EQ Basin

Richardson, Robert

From: Redder, Jerome
Sent: Tuesday, July 14, 1998 11:34 AM
To: 'Marc Gutterman, CENAO'
Cc: Richardson, Robert; Olsen, Arne
Subject: EQ BASIN Closure

We just received a letter from DEQ not granting the 180 day extension to the closure plan submittal.

Based on our comments we would like to review the report ready for submission to DEQ July 27.

ALLIANT TECHSYSTEMS

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

July 10, 1998

98-815-152

Administrative
contracting Officer
Radford Army Ammunition Plant
Radford, Virginia 24141

Attention: SIORF-OP-EN

Subject: Review of "Risked Assessment and Closure Certification for the Former Bioplant Equalization Basin at the Radford Army Ammunition Plant"

Dear Mr. Richardson:

After reviewing the "Risk Assessment and Closure Certification for the Former Bioplant Equalization Basin at the Radford Army Ammunition Plant", prepared for the Norfolk District, United States Army Corps of Engineers by Environmental Resources Management, the following comments were noted:

1. In section 1.0 change, "On behalf of the United States Army Corps of Engineers (USACOE) and its subcontractor, Alliant Techsystems, Inc. (Alliant), Environmental Resources Management (ERM) has prepared this risk assessment and closure report for the former Bioplant Equalization Basin (United States Environmental Protection Agency (USEPA) ID No. VA1210020730)" to, On behalf of the United States Army and Alliant Techsystems, Inc. the Untied States Army Corps of Engineers (USACOE) and Environmental Resources Management (ERM) have prepared this closure report and risk assessment . . .

2. Section 3.3.2 . . . wastewater and sludge removed from he basin were disposed of at E. I. DuPont de Nemours & Company, Inc. Chambers Works

3. Section 3.3.2 . . . concrete debris was disposed of at County South Debris Landfill, Roanoke County, which is a permitted Construction . . .

4. Section 3.3.2 change, "Samples collected from the soil/concrete liner (Section 6.1) passed TCLP analysis and was disposed of at _____." to, samples collected from the soil/concrete line (Section 6.1) passed TCLP analyses. The soil/concrete liner was disposed of at County South Debris Landfill, Roanoke County.

5. Section 4.1 please include a copy of VADEQ approval letter in the closure report.

6. Section 4.2 please reference the VADEQ approval letter and include it in the closure report.

7. Section 4.4 please change 333 μq/Kg to .333 mg/Kg to maintain consistency with the remainder of the report.

8. Attachment 1 please include the risk amendment to the closure plan.

If you have any questions or concerns regarding these comments please contact me at (540)639-8220.

Very truly yours,

A. E. Olsen, Engineer
Environmental Affairs

cc: Administrative File
C. A. Jake
J. J. Redder
A. E. Olsen
Env. File

ALLIANTTECHSYSTEMS

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

July 10, 1998 98-815-152

Administrative
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C. A. Jake
J. J. Redder
A. E. Olsen
Env. File

ALLIANTTECHSYSTEMS

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

EQ BASIN

Richardson, Robert

From: Olsen, Arne
Sent: Tuesday, June 23, 1998 3:06 PM
To: marc.d.gutterman@usace.army.mil; 'Monty Bennett'
Cc: Redder, Jerome; Richardson, Robert
Subject: RE: Bio-Equalization Risk Assessment

I agree that doing a full blown risk assessment for a chemical that is apparently much lower then RBC's is not the wisest use of resources and that we should try one last time to convince Ms. Miller of this fact. However, I think that bullet one two and three of your "Points of Discussion" memo might be counter productive as they could be misconstrued to indicate that the sample taken for the background comparison at grid 9 is invalid and could lead to the resampling of grid 9. As grid 9 no longer exists this could prove to be impossible. However, I feel that the comparison to all reasonable health protection standards might prove convincing if presented in the appropriate context. I would like to have a phone call conference with all concerned parties excluding DEQ before proceeding with the actual phone call to DEQ. I suggest that we start this process as soon as possible how does 9:00 am on Friday June 26, 1998 sound for the initial phone call and then contact Ms. Miller after that conversation.

From: Monty Bennett[SMTP:Monty_Bennett@erm.com]
Sent: Tuesday, June 23, 1998 2:06 PM
To: Olsen, Arne; marc.d.gutterman@usace.army.mil
Subject: Bio-Equalization Risk Assessment

<<File: BioEQ Risk Screening.doc>>
Arne/Marc:

Attached is a one page summary of the relevant screening values that we should point out to the DEQ in an attempt to dissuade them from wanting a full-blown risk evaluation. While I am sure this argument has already been made, I think it's worth a second attempt.

