demonstrating that the Contractor meets the requirements in paragraph QUALIFICATIONS. Include owner, owner point of contact with phone number, location of work site, and dates of previous projects.

SD-18 Records

Shipping Manifest; FIO.

Manifest in accordance with all applicable Federal, State and local requirements.

Site Safety and Health Plan; GA

Analysis performed on the concrete floodwall and the soil/cement liner indicate the demolition debris is non-hazardous, yet there is potential for workers at the site to be exposed to chemical constituents during excavation and handling. Pursuant to regulations issued by CFR 29 Part 1910.120, the Contractor shall take appropriate measures to safeguard the health of workers at the site. Such measures include appraising workers of the nature of the contaminants at the site, ensuring workers have appropriate training for working at contaminated sites, and preparing and conducting work in accordance with a site specific health and safety plan. The Contractor shall prepare a health and safety plan, in accordance with CFR 29 Part 1910.120, EM 385-1-1, and ER 385-1-92, which addresses all aspects of worker notification, training, exposure, protective equipment, and other protection at the site. See Section 01110 for further details

1.4 QUALIFICATIONS

The Contractor shall have a minimum of two years experience in the removal and disposal of potentially contaminated material.

1.5 NOTIFICATION

The Contractor shall notify the Contracting Officer (CO) immediately upon a an encounter with a suspected contaminant.

1.6 AVAILABLE DATA

An approved Closure Plan of the site and a recent (February 1997) Site Investigation/Evaluation Study as discussed in SECTION 01110 is available

for review at the Norfolk District. These reports provide a history and a soil/sludge and groundwater investigation of the site.

1.7 ENVIRONMENTAL PROTECTION

The Contractor shall take necessary measures specified herein, shown in Section 01560, and otherwise required, to protect the environment.

PART 2 PRODUCTS

2.1 BACKFILL MATERIAL

Backfill material shall be as specified in Section 02210 Grading.

Backfill shall be classified in accordance with ASTM D 2487 as GW, GP, GM, GC, SW, SP, SM, MH, CL, or CH and shall be free from roots and other organic matter, trash, debris, snow, ice or frozen materials.

Soil classification test results shall be approved prior to bringing material onsite. Non-contaminated material removed from the excavation can be used for backfill in accordance with paragraph BACKFILLING.

3 EXECUTION

3.1 SAFETY

Personnel working inside and in the general vicinity of the excavation shall be trained and thoroughly familiar with the safety precautions, procedures, and equipment required for controlling potential hazards associated with this work. Personnel shall use proper protection and safety equipment during work in and around the excavation in accordance with the approved Site Health and Safety Plan, and as otherwise specified.

3.3 EXCAVATION

3.3.2 Open Excavations

Open excavations and stockpile areas shall be secured. The Contractor shall divert surface water around excavations to prevent water from directly entering into the excavation.

3.4 BACKFILLING

The excavation shall be backfilled with the approved available onsite basin berm material and approved offsite fill material only. The excavation shall be dewatered if necessary. Backfilling shall be in accordance with Section 02210 GRADING

3.5 DISPOSAL GUIDELINES

3.5.1 General

Sampling and analysis previously performed in February 1997, on the subsurface soils beneath the basin liner, indicates the material is classified as non-hazardous and does not require removal for clean closure. Analytical results of the samples collected within the subsurface beneath the basin liner can be found in Table 3-2 of the Site Investigation/Evaluation Study, dated February 1997. A copy of the results may be obtained from the Norfolk District Engineering Division, P.O.C., Marc D. Gutterman at 757-441-7669. It is the responsibility of the Contractor to ensure that all removal operations are performed in such a manner as to limit disturbance to the underlying subsurface soils.

3.5.1.1 Rainwater Accumulated Within the Basin

All water and sludge that accumulated within the basin while it was in operation, has been previously removed by Alliant Tech. All rainwater currently accumulated within the basin must be pumped to the on-site

influent pump station, identified on the plans. All grit remaining in the basin, after the rainwater has been pumped out, is the result of the decaying basin liner surface and shall be disposed of with the basin liner material.

3.5.1.2 Concrete Floodwall Disposal

Toxicity Characteristic Leaching Procedure (TCLP) analysis performed in February 1997, on the concrete floodwall, indicates the demolition debris is classified non-hazardous. The Contractor may obtain the TCLP results, found in Table 3-3 of the Site Investigation/Evaluation Study, dated February 1997, from the Norfolk District Engineering Division. The P.O.C. for the study report is Marc D. Gutterman at 757-441-7669. It is the responsibility of the Contractor to ensure that the concrete is disposed as a solid waste to a permitted CDD landfill. This is a requirement of the state.

3.5.1.3 Soil/Cement Liner Disposal

Toxicity Characteristic Leaching Procedure (TCLP) analysis was performed in February 1997, on one composite sample, made up of seven sampling locations within the basin liner. The results of the TCLP analysis on the basin liner indicates the demolition debris is classified as non-hazardous. The Contractor may obtain the TCLP results, found in Table 3-3 of the Site Investigation/Evaluation Study, dated February 1997, from the Norfolk District Engineering Division. The P.O.C. for the study report is Marc D. Gutterman at 757-441-7669. It is the responsibility of the Contractor to ensure that all disposal is performed in accordance with all Federal, State, and Local regulations at a RCRA D landfill.

3.5.1.4 Equipment to be Salvaged, Equipment to be Disposed, Ancillary Piping, and Effluent Pump Station Demolition Debris Disposal

There is the potential to encounter grit/sludge within the equipment identified on the plans to be salvaged, equipment identified on the plans to be disposed, all piping identified on the plans to be disposed, and the concrete effluent pump station to be demolished and disposed. Prior to salvage or disposal of equipment, piping, and effluent pump station concrete, all grit/sludge must be removed and all items must be washed down thoroughly, with a high pressure spray. All grit/sludge and washdown water must be collected by the Contractor and disposed of on-site in the existing influent pump station. It is the responsibility of the Contractor to ensure that no material (grit/sludge and washdown water) is spilled on the site. As part of the Work Plan requirements (SECTION 02072, Paragraph 1.3.i and 1.3.j) the Contractor is required to provide a spill prevention plan and a spill contingency plan.