Please call to let me know when we should arrange for this call or if you want me to make the arrangements.

monty
(See attached file: BioEQ Risk Screening.doc)

ALLIANTTECHSYSTEMS EQ Basin

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

June 1, 1998 98-815-125

Montgomery S. Bennett
Environmental Resources Management
812 Moorefield Park Drive
Suite 300
Richmond, VA 23236

Subject: Closure Documentation
Closure of Equalization Basin HWMU 10 & SWMU 10
Radford Army Ammunition Plant, Radford Virginia,
EPA ID# VA1210020730

Dear Mr. Bennett:

Enclosed are the documents that you requested in our meeting of May 28, 1998:

- Alliant Techsystems' December 18, 1997 letter to Ms. Miller of VaDEQ addressing the revised sampling results at HWMU 10
- "Final Site Investigation/ Evaluation," prepared by Radian Corporation for the Norfolk District of the U.S. Army Corps of Engineers
- "Analytical Results, Background Soil Samples," prepared by Radian Corporation for the Norfolk District of the U.S. Army Corps of Engineers.

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

Sincerely

C. A. Jake

C. A. Jake
Environmental Manager

Enclosures

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

EQ BASIN
Closure Report

Richardson, Robert

From: Redder, Jerome
Sent: Tuesday, April 28, 1998 2:03 PM
To: Richardson, Robert
Subject: FW: closure reports and Risk assessments

It moves along

From: Gutterman, Marc D NAO02[SMTP:Marc.D.Gutterman@NAO02.USACE.ARMY.MIL]
Sent: Tuesday, April 28, 1998 2:54 PM
To: Meals, Thomas A NAO02
Cc: Byrne, Matthew T NAO02; 'Jerry Redder'
Subject: RE: closure reports and Risk assessments

Tom - I spoke with ERM today and based on my conversation it appears the amount previously provided is good. I will need approximately $10K for the Contract portion, $5K for in-house labor. In addition, SWVAO will need some money for escorting ERM personnel, providing documentation, and signing the closure report. Any questions, I can be reached at X7669. - Marc

-----Original Message-----
From: Gutterman, Marc D NAO02
Sent: Tuesday, March 31, 1998 9:07 AM
To: Meals, Thomas A NAO02
Cc: Byrne, Matthew T NAO02
Subject: FW: closure reports and Risk assessments

Tom - Jerry Redder requested the Norfolk District perform a Risk Assessment and write the closure plan for the BioEQ Basin Closure. Based on the information provided by Jerry on a previous closure, the cost will be approximately $10K contract and $5K in-house labor. Do we have the funds available for this work? Mark Bishop was present during the conversation and he told me to relay to you that he will need the contingencies for some changes. Please let me know status as soon as you can as we only have 60 days from May 15, 1998 to complete the RA and Closure Plan. Thanks - Marc

-----Original Message-----
From: Redder, Jerome [SMTP:Jerome_Redder@ATK.COM]
Sent: Friday, March 27, 1998 11:48 AM
To: Gutterman, Marc D NAO02; 'Marc Gutterman, Corps of Engineers'
Cc: Bishop, Mark A NAO02; Richardson, Robert
Subject: closure reports and Risk assessments

the REAMS was $5,000. we had 3 or 4 constituents. EQ Basin has 1. We had ERM on site as a QA/QC representative. the bills look like $3,000 for the closure report.

I sent both addresses as I can't remember which one is correct.

ALLIANTTECHSYSTEMS EQ Basin

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

April 3, 1998

98-815-084

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

Subject: Closure Photographs 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 March 27, 1998. and reviewing the work at HWMU 10. Enclosed are the photographs Mike Scott took during your visit. The Corps is proceeding with filling in the excavation. They should be physically complete before May 15, 1998. The closure documentation will be prepared by the Corps.

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

C. A. Jake, Supervisor
Environmental

Photographs

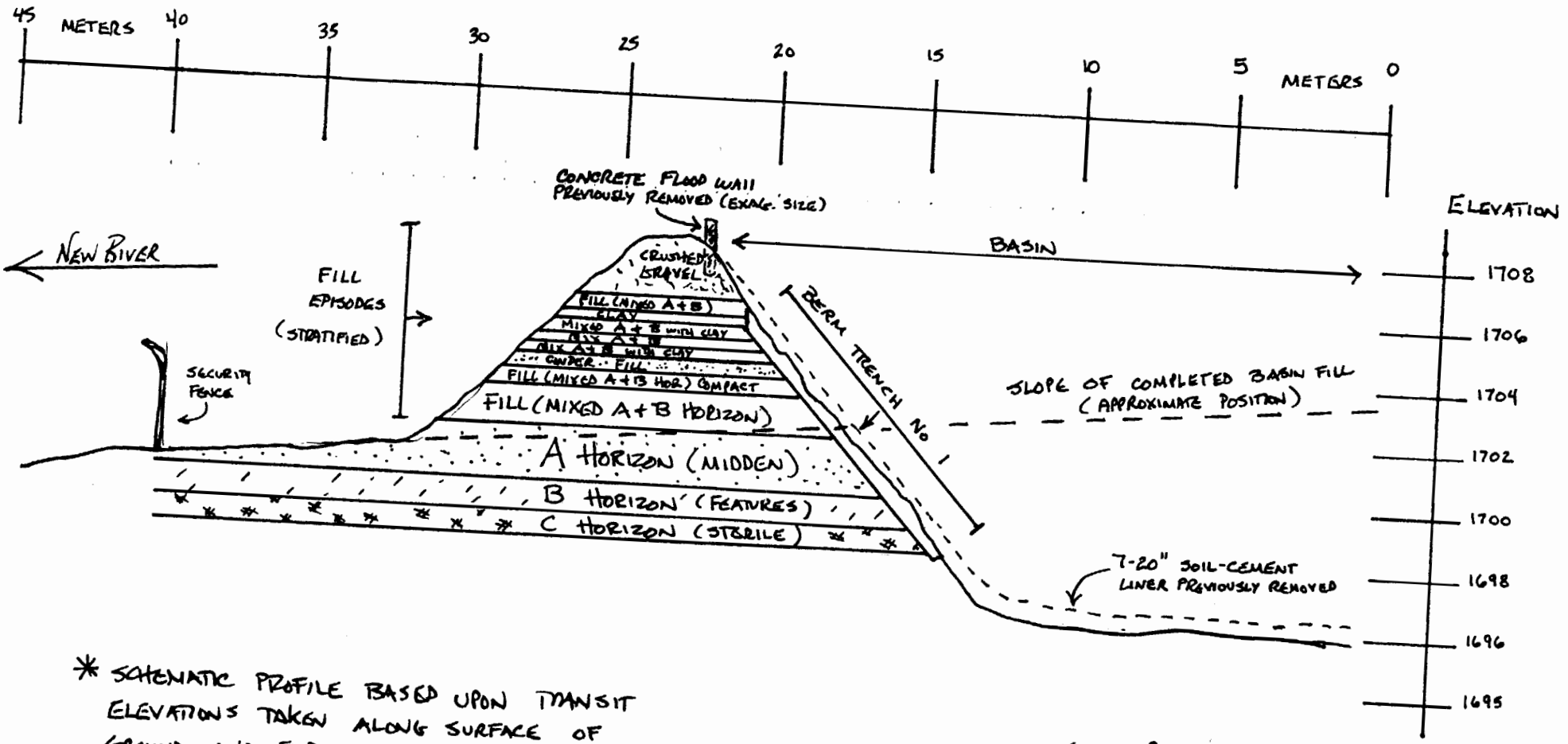
c: w/ Photographs
Mike Scott, DEQ, West Central Regional Office- Roanoke
J. J. Redder

w/o Photographs
R. L. Richardson, RAAP ACO
M. D. Gutterman, Norfolk Corps of Engineers
Mark Bishop, Norfolk Corps of Engineers, Southwest Area Office

596294

~~NORTH~~

BIOPLANT EQUALIZATION BASIN CLOSURE (RADFORD ARMY AMMUNITION PLANT)
SCHEMATIC REPRESENTATION: NORTH BERM COMPOSITION



* SCHEMATIC PROFILE BASED UPON TRANSIT ELEVATIONS TAKEN ALONG SURFACE OF GROUND AND EXPOSED HORIZONS WITHIN BERM TRENCH NO. 1. POSITION AND EXTENT OF HORIZONS ALONG NORTHERN EDGE ARE SPECULATIVE.

GRAY + PAPE, INC.

PROJECT 97-27501

44MY7 (MONITORING)

DAVID E. ROTENIZER
"44MY7 C-SAM"
24 MARCH 1998

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 demonstate 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 tests 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

Historic Preservation Officer (SHPO). A resume or vita for the C-sAM shall be submitted for review and approval prior to the final hire of this individual.