For preparation of the Work Plan and the Site Specific Safety and Health Plan, an analysis of the sludge previously removed from the basin, by Alliant Tech., is available from the Norfolk District Engineering Division, P.O.C., Marc D. Gutterman at 757-441-7669. This information should be considered the worst case scenario as to the presence of hazardous constituents of concern in the grit/sludge which may be encountered within the equipment identified on the plans to be salvaged, equipment identified on the plans to be disposed, all piping identified on the plans to be disposed, and the concrete effluent pump station to be demolished and disposed.

It is the responsibility of the Contractor to dispose of all equipment identified for disposal, piping, and effluent pump station concrete in accordance with all Federal, State, and Local regulations.

3.5.2 Transportation of Wastes

Transportation shall comply with all Federal, State, and local regulations.

3.5.3 Records

Records shall be maintained of all waste determinations (if required by the disposal facility), including appropriate results of analyses performed, substances and sample locations, the time of collection, and other pertinent data as required by CFR 40 Part 262 Subpart D. Transportation, disposal methods and dates, the quantities of waste, the names and addresses of each transporter and the disposal facility shall also be recorded and available for inspection, as well as copies or originals of the following documents:

- a. Manifests
- b. Waste analyses or waste profile sheets (if required by the receiving landfill)
- c. Certifications of disposal signed by the responsible disposal facility official
- d. Weighing scale receipt corresponding to each manifest

Following contract close out, the records shall become the property of the Government.

3.5.4 Waste Manifests

Should the Contractor be required by the receiving disposal facility Owner to show that the demolition debris is not hazardous waste, the Contractor will first attempt to demonstrate this proof using the results of the TCLP analysis from Table 3-3 of the February 1997 Site Investigation/Evaluation Study. Should these results not satisfy the Landfill Owner's Permit and further testing is required, the Contracting Officer shall be immediately notified and a sampling protocol agreed upon for further testing. Should the Contractor's initial test results show contamination in the demolition debris then the government shall require verification testing. If verification testing is positive for contamination, then all work will cease until a Change Order is approved for removing and disposing the contaminated demolition debris. All negative test results shall be paid by the Contractor and all positive test results shall be paid by the Government.

3.5.5 Documentation of Treatment or Disposal

a. Documentation

The demolition debris shall be taken to an appropriate disposal facility in accordance with all Federal, State and Local regulations. Should the disposal facility Owner require a manifest on the debris and Paragraph 3.5.4 testing results in contamination, then Contractor shall provide documentation of acceptance of special waste or hazardous waste by the original return copy of the hazardous waste manifest, signed by the owner or operator of a facility legally permitted to dispose of those materials. If the Contractor selects a different facility than is identified in the Work Plan, documentation shall be provided for approval to certify that the facility is authorized and meets the standards specified.

b. Payment

There will be no payment for transportation and disposal of demolition debris for which the transportation, disposal, and weight are not documented by the specified material manifest and corresponding weighing scale receipt and other information specified in paragraph RECORDS.

-- End of Section --

SECTION 02210

GRADING
12/88
(MOD NAO APRIL 1995)

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 422	(1963; R 1990) Particle Size Analysis of Soils
ASTM D 1556	(1990) Density and Unit Weight of Soil In-Place by the Sand-Cone Method
ASTM D 1557	(1991) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. ft. (2,700 kN-m/cu.m.))
ASTM D 2216	(1990) Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil Aggregate Mixtures
ASTM D 2487	(1990) Classification of Soils for Engineering Purposes
ASTM D 2922	(1991) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	(1988) Water Content of Soil and Rock In-Place by Nuclear Methods (Shallow Depth)
ASTM D 4318	(1984) Liquid Limit, Plastic Limit, and Plasticity Index of Soils

1.3 DEFINITIONS

1.3.1 Satisfactory Materials

Materials classified in ASTM D 2487 as GW, GP, GM, GC, SW, SP, SM, SC, CL, CH, ML, and MH are satisfactory as fill for overlot grading and are satisfactory as backfill material.

1.3.2 Unsatisfactory Materials

Materials classified in ASTM D 2487 as Pt, OH, and OL are unsatisfactory as fill. Unsatisfactory materials also include those materials containing roots and other organic matter, trash, debris, frozen materials, and stones larger than six inches in any dimension.

1.3.3 Cohesionless and Cohesive Materials

Cohesive materials include materials classified as GC, SC, ML, CL, MH, and CH. Cohesionless materials include materials classified in ASTM D 2487 as GW, GP, SW, and SP. Materials classified as GM and SM will be identified as cohesionless only when the fines have a plasticity index of zero.

1.3.4 Degree of Compaction

Degree of compaction is a percentage of the maximum density obtained by the appropriate test procedure presented in ASTM D 1557 abbreviated below as a percent of laboratory maximum density.

1.3.6 Topsoil

Material obtained from off-site areas, suitable for topsoils, is defined in Section 02935 TURF.

1.4 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "F10" designation are for information only. The following shall be submitted in accordance with Section 01300 SUBMITTAL DESCRIPTIONS and Section 01305:

SD-06 Instructions; GA.

Detailed instructions describing use of a product, system or material, including special notices and material safety data sheets, if any, concerning impedance, hazards, and safety precautions defining the Contractor's provisions for a blasting plan and blasting operations.].

SD-09, Reports.

Soils Tests; GA.

Copies of all laboratory and field test reports shall be submitted to the Contracting Officer within 72 hours of the completion of the test.

1.5 SUBSURFACE DATA

Subsurface soil boring logs are available upon request. These data represent the best subsurface information available; however, variations may exist in the subsurface between these boring locations. Subsurface soils in the area generally consist of medium density silts, sands and clays although dense gravel or bedrock may be encountered as high as elevation 1690 feet NGVD. Groundwater is normally encountered at approximately elevation 1690' NGVD.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

The work conducted under this section shall be coordinated and accomplished in accordance with requirements of Section 02072: DEMOLITION DEBRIS DISPOSAL.

3.1 DRAINAGE AND DEWATERING

3.1.1 Drainage

Surface water shall be directed away from excavation and construction sites so as to prevent erosion. Diversion ditches, dikes, and grading shall be provided and maintained as necessary during construction. Excavated slopes and backfill surfaces shall be protected to prevent erosion and sloughing. Excavation shall be performed so that the site and the area immediately surrounding the site and affecting operations at the site shall be continually and effectively drained.