1.8.2.5.1 This project will take place next to the prehistoric archaeological site 44My7, which is eligible for listing on the National Register of Historic Places. It is likely that this site extends into the project area, under the berm which is to be removed, and that it might be damaged by this action. The C-sAM will observe and monitor all earth-disturbing activities connected with the project and will direct that all earth disturbing activities cease if significant archaeological remains associated with this site are encountered during the work. The Contracting Officer will be notified immediately and a plan will 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:

1. The contractor will supply additional trained personnel to assist the on-site project C-sAM in recovering significant data.

2. All exposed prehistoric features, such as post holes, pit features, burials and midden will be mapped and photographed under the supervision of the C-sAM.

3. Archaeological remains will be excavated only as necessary to comply with debris removal provisions of the contract documents. A plan to carry out protective measures to safeguard discovered archaeological remains shall be as mutually agreed by the C-sAM and the Contracting Officer and will be submitted to the SHPO by RAAP for approval.

4. If a plan for site burial is approved by the SHPO, it will include the following measures: The portions of the site exposed during the SWMU 10 project will be covered with geotextile fabric installed and secured to the exposed site surface with six-to eight-inch steel staples. The geo-textile material will conform to the VDOT Road and Bridge Specifications, January, 1991 (245.02.B). Any overlaps will be a minimum of four feet in width. Fill material will be placed on top of the geo-textile fabric by dumped successive loads that will be spread from the perimeter of the sites to their interior following specification 303.04. Fill material will then be compacted ensuring a minimum depth of one foot. Construction machinery will operate only on the deposited fill material. Under no circumstances will construction equipment drive on the exposed ground surfaces of the site or on the geo-textile fabric. This work will be conducted under the supervision of the C-sAM.

5. Perimeter fencing will be installed around the site 44MY7 after closure.

6. If Native American burials and/or associated funerary objects are encountered the requirements of the Native American Graves Protection and Repatriation Act will be observed, work which may affect the subject 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.

7. 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.

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

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 wqrk, 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 REQUIRMENTS

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 of 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 form 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

EQ Basin

Friday 27 March 98

Richardson, Robert Visit: Debbie Miller, mike Scott

From: Compton, Christel
Sent: Thursday, March 19, 1998 4:32 PM
To: 'Mark.A.Bishop@NAO02.USACE.Army.mil'; Richardson, Robert; Redder, Jerome
Subject: FW: Friday

Set up the verification inspection for 9:00am on March 27th. Call me if you have any questions. Thanks.

From: damiller@deq.state.va.us[SMTP:damiller@deq.state.va.us]
Sent: Thursday, March 19, 1998 8:57 AM
To: Christel_Compton@ATK.COM
Cc: mtscott@deq.state.va.us
Subject: Friday

How about we set up the verification inspection for Friday, 3/27?? We'll (as in me and Mike) will get there around 9am. I do not think it will take very long for the verification - Mike has some additional things he wants to see (I'll let you all figure that out). If I can get out by 1pm - that would be great!!! Let me know if this sounds okay with y'all!

5962911

EQ BASIN

DEQ Visit

Richardson, Robert

From: Compton, Christel
Sent: Wednesday, March 18, 1998 10:02 AM
To: 'Mark.A.Bishop@NAO02.USACE.Army.mil'; Richardson, Robert
Cc: Redder, Jerome
Subject: DEQ Inspection - EQ Basin

Jerry and I spoke with Debbie Miller, DEQ - Richmond and Mike Scott, DEQ - Roanoke regarding inspection of the EQ Basin excavation. The tentative dates are March 25 or March 27, 1998. Debbie will let us know for sure once she coordinates travel and state vehicle access. Mike Scott is available both dates. I wanted to give you notice so each of you can plan for these dates. I will contact you as soon as I hear the exact date. Thanks. Call me at 8211 if you have any questions.

Richardson, Robert

From: Compton, Christel
Sent: Thursday, March 19, 1998 11:17 AM
To: 'Mark.A.Bishop@NAO02.USACE.Army.mil'; Richardson, Robert
Cc: Redder, Jerome
Subject: EQ Basin Inspection

I spoke with Ms. Miller, DEQ this morning. Because there are no state vehicles available Wednesday, she is requesting a vehicle for Friday. This is not FINAL. I just wanted to update everyone. The requirement for inpecting resides in EPA's interpretation of "certification" - certification is to include verification by state representatives that the closure/excavation has been completed in accordance with the closure plan. This includes depth as defined by the analytical results (procedures outlined in the plan).

If you have any questions, please contact me at 8211. Thanks.

96-067

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

Peter W. Schmidt
Director

Water Regional Office
3015 Peters Creek Road
Post Office Box 7017
Roanoke, Virginia 24019
(703) 562-3666

Thomas L. Henderson
Regional Director

May 03, 1996

US Army & Alliant Techsystems
Radford Army Ammunition Plant
P.O. Box 1
Radford, VA 241410100

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Attn: Ms. Cy Lane

Re: VPDES Permit No. VA0000248, VPDES Permit Modification
Radford Army Ammunition Plant

Dear Permittee:

The State Water Control Board is considering processing the above permit. Please review the enclosed public notice and draft permit package carefully.

Certain public notice procedures must be complied with before the actual permit can be approved. They are as follows:

1. The attached public notice must be published once a week for two consecutive weeks in a newspaper of general circulation. Please complete and return the attached authorization form which will allow us to mail the notice to the newspaper and permit the newspaper to bill you for the public notice. In addition, please insure that the newspaper certification of publishing is received by this office.

2. A minimum of 30 days will be allowed for public response following the date of the first public notice. If no public response is received, or the public response can be satisfactorily answered, then the permit will be processed. However, if there are significant public response, then we may hold a public hearing. You will be advised should this occur.

EQ Basin Closure

DEQ Approval of revised sampling

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;

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- 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

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

EQ Basin Closure

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

James S. Gilmore, III
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Thomas L. Hopkins
Director

(804) 698-4000
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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

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,

Leslie A. Romanchik

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 exit.

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 Plan 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 background[1] 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 $1x10^{-06}$ and cumulative carcinogenic risk of $1x10^{-04}$. 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 1E-06 or less for individual carcinogens;

iii. cumulative risk of 1E-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 modeling[2] 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

[2]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 cm^2 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/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 m^3/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 ($[mg/kg\text{-}day]^{-1}$). 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 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 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:

$$RISK_c = CDI_{ingestion} * SF_{ingestion} + CDI_{dermal} * SF_{dermal} + CDI_{inhalation\text{-}VOCs} * Sf_{inhalation\text{-}VOCs} + CDI_{inhalation\text{-}particles} * SF_{inhalation\text{-}particles}$$

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

$$Hi_c = CDI_{ingestion} / RfD_{ingestion} + CDI_{dermal} / RfD_{dermal} + CDI_{inhalaltion\text{-}VOCs} / RfD_{inhalation\text{-}VOCs} + CDI_{inhalation\text{-}particles} / RfD_{inhalation\text{-}particles}$$

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

Exposure Route	Chronic Daily Intake (CDI), mg/L-day	
	Residential Exposure	Occupational/Industrial Exposure
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 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 ajusted	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	Volatilazation 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.

EQ Basin Closure

WORK PLAN ADDENDUM

The numbered sections below correspond to sections of the original Work Plan. Unless otherwise noted the numbered sections of this addendum are additions or supercede the original.

The first paragraph of section 1.1 should be as follows:

1.1 It will be combined responsibility of the Site Superintendent and CQC Manager to ensure that all work is done in compliance with the documents listed below. This will be accomplished through Activity Hazard Analysis and the Three Phase Control system.

The last paragraph of section 1.1 should read.

The Three Phase Control system, along with the use of Activity Hazard Analysis, will ensue that all work is conducted in a safe and careful manner without causing damage to undisturbed property. Following the Work Plan and the CQC Plan in their entirety will result in smooth and well-planned execution of each segment of work

2. Scheduling and Operational Sequencing

Site demolition work is planed to proceed in the follow order.

2.1) Electrical demolition
- a) Determination of designated electrical circuits
- b) Label spare breakers and MCC circuits
- c) Removal of wiring
- d) Removal of conduit
- e) Demolition of electrical equipment racks
- f) Salvage and cleaning of designated equipment

2.2) Demolition and cleaning of steel pipe
- a) Dewatering pipe
- b) Cutting pipe and breaking joints
- c) High pressure rinsing of pipe
- d) Salvage steel

2.3) Demolition and disposal of concrete floodwall
- a) Demolition of wall into basin
- b) Concrete wall will be disposed with liner

2.4) Demolition and disposal of soil / cement liner
- a) Dewatering of basin
- b) Removal of liner
- c) Hauling and disposal of concrete and soil / cement

2.5) Demolition of concrete effluent station and ancillary piping
- a) Disconnect steam and air lines
- b) High pressure washing of concrete and piping
- c) Demolition of concrete and piping

d) Disposal of concrete
e) Salvage steel

3. Removal and Disposal Procedures

3.1) Dewatering of EQ Basin

a) A combination of electric and / or gas pumps with hard hose will be used to pump the contents of the basin directly to the effluent pumping station. All connection will be checked to prevent any leaking.