3.1.2 Dewatering

Groundwater flowing toward or into excavations shall be controlled to

prevent sloughing of excavation slopes and walls, boils, uplift and heave in the excavation and to eliminate interference with orderly progress of construction. Control measures shall be taken by the time the excavation reaches the water level in order to maintain the integrity of the in situ material. While the excavation is open, the water level shall be maintained continuously below the working level or deeper as required to continue construction.

3.3 EXCAVATION

Excavation of every description, within the grading limits of the project, shall be performed to the lines and grades indicated. Satisfactory excavation material shall be stockpiled or shall be transported to and placed in fill areas within the limits of the work. All unsatisfactory material, including any soil which is disturbed by the Contractor's operations or softened due to exposure to the elements and water, and surplus material shall be disposed of in areas approved for surplus material storage. In the event that it is necessary to remove unsatisfactory material to a depth greater than specified, the Contracting Officer shall be notified and an adjustment in the contract price will be considered in accordance with the CHANGES clause. Unsatisfactory material excavated below the grade shown and replaced with satisfactory material as directed shall be included in the contract unit price for excavation. Excavations carried below the depths indicated, without specific directions, or as required due to the action or inaction of the Contractor during performance of the work, shall, except as otherwise specified, be refilled at the Contractor's expense to the proper grade with satisfactory material as directed. Material required for fills in excess of that produced by excavation within the grading limits shall be obtained from borrow areas.

3.4 CLASSIFICATION OF EXCAVATION

No consideration will be given to the nature of the materials, and all excavation will be designated as unclassified excavation.

3.5 BORROW MATERIAL

Borrow material shall be selected to meet requirements and conditions of the particular fill for which it is to be used. Borrow materials shall be subject to approval. Necessary clearing, grubbing, disposal of debris, and satisfactory drainage of borrow pits shall be performed by the Contractor as incidental operations to the borrow excavation.

3.5.1 Selection

Borrow materials shall be obtained from off-site sources. Unless specifically provided, no borrow shall be obtained within the limits of the project site without prior written approval.

3.5.2 Borrow Pits

The Contractor shall notify the Contracting Officer sufficiently in advance of the opening of any excavation or borrow pit to permit elevations and measurements to be taken of the undisturbed ground surface. Except as otherwise permitted, borrow pits shall be excavated to afford adequate drainage. Overburden and other spoil material shall be disposed of or used for other purposes. Borrow pits shall be neatly trimmed and left in such shape as will facilitate taking accurate measurements after the excavation is completed.

3.6 BACKFILL

Backfill shall be placed and compacted uniformly in 6 inch lifts. Slopes bounding or within areas to be backfilled shall be stepped or serrated to

prevent sliding of the fill. During backfilling operations and in the formation of embankments, equipment that will overload existing underground utilities in passing over and compacting these fills shall not be used. Backfill for storm drains and subdrains, including the bedding and backfill for structures other than culverts and drains, shall conform to the additional requirements in other applicable sections.

3.7 PREPARATION OF GROUND SURFACE FOR FILL

All vegetation, such as roots, brush, heavy sods, heavy growth of grass, and all decayed vegetable matter, rubbish, and other unsatisfactory material within the area upon which fill is to be placed, shall be stripped or otherwise removed before the fill is started. In no case shall unsatisfactory material remain in or under the fill area. Sloped ground surfaces steeper than one vertical to four horizontal on which fill is to be placed shall be plowed, stepped, or broken up, as directed, in such manner that the fill material will bond with the existing surface. Prepared surfaces on which compacted fill is to be placed shall be wetted or dried as may be required to obtain the specified compaction.

3.8 FILLS AND EMBANKMENTS

Fills and embankments shall be constructed at the locations and to lines and grades indicated. The completed fill shall conform to the shape of the typical sections indicated or shall meet the requirements of the particular case. Satisfactory material obtained during excavation may be used in forming required fill. Fill shall be satisfactory material and shall be reasonably free from roots, other organic material, and trash and from stones having a maximum diameter greater than 6 inches in any dimension. No frozen material will be permitted in the fill. Stones having a dimension greater than 3 inches shall not be permitted in the upper 6 inches of fill or embankment. The material shall be placed in successive horizontal layers of 8 inches in loose depth for the full width of the cross section and shall be compacted as specified. Each layer shall be compacted before the overlaying lift is placed. Moisture content of the fill or backfill material shall be adjusted by wetting or aerating, as necessary to provide the moisture content that will readily facilitate obtaining the specified compaction with the equipment used.

3.9 COMPACTION

Each layer of the fill or embankment shall be compacted to at least 90 percent of laboratory maximum density for cohesive and cohesionless materials, respectively.

3.11 FINISHED EXCAVATION, FILLS, AND EMBANKMENTS

All areas covered by the project, including excavated and filled sections and adjacent transition areas, shall be uniformly smooth-graded. The finished surface shall be reasonably smooth, compacted, and free from irregular surface changes. The degree of finish shall be that ordinarily obtainable from blade-grader operations, except as otherwise specified. Ditches and gutters shall be finished to permit adequate drainage. The surface of areas to be turfed shall be finished to a smoothness suitable for the application of turving materials. Surfaces shall be finished not more than 0.15 foot above or below the established grade or approved cross section.

3.12 PLACING TOPSOIL

Areas indicated on the plans shall be topsoiled. The surface shall be free of materials that would hinder planting or maintenance operations. The subgrade shall be pulverized to a depth of 2 inches by diskings or plowing

for the bonding of topsoil with the subsoil. Topsoil shall then be uniformly spread, graded, and compacted to the thickness, elevations, slopes shown, and left free of surface irregularities. Topsoil shall be compacted as specified in Section 02935TURF]. Topsoil shall not be placed when the subgrade is frozen, excessively wet, extremely dry, or in a condition otherwise detrimental to seeding, planting, or proper grading. Material required for topsoil in excess of that produced by excavation within the grading limits shall be obtained from off Government property.