3.4) 20 inch steel piping

a) Rain and rinsate water from the pipe will be collected in the original EQ Basin and pumped to the effluent collection box. Once the pipe is dewatered, it will be moved into the EQ Basin, by heavy equipment, where it will be rinsed in sections small enough to ensure a thorough job. Open ends of the pipe will be secured to ensure that any residue is contained during moving.
b) After the pipe is thoroughly rinsed it will be moved to a collection box via heavy equipment. Special care will be taken to see that proper rigging is used in moving sections of pipe.

3.5) Electrical demolition

a) A qualified journeyman electrician will perform all determination of electrical circuits.
b) Spare circuits will be labeled.
c) General labor will be used to remove conduit and wiring.
d) Conduit and wiring will be moved to staging area for salvage.

3.6) Mechanical demolition

a) Arrangements will be made with Alliant Tech personnel to determinate any steam and air lines.
b) Dead lines will be removed by general labor.
c) Salvageable material will be restaged for collection.

3.7) Demolition of Effluent Station

a) The first stages of this feature will be accomplished in the electrical, mechanical, and piping stages.
b) When nothing is left but the concrete structure, it will be rinsed with high pressure spray.
c) Rinse water will be collected and pumped from the basin
d) Concrete will be disposed of with liner and flood wall at a permitted land fill.

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)

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 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, Stae 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 withCFR 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 ia 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 demonstate 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 tests 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 --

NELLI SERVICES CORP.

WORK PLAN

(In Accordance with Sections 2072, 2050, 1300, 1305, SSHP, CQ Plan, and Erosion Control Plan)

TABLE OF CONTENTS

1. Introduction

This Work Plan is intended to assist Ciminelli Services Corp. (CSC) to develop, implement, maintain and supervise a general plan for demolition, demolition debris removal and disposal, and related operations.

1.1 Applicability of the Work Plan

The purpose of this written Work Plan is to assist CSC and ACE with a proposed guideline by which to complete and manage work activities as indicated in the contract documents. If deviations from this Work Plan are requested or necessary, CSC will resubmit a plan for that portion of the work to be approved by the engineer.

1.2 All work shall be done in compliance with the following documents:

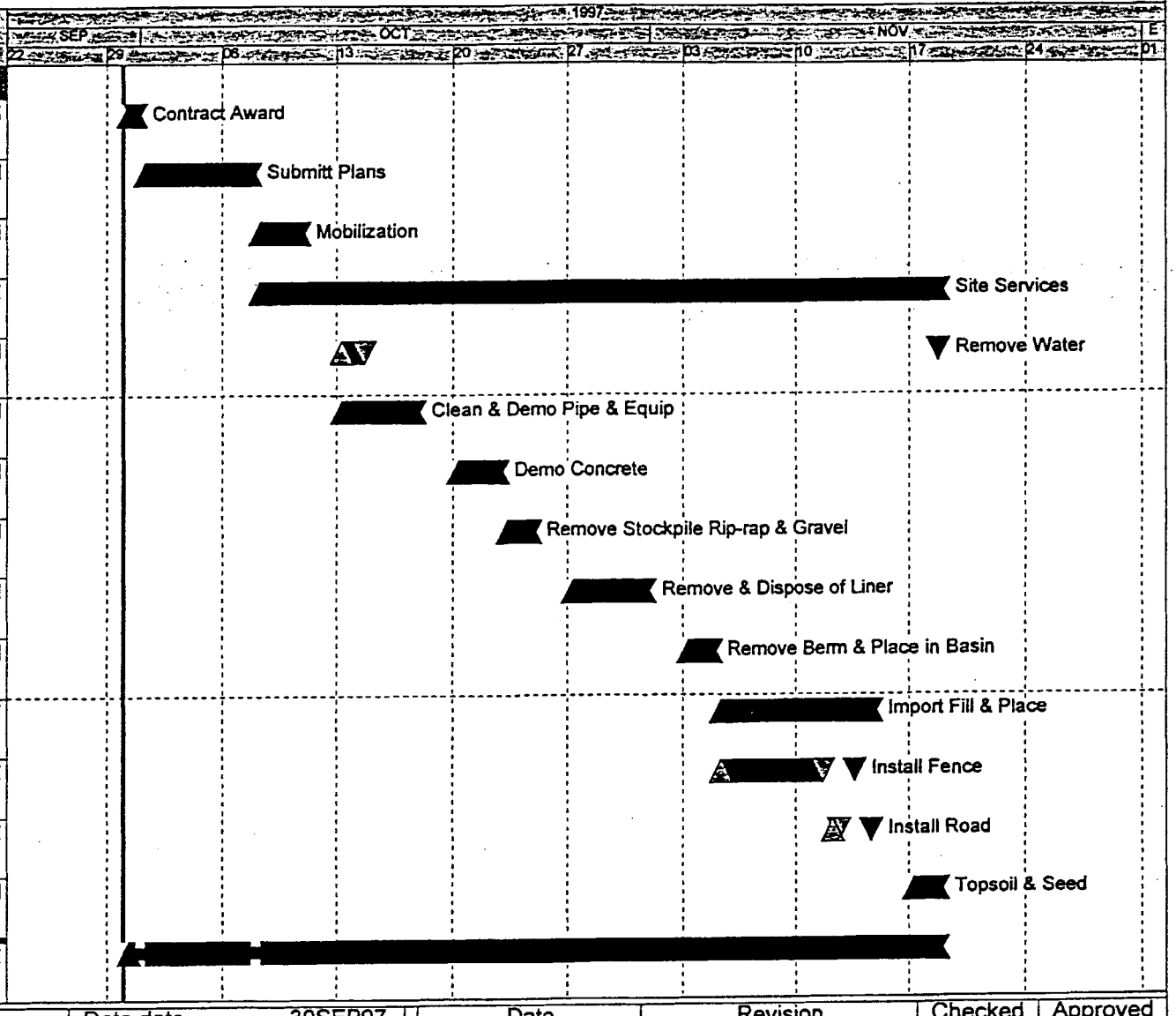
- CSC Corporate Health & Safety Plan
- Erosion Control Plan
- Contract clauses, drawings and referenced standards
- ER 1110-1-263
- EM 200-1-3
- ER 385-1-92
- EM 385-1-1
- VR 672-10-1
- VR 672-20-10
- VR 680-21-00
- CFR 29 Part 1910.120

2. Scheduling and Operational Sequencing

The work is scheduled to take place for the duration and in the sequence indicated on the attached project schedule. Schedule to be updated upon approval of plans and actual start of physical work.

SureTrak Project Manager
Radford Basin Closure

Act ID	Activity Description	Rem Dur
Radford Basin Closure		
1000	Contract Award	1d
1005	Submitt Plans	5d
1010	Mobilization	3d
1120	Site Services	30d
1020	Remove Water	2d
1030	Clean & Demo Pipe & Equip	5d
1040	Demo Concrete	3d
1050	Remove Stockpile Rip-rap & Gravel	2d
1060	Remove & Dispose of Liner	5d
1070	Remove Berm & Place in Basin	2d
1080	Import Fill & Place	8d
1100	Install Fence	5d
1110	Install Road	1d
1090	Topsoil & Seed	2d
		36d



Early start point	Summary bar
Early finish point	Progress point
Early bar	Critical point
Late finish point	Summary point
Progress bar	Start milestone point
Critical bar	Finish milestone point

Data date	30SEP97
Start date	30SEP97
Finish date	18NOV97
Must finish date	
Target finish date	

Date	Revision	Checked	Approved

3. Removal and Disposal Procedures

3.1 Rain Water and Piping Rinsate Water

A. Removal and disposal shall be done via collection at the effluent collection box and pumped to the influent collection pump using a 2 or 3 inch diameter or centrifuge pump with hard hose. If necessary, trucks and equipment shall be washed down on gravel at roadside to prevent tracking mud to road.

B. This work shall be done with special attention given to Sections 9.8 and 11 of the SSHP.

3.2 Concrete Flood Wall and Soil/cement Liner Removal/Disposal

A. Removal - These items shall be excavated by a 300 PC or equivalent excavator. When possible, these materials shall be loaded into trucks from the excavation. If not possible, CSC shall relocate materials to a better suited loading area within the basin with a D-4 or equivalent bulldozer, or with a 450 or equivalent loader.