3.13 SOILS TESTS

Testing shall be the responsibility of the Contractor and shall be performed by an approved commercial testing laboratory or may be performed by the Contractor subject to approval. Laboratory tests for moisture - density relations complete with zero air voids curve, gradation, and Atterberg limits shall be made in accordance with the procedures referenced in ASTM D 1557, ASTM D 422, and ASTM D 4318. Field tests for density and moisture content shall be made in accordance with ASTM D 1556 and ASTM D 2216 except that Method ASTM D 2922 may be used to supplement tests by Method ASTM D 1556. When ASTM D 2922 is used, the calibration curves shall be checked and adjusted using only the sand cone method as described in ASTM D 1556. ASTM D 2922 results in a wet unit weight of soil and when using this method, ASTM D 3017 shall be used to determine the moisture content of the soil. When soil conditions exist, such as the presence of mica, which produces inconsistent results by the nuclear gauge method D 2922, only method D 1556 shall be used. The following tests are required:

- a. A minimum of one moisture-density test shall be performed for each classification of fill material, backfill material, and existing subgrade material.
- b. One Atterberg limits test and one gradation analysis is required for every six field density tests.
- c. A minimum of one sand cone density test is required for every six nuclear gauge field density tests or fraction thereof. Worksheets of sand density and sand cone calibration shall be submitted to the Contracting Officer prior to commencing work and each time a new supply of sand is used.
- d. Field density tests shall be performed as follows: a minimum of one test per lift per 650 square yards or fraction thereof is required for fill material and a minimum of one test per lift per 1000 square yards or fraction thereof is required for ground surfaces prior to filling. Locations of all tests shall be at the direction of the Contracting Officer.

3.14 PROTECTION

Newly graded areas shall be protected from traffic and from erosion, and any settlement or washing away that may occur from any cause, prior to acceptance, shall be repaired and grades reestablished to the required elevations and slopes. All work shall be conducted in accordance with the environmental protection requirements of the contract.

-- End of Section --

SECTION 02831

CHAIN LINK FENCE
07/92

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 121	(1992a) Zinc-Coated (Galvanized) Steel Barbed Wire
ASTM A 153	(1996) Zinc-Coated (Hot Dip) on Iron and Steel Hardware
ASTM A 176	(1994) Stainless and Heat-Resisting ChromiumSteel Plate, Sheet, and Strip
ASTM A 392	(1991b) Zinc-Coated Chain-Link Fence Fabric
ASTM A 478	(1995a) Chromium-Nickel Stainless and Heat-Resisting Steel Weaving and Knitting Wire
ASTM A 491	(1994) Aluminum-Coated Steel Chain-Link Fence Fabric
ASTM A 585	(1992) Aluminum-Coated Steel Barbed Wire
ASTM A 666	(1994) Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar
ASTM A 780	(1993a) Repair of Damaged and Uncoated Areas of Hot-Dipped Galvanized Coatings
ASTM A 824	(1992) Metallic-Coated Steel Marcellled Tension Wire for Use With Chain Link Fence
ASTM C 94	(1994) Ready-Mixed Concrete
ASTM F 626	(1994a) Fence Fittings
ASTM F 668	(1994) Poly(Vinyl Chloride) (PVC) Coated Steel Chain-Link Fence Fabric
ASTM F 883	(1990) Padlocks
ASTM F 900	(1994) Industrial and Commercial Swing Gates
ASTM F 1043	(1995) Strength and Protective Coatings on

Metal Industrial Chain-Link Fence Framework

ASTM F 1083

(1993) Specification for Pipe, Steel,
Hot-Dipped Zinc-Coated (Galvanized)
Welded, for Fence Structures

ASTM F 1184

(1994) Industrial and Commercial
Horizontal Slide Gates

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01300 SUBMITTAL PROCEDURES:

SD-13 Certificates

Chain Link Fence; [GA].

Statement signed by an official authorized to certify on behalf of the manufacturer attesting that the chain link fence and component materials meet the specified requirements.

PART 2 PRODUCTS

2.1 MATERIALS

Materials shall conform to the following:

2.1.1 Chain Link Fence Fabric

ASTM A 392, Class 2, zinc-coated steel wire with minimum coating weight of 1.2 ounces of zinc per square foot of coated surface, or ASTM A 491, Type I, aluminum-coated steel wire. Fabric shall be fabricated of 9 gauge wire woven in 2 inch mesh. Fabric height shall match existing. Fabric shall be twisted and barbed on the top selvage and knuckled on the bottom selvage.

2.1.2 Gates

ASTM F 900 and/or ASTM F 1184. Gate shall be the type and swing shown. Gate frames shall conform to strength and coating requirements of ASTM F 1083 for Group IA, steel pipe, with external coating Type A, nominal pipe size (NPS) 1-1/2. Gate frames shall conform to strength and coating requirements of ASTM F 1043, for Group IC, steel pipe with external coating Type A or Type B, pipe size (NPS) 1-1/2. Gate fabric shall be as specified for chain-link fabric. Each end member of gate frames shall be extended sufficiently above the top member to carry three strands of barbed wire in horizontal alignment with barbed wire strands on the fence. Gate leaves more than 8 feet wide shall have either intermediate members and diagonal truss rods or shall have tubular members as necessary to provide rigid construction, free from sag or twist. Gate leaves less than 8 feet wide shall have truss rods or intermediate braces. Intermediate braces shall be provided on all gate frames with an electro-mechanical lock. Gate fabric shall be attached to the gate frame by method standard with the manufacturer except that welding will not be permitted. Latches, hinges, stops, keepers, rollers, and other hardware items shall be furnished as required for the operation of the gate. Latches shall be arranged for

padlocking so that the padlock will be accessible from both sides of the gate. Stops shall be provided for holding the gates in the open position.

2.1.3 Posts

ASTM F 1083, zinc-coated. Group IA, with external coating Type A steel pipe. Group IC steel pipe, zinc-coated with external coating Type A or Type B and Group IIA, formed steel sections, shall meet the strength and coating requirements of ASTM F 1043. Group III, ASTM F 1043 steel H-section may be used for line posts in lieu of line post shapes specified for the other classes. Sizes shall be as shown on the drawings. Line posts and terminal (corner, gate, and pull) posts selected shall be of the same designation throughout the fence. Gate post shall be for the gate type specified subject to the limitation specified in ASTM F 900 and/or ASTM F 1184.

2.1.4 Braces and Rails

ASTM F 1083, zinc-coated, Group IA, steel pipe, size NPS 1-1/4. Group IC steel pipe, zinc-coated, shall meet the strength and coating requirements of ASTM F 1043. Group IIA, formed steel sections, size 1.66 inch, conforming to ASTM F 1043, may be used as braces and rails if Group IIA line posts are furnished.

2.1.5 Tension Wire

Tension wire shall be Type I or Type II, Class 2 coating, in accordance with ASTM A 824.

2.1.6 Accessories

ASTM F 626. Ferrous accessories shall be zinc or aluminum coated. Truss rods shall be furnished for each terminal post. Truss rods shall be provided with turnbuckles or other equivalent provisions for adjustment. Barbed wire shall be 2 strand, 12-1/2 gauge wire, zinc-coated, Class 3 in accordance with ASTM A 121 or aluminum coated Type I in accordance with ASTM A 585. Barbed wire shall be four-point barbed type steel wire. Barbed wire support arms shall be the V arm type and of the design required for the post furnished. Tie wire for attaching fabric to rails, braces, and posts shall be 9 gauge steel wire and match the coating of the fence fabric. Miscellaneous hardware coatings shall conform to ASTM A 153 unless modified herein.

2.1.8 Concrete

ASTM C 94, using 3/4 inch maximum size aggregate, and having minimum compressive strength of 3000 psi at 28 days. Grout shall consist of one part portland cement to three parts clean, well-graded sand and the minimum amount of water to produce a workable mix.

2.1.9 Padlocks

ASTM F 883, Type PO1, Grade 2, Size 1-3/4 inch. Padlocks shall be keyed alike and each lock shall be furnished with two keys.

PART 3 EXECUTION

3.1 GENERAL

Fence shall be installed to the lines and grades indicated. The area on

either side of the fence line shall be cleared to the extent indicated. Line posts shall be spaced equidistant at intervals not exceeding 10 feet. Terminal (corner, gate, and pull) posts shall be set at abrupt changes in vertical and horizontal alignment. Fabric shall be continuous between terminal posts; however, runs between terminal posts shall not exceed 500 feet. Any damage to galvanized surfaces, including welding, shall be repaired with paint containing zinc dust in accordance with ASTM A 780.

3.2 EXCAVATION

Post holes shall be cleared of loose material. Waste material shall be spread where directed. The ground surface irregularities along the fence line shall be eliminated to the extent necessary to maintain a 2 inch clearance between the bottom of the fabric and finish grade.

3.3 POSTS

Posts shall be set plumb and in alignment. Except where solid rock is encountered, posts shall be set in concrete to the depth indicated on the drawings. Where solid rock is encountered with no overburden, posts shall be set to a minimum depth of 18 inches in rock. Where solid rock is covered with an overburden of soil or loose rock, posts shall be set to the minimum depth indicated on the drawing unless a penetration of 18 inches in solid rock is achieved before reaching the indicated depth, in which case depth of penetration shall terminate. All portions of posts set in rock shall be grouted. Portions of posts not set in rock shall be set in concrete from the rock to ground level. Posts set in concrete shall be set in holes not less than the diameter shown on the drawings. Diameters of holes in solid rock shall be at least 1 inch greater than the largest cross section of the post. Concrete and grout shall be thoroughly consolidated around each post, shall be free of voids and finished to form a dome. Concrete and grout shall be allowed to cure for 72 hours prior to attachment of any item to the posts. Class 3 line posts may be mechanically driven, for temporary fence construction only, if rock is not encountered. Driven posts shall be set to a minimum depth of 3 feet and shall be protected with drive caps when being set. Fence post rigidity shall be tested by applying a 50 pound force on the post, perpendicular to the fabric, at 5 feet above ground. Post movement measured at the point where the force is applied shall be less than or equal to 3/4 inch from the relaxed position. Every tenth post shall be tested for rigidity. When a post fails this test, further tests on the next four posts on either side of the failed post shall be made. All failed posts shall be removed, replaced, and retested at the Contractor's expense.

3.4 RAILS

3.4.1 Top Rail

Top rail shall be supported at each post to form a continuous brace between terminal posts. Where required, sections of top rail shall be joined using sleeves or couplings that will allow expansion or contraction of the rail. Bottom rail, if required for high security fence, shall be installed as indicated on the drawings.

3.4.2 Bottom Rail

The bottom rail shall be bolted to double rail ends and double rail ends shall be securely fastened to the posts. Bolts shall be peened to prevent easy removal. Bottom rail shall be installed before chain link fabric.

3.5 BRACES AND TRUSS RODS

Braces and truss rods shall be installed as indicated and in conformance with the standard practice for the fence furnished. Horizontal (compression) braces and diagonal truss (tension) rods shall be installed on fences over 6 feet in height. A center brace or 2 diagonal truss rods shall be installed on 12 foot fences. Braces and truss rods shall extend from terminal posts to line posts. Diagonal braces shall form an angle of approximately 40 to 50 degrees with the horizontal. No bracing is required on fences 6 feet high or less if a top rail is installed.

3.6 TENSION WIRES

Tension wires shall be installed along the [top and] bottom of the fence line and attached to the terminal posts of each stretch of the fence. [Top tension wires shall be installed within the top 4 inches of the installed fabric.] Bottom tension wire shall be installed within the bottom 6 inches of the installed fabric. Tension wire shall be pulled taut and shall be free of sag.

3.7 CHAIN LINK FABRIC

Chain link fabric shall be installed on the side of the post indicated. Fabric shall be attached to terminal posts with stretcher bars and tension bands. Bands shall be spaced at approximately 15 inch intervals. The fabric shall be installed and pulled taut to provide a smooth and uniform appearance free from sag, without permanently distorting the fabric diamond or reducing the fabric height. Fabric shall be fastened to line posts at approximately 15 inch intervals and fastened to all rails and tension wires at approximately 24 inch intervals. Fabric shall be cut by untwisting and removing pickets. Splicing shall be accomplished by weaving a single picket into the ends of the rolls to be joined. The bottom of the installed fabric shall be 2 inches [1 inch] (plus or minus) above the ground. After the fabric installation is complete, the fabric shall be exercised by applying a 50 pound push-pull force at the center of the fabric between posts. The use of a 30 pound pull at the center of the panel shall cause fabric deflection of not more than 2.5 inches when pulling fabric from the post side of the fence. Every second fence panel shall meet this requirement. All failed panels shall be resecured and retested at the Contractor's expense.

3.8 BARBED WIRE SUPPORTING ARMS AND BARBED WIRE

Barbed wire supporting arms and barbed wire shall be installed as indicated and as recommended by the manufacturer. Supporting arms shall be anchored to the posts in a manner to prevent easy removal with hand tools. Supporting arms shall be anchored with 3/8 inch diameter plain pin rivets or, at the Contractor's option, with studs driven by low-velocity explosive-actuated tools for steel, wrought iron, ductile iron, or malleable iron. Studs driven by an explosive-actuated tool shall not be used with gray iron or other material that can be fractured. A minimum of two studs per support arm shall be used. Barbed wire shall be pulled taut and attached to the arms with clips or other means that will prevent easy removal.

3.9 GATES

Gates shall be installed at the locations shown. Hinged gates shall be mounted to swing as indicated. Latches, stops, and keepers shall be installed as required. Padlocks shall be attached to gates or gate posts

with chains. Hinge pins, and hardware shall be welded or otherwise secured to prevent removal.

-- End of Section --

SECTION 02935
TURF
06/90
MOD 1 JUN 91 NAOEN-DT

PART 1 GENERAL

1.1 SUMMARY (NOT APPLICABLE)

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AGRICULTURAL MARKETING SERVICE (AMS)

AMS-01 (Sep 1977; Amended Oct 29, 1986) Federal
Seed Act Regulations (Part 20): Certified
Seed Regulations

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 977 (1986) Emulsified Asphalt
ASTM D 2028 (1976; R 1986) Cutback Asphalt
(Rapid-Curing Type)

COMMERCIAL ITEM DESCRIPTIONS (CID)

CID A-A-1909 (Basic) Fertilizer

FEDERAL SPECIFICATIONS (FS)

FS O-F-241 (Rev D) Fertilizers, Mixed, Commercial
FS JJJ-S-181 (Rev B) Seeds, Agricultural

1.3 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01300 SUBMITTALS:

SD-01 Data

Manufacturer's Literature; FIO.

Manufacturer's literature discussing physical characteristics, application and installation instructions for erosion control material, and for

chemical treatment material.

SD-07 Schedules

SD-08 Statements

Delivery; FIO.

Delivery schedule, at least 10 days prior to the intended date of the first delivery.

Maintenance Report; FIO.

Written record of maintenance work performed.

Turf Establishment Period; FIO.

Written calendar time period for the turf establishment period. When there is more than one turf establishment period, the boundaries of the turfed area covered for each period shall be described.

SD-13 Certificates

Certificates of compliance certifying that materials meet the requirements specified, prior to the delivery of materials. Certified copies of the reports for the following materials shall be included:

- a. Seed: For mixture, percent pure live seed, minimum percent germination and hard seed, maximum percent weed seed content, date tested and state certification.
- c. Fertilizer: For chemical analysis, composition percent.
- d. Agricultural Limestone: For calcium carbonate equivalent and sieve analysis.
- g. Topsoil: For pH, particle size, chemical analysis and mechanical analysis.

1.5 DELIVERY, INSPECTION, STORAGE, AND HANDLING

1.5.1 Delivery

1.5.1.3 Soil Amendments

Soil amendments shall be delivered to the site in the original, unopened containers bearing the manufacturer's chemical analysis. In lieu of containers, soil amendments may be furnished in bulk. A chemical analysis shall be provided for bulk deliveries.

1.5.2 Inspection

Seed shall be inspected upon arrival at the job site by the Contracting Officer for conformity to type and quality in accordance with paragraph MATERIALS. Other materials shall be inspected for meeting specified requirements and unacceptable materials shall be removed from the job site.

1.5.3 Storage

Materials shall be stored in areas designated by the Contracting Officer. Seed, lime and fertilizer shall be stored in cool, dry locations away from contaminants. Chemical treatment materials shall not be stored with other landscape materials.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Seed

2.1.1.1 Seed Classification

State-certified seed of the latest season's crop shall be provided in original sealed packages bearing the producer's guaranteed analysis for percentages of mixture, purity, germination, hard seed, weed seed content, and inert material. Labels shall be in conformance with AMS-01 and applicable state seed laws.

2.1.1.2 Seed Mixtures

Seed mixtures shall be proportioned by weight as follows:

<u>Botanical Name</u>	<u>Common Name</u>	<u>Mixture Percent by Weight</u>	<u>Percent Pure Live Seed</u>
Festuca arundinacea	Tall Fescue	70	85
Trifolium incarnatum	Crimson Clover	10	82
Lolium multiflorum	Annual Ryegrass	20	85

2.1.1.3 Quality

Seed shall conform to FS JJJ-S-181. Weed seed shall not exceed 1 percent by weight of the total mixture. Wet, moldy, or otherwise damaged seed shall be rejected.

2.1.3 Topsoil

2.1.3.1 Topsoil Materials

Topsoil shall be natural, friable, loam topsoil possessing the characteristics of representative soils in the vicinity that produce heavy growths of crops, grass, or other vegetation, and shall be obtained from naturally well drained areas. The topsoil shall be free from subsoil, clay lumps, brush, objectionable weeds, and other litter, and shall be free from stones, stumps, and other objects larger than one-half inch in diameter, from roots and toxic substances, and from any other material or substance that might be harmful to plant growth or to be a hindrance to grading, planting, and maintenance operations.

2.1.3.2 Topsoil

Topsoil shall be a natural, friable soil representative of productive soils in the vicinity. It shall be obtained from well-drained borrow

areas, provided by the Contractor, and shall be free of any admixture of subsoil, foreign matter, objects larger than one inch in any dimension, toxic substances, and any material or substance that may be harmful to plant growth. The pH range shall be 6.2 to 7.0. Topsoil that does not meet this pH range shall be amended by the addition of pH adjusters, at a rate recommended based on soil tests.

2.1.4 Soil Amendments

Soil amendments shall consist of lime, fertilizer, and soil conditioners meeting the following requirements.

2.1.4.1 Lime

Lime shall be agricultural limestone and shall have a minimum calcium carbonate equivalent of 90 percent and shall be ground to such a fineness that at least 90 percent will pass a 10-mesh sieve and at least 50 percent will pass a 60-mesh sieve.

2.1.4.2 Fertilizer

Fertilizer shall be commercial grade, free flowing, uniform in composition and conforming to CID A-A-1909. Granular Fertilizer As recommended by the soil test.

2.1.5 Mulch

Mulch shall be free from weeds, mold, and other deleterious materials.

2.1.5.1 Straw

Straw shall be stalks from oats, wheat, rye, barley, or rice furnished in air-dry condition and with a consistency for placing with commercial mulch-blowing equipment.

2.1.5.2 Hay

Hay shall be native hay, sudan-grass hay, broomsedge hay, or other herbaceous mowings furnished in an air-dry condition suitable for placing with commercial mulch-blowing equipment.

2.1.5.3 Wood Cellulose Fiber

Wood cellulose fiber shall not contain any growth or germination-inhibiting factors and shall be dyed an appropriate color to facilitate visual metering during application. Composition on air-dry weight basis: 9 to 15 percent moisture, pH range from 4.5 to 6.0.

2.1.5.4 Paper Fiber Mulch

Paper fiber mulch shall be recycled news print that is shredded for the purpose of mulching seed.

2.1.7 Water

Water shall not contain elements toxic to plant life.

2.1.8 Erosion Control Material

Soil erosion control shall conform to the following:

2.1.8.1 Soil Erosion Control Blanket

Machine produced mat of wood excelsior formed from a web of interlocking wood fibers, covered on one side with either knitted straw blanket-like mat construction, covered with biodegradable plastic mesh, or interwoven biodegradable thread, plastic netting or twisted kraft paper cord netting.

2.1.8.2 Soil Erosion Control Fabric

Knitted construction of polypropylene yarn with uniform mesh openings 3/4 to 1 inch square with strips of biodegradable paper. Filler paper strips shall last 6 to 8 months.

2.1.8.3 Soil Erosion Control Net

Heavy, twisted jute mesh weighing approximately 1.22 pounds per linear yard and 4 feet wide with mesh openings of approximately 1 inch square.

2.1.8.4 Soil Erosion Control Chemicals

High-polymer synthetic resin or cold-water emulsion of selected petroleum resins.

2.1.8.5 Hydrophilic Colloids

Hydrophilic colloids shall be physiologically harmless to plant and animal life, without phytotoxic agents. Colloids shall be naturally occurring, silicate powder based, and shall form a water insoluble membrane after curing. Colloids must resist mold growth.

2.1.8.6 Anchors

Erosion control anchor material shall be as recommended by the manufacturer.

PART 3 EXECUTION

3.1 SEEDING TIMES, CONDITIONS, AND AREAS

3.1.1 Seeding Time

Seed shall be sown from 1 Mar to 15 May for spring planting and from 16 Aug to 31 Oct for fall planting.

3.1.2 Areas to be Seeded

All disturbed ground areas within the limits of construction shall be topsoiled, tilled, limed, fertilized, seeded and mulched.

3.2 SITE PREPARATION

3.2.1 Grading

The Contracting Officer shall verify that finished grades are as indicated on drawings, and the placing of topsoil and the smooth grading has been completed in accordance with Section 02210 GRADING.

3.2.2 Placing Topsoil

Topsoil shall be distributed uniformly and spread evenly to an average thickness of three inches, with a minimum thickness of two inches. Topsoil shall be spread so that planting can proceed with little additional soil preparation of additional tillage. Surface irregularities resulting from topsoiling or other operations shall be leveled to prevent depressions. Grade shall be adjusted to assure that planted grade will be one inch below adjoining grade of any surfaced area. Topsoil shall not be placed when the subgrade is frozen, excessively wet, extremely dry, excessively compacted, or in a condition detrimental to the proposed planting or grading. Soil compacted by construction equipment or soil on compacted cut slopes of grades shall be pulverized to a minimum depth of two inches by disking or plowing before applying topsoil.

3.2.3 Application of Soil Amendments

3.2.3.1 Soil Test

A soil test shall be performed for pH, chemical analysis and mechanical analysis to establish the quantities and type of soil amendments required to meet local growing conditions for the type and variety of turf specified.

3.2.3.2 Lime

Lime shall be applied at the rate recommended by the soil test. Lime shall be incorporated into the soil to a minimum depth of 4 inches or may be incorporated as part of the tillage operation.

3.2.3.3 Fertilizer

Fertilizer shall be applied at the rate recommended by the soil test. Fertilizer shall be incorporated into the soil to a minimum depth of 4 inches or may be incorporated as part of the tillage or hydroseeding operation.

3.2.4 Tillage

3.2.4.1 Minimum Depth

Soil on slopes gentler than 3-horizontal-to-1-vertical shall be tilled to a minimum depth of 4 inches. On slopes between 3-horizontal-to-1-vertical and 1-horizontal-to-1 vertical, the soil shall be tilled to a minimum depth of 2 inches by scarifying with heavy rakes, or other method. Rototillers shall be used where soil conditions and length of slope permit. On slopes 1-horizontal-to-1 vertical and steeper, no tillage is required.

3.2.5 Finished Grading

3.2.5.1 Preparation

Turf areas shall be filled as needed or have surplus soil removed to attain the finished grade. Drainage patterns shall be maintained as indicated on drawings. Turf areas compacted by construction operations shall be completely pulverized by tillage. Soil used for repair of erosion or grade

deficiencies shall conform to topsoil requirements specified in Section 02210 GRADING. Finished grade shall be 1 inch below the adjoining grade of any surfaced area. New surfaces shall be blended to existing areas.

3.2.5.2 Lawn Area Debris

Lawn areas shall have debris and stones larger than 1 inch in any dimension removed from the surface.

3.2.5.3 Field Area Debris

Field areas shall have debris and stones larger than 2 inches in any dimension removed from the surface.

3.2.5.4 Protection

Finished graded areas shall be protected from damage by vehicular or pedestrian traffic and erosion.

3.3 SEEDING

3.3.1 General

Prior to seeding, any previously prepared seedbed areas compacted or damaged by interim rain, traffic or other cause, shall be reworked to restore the ground condition previously specified. Seeding operations shall not take place when the wind velocity will prevent uniform seed distribution.

3.3.2 Equipment Calibration

The equipment to be used and the methods of turfing shall be subject to the inspection and approval of the Contracting Officer prior to commencement of turfing operations. Immediately prior to the commencement of turfing operations, the Contractor shall conduct turfing equipment calibration tests in the presence of the Contracting Officer.

3.3.3 Applying Seed

3.3.3.1 Broadcast Seeding

Seed shall be uniformly broadcast at the rate of 4 pounds per 1000 square feet using broadcast seeders. Half of seed shall be broadcast in one direction, and the remainder at right angles to the first direction. Seed shall be covered to an average depth of 1/4 inch by disk harrow, steel mat drag, cultipacker, or other approved device.

3.3.3.3 Rolling

Immediately after seeding, except for slopes 3-horizontal-to-1 vertical and greater, the entire area shall be firmed with a roller not exceeding 90 pounds for each foot of roller width. Areas seeded with seed drills equipped with rollers shall not be rolled.

3.3.4 Hydroseeding

Seed and fertilizer shall be added to water and thoroughly mixed at the rates specified. Slurry shall be uniformly applied under pressure over the

entire area. The hydroseeded area shall not be rolled.

3.3.5 Mulch

3.3.5.1 Straw or Hay Mulch

Straw or hay mulch shall be spread uniformly at the rate of 2 tons per acre. Mulch shall be spread by hand, blower-type mulch spreader or other approved method. Mulching shall be started on the windward side of relatively flat areas or on the upper part of a steep slope and continued uniformly until the area is covered. The mulch shall not be bunched. All seeded areas shall be mulched on the same day as the seeding.

3.3.5.2 Mechanically Anchoring

Immediately following spreading, the mulch shall be anchored to the soil by a V-type-wheel land packer, a scalloped-disk land packer designed to force mulch into the soil surface, or other suitable equipment.

3.3.5.4 Non-Asphaltic Tackifier

Hydrophilic colloid shall be applied at rate recommended by manufacturer. Apply with hydraulic equipment suitable for mixing and applying uniform mixture of tackifier.

3.3.5.6 Wood Cellulose Fiber

Wood cellulose fiber mulch for use with the hydraulic application of seed and fertilizer shall be applied as part of the hydroseeding operation.

3.3.6 Water

Watering shall be started within 7 days after completing the seeded area. Water shall be applied at a rate sufficient to ensure moist soil conditions to a minimum depth of 1 inch. Run-off and puddling shall be prevented.

3.5 EROSION CONTROL

3.5.1 Erosion Control Material

Erosion control material, where indicated or required, shall be installed in accordance with manufacturer's instructions. Placement of the erosion control material shall be accomplished without damage to installed material or without deviation to finished grade.

3.5.2 Temporary Turf Cover

3.5.2.1 General

When there are contract delays in the turfing operation or a quick cover is required to prevent erosion, the areas designated for turf shall be seeded with a temporary seed as directed by the Contracting Officer.

3.5.2.2 Application

When no other turfing materials have been applied, the quantity of one half of the required soil amendments shall be applied and the area tilled in accordance with paragraph SITE PREPARATION. Seed shall be uniformly broadcast and applied at the rate of 2.5 pounds per 1000 square feet. The area shall be watered as required.

3.6 RESTORATION AND CLEAN UP

3.7.1 Restoration

Existing turf areas, pavements and facilities that have been damaged from the turfing operation shall be restored to original condition at Contractor's expense.

3.6.2 Clean Up

Excess and waste material shall be removed from the planting operation and shall be disposed of off the site. Adjacent paved areas shall be cleaned.

3.7 PROTECTION OF TURFED AREAS

Immediately after turfing, the area shall be protected against traffic or other use by erecting barricades and providing signage as required, or as directed by the Contracting Officer.

3.8 TURF ESTABLISHMENT PERIOD

3.8.1 Commencement

The Turf Establishment Period for establishing a healthy stand of turf shall begin on the first day of work under this contract and shall end three (3) months after the last day of turfing operations required by this contract. Written calendar time period shall be furnished to the Contracting Officer for the Turf Establishment Period. When there is more than one turf establishment period, describe the boundaries of the turfed area covered for each period.

3.8.2.1 Seeded Area

- a. Lawn Area: A satisfactory stand of turf from the seeding operation for a lawn area is defined as a minimum of 15 grass plants per square foot. Bare spots shall reseeded.
- b. Field Area: A satisfactory stand of turf from the seeding operation for a field area is defined as a minimum of 10 grass plants per square foot. Bare spots shall be reseeded.

3.8.3 Maintenance During Establishment Period

3.8.3.1 General

Maintenance of the turfed areas shall include eradicating weeds, eradicating insects and diseases, protecting embankments and ditches from erosion, maintaining erosion control materials and mulch, protecting turfed areas from traffic, mowing, watering, and post-fertilization.

3.8.3.2 Mowing

- a. Lawn Areas: Lawn areas shall be mowed to a minimum height of 3 inches when the average height of the turf becomes 4-5 inches. Clippings shall be removed when the amount of cut turf is heavy enough to damage the turfed areas.

- b. Field Areas: Field areas shall be mowed once during the season to a minimum height of 3 inches.

3.8.3.3 Watering

Watering shall be at intervals to obtain a moist soil condition to a minimum depth of 1 inch. Frequency of watering and quantity of water shall be adjusted in accordance with the growth of the turf. Run-off, puddling and wilting shall be prevented.

3.8.3.4 Post-Fertilization

Nitrogen carrier fertilizer shall be applied at the rate of 0.5 pounds per 1000 square feet after the first month and again prior to the final acceptance. The application shall be timed prior to the advent of winter dormancy and shall avoid excessively high nitrogen levels.

3.8.3.5 Repair

The Contractor shall re-establish as specified herein, eroded, damaged or barren areas. Mulch shall also be repaired or replaced as required.

3.8.3.6 Maintenance Report

A written record shall be furnished to the Contracting Officer of the maintenance work performed.

3.9 FINAL ACCEPTANCE

3.9.1 Preliminary Inspection

Prior to the completion of the Turf Establishment Period, a preliminary inspection shall be held by the Contracting Officer. Time for the inspection shall be established in writing. The acceptability of the turf in accordance with the Turf Establishment Period shall be determined. An unacceptable stand of turf shall be repaired as soon as turfing conditions permit.

3.9.2 Final Inspection

A final inspection shall be held by the Contracting Officer to determine that deficiencies noted in the preliminary inspection have been corrected. Time for the inspection shall be established in writing.

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