B. Disposal - Once loaded into trucks, the debris will be covered and shipped to the approved disposal facility.

3.3 Equipment to be Salvaged and Equipment for Disposal

A. Removal - Small hand tools shall be used for disconnection of items to be removed from items to remain. Hand labor will be used to restage materials to area such that rinsate shall be collected at the influent collection pump station when possible. Heavy equipment shall be used to move pieces when too heavy to carry.

B. Disposal - Equipment to be salvaged will be staged in an area designated by the Area Engineer. Equipment to be disposed of shall be loaded onto trucks and shipped to the approved disposal facility after rinsing.

4. Sampling and Analysis Plan (SAP)

(Not used in this contract)

5. Regulatory Permit

Browning-Ferris Industries' DEC permit attached

State of Tennessee
Department of Environment and Conservation
Division of Solid Waste Management

Solid Waste Management Program
5th Floor, L & C Tower
Nashville, Tennessee 37243-1535
(615) 532-0780

REGISTRATION AUTHORIZING SOLID WASTE DISPOSAL ACTIVITIES IN TENNESSEE

Registration Number: SNI 371040185 EXT

Date Issued: October 1, 1993

Issued to TRASH, Inc., a wholly-owned subsidiary of Browning-Ferris Industries of Tennessee, Inc. for a facility located in Hawkins County, Tennessee on Carter Valley Road, approximately six miles northeast of Surgoinsville and three miles south of the Virginia-Tennessee border.

Activities Authorized: Disposal of non-hazardous solid waste in a Class I Disposal Facility.

By my signature, this registration is issued in compliance with the provisions of the Tennessee Solid Waste Disposal Act (Tennessee Code Annotated, Section 68-211-101, et seq.), and applicable regulations developed pursuant to this law and in effect; and in accordance with the conditions and other terms set forth in this registration document and the attached Registration Conditions.

Tom Tiesler, Director
Division of Solid Waste Management

JTT/DBM/E5043153/D7/92SWM

Registration Number SNL 371040185 EXT

PERMIT TERMS AND CONDITIONS

1. Recertification by Permittee for Facilities Whose Initial Operation is Delayed - If the facility does not initiate construction and/or operation within one year of the date of this permit, the permittee must recertify the application in accordance with Rule 1200-1-7-.02(2)(e).

2. Duty to Comply - The permittee must comply with all conditions of this permit, unless otherwise authorized by the Department. Any permit noncompliance, except as otherwise authorized by the Department, constitutes a violation of the Act and is grounds for enforcement action, or for permit termination, revocation and reissuance, or modification.

3. Need to Halt or Reduce Activity Not a Defense - It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

4. Duty to Mitigate - In the event of noncompliance with the permit, the permittee shall take all reasonable steps to minimize releases to the environment, and shall carry out such measures as are reasonable to prevent adverse impacts on human health or the environment.

5. Proper Operation and Maintenance - The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of the permit.

6. Permit Actions - This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any existing permit condition.

7. Property Rights - This permit does not convey any property rights of any sort, or any exclusive privilege.

8. Duty to Provide Information - The permittee shall furnish to the Commissioner, within a reasonable time, any relevant information which

Registration Number SNL 971040185EXT

the Commissioner may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Commissioner, upon request, copies required to be kept by this permit.

9. Inspection and Entry - The permittee shall allow the Commissioner, or an authorized representative, to:

(i) Enter at any reasonable time the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

(ii) Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

(iii) Inspect at any reasonable time any facilities, equipment (including monitoring and control equipment), practices or operations regulated or required under this permit (Note: If requested by the permittee at the time of sampling, the Commissioner shall split with the permittee any samples taken.);

(iv) Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Act, any substances or parameters at any location; and

(v) Make photographs for the purpose of documenting items of compliance or noncompliance at waste management units, or where appropriate to protect legitimate proprietary interests, require the permittee to make such photos for the Commissioner.

10. Monitoring and Records

(i) Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

(ii) The permittee shall retain records of all required monitoring information. The permittee shall maintain records for all ground-water monitoring wells and associated ground-water surface elevations, for the active life of the facility, and for the post-closure care period as well. This period may be extended by request of the Commissioner at any time.

(iii) Records of monitoring information shall include:

(I) The date, exact place, and time of sampling or measurements;

Registration Number SNL 571040185 EXT

(II) The individual(s) who performed the sampling or measurements;

(III) The date(s) analyses were performed;

(IV) The individual(s) who performed the analyses;

(V) The analytical techniques or methods used (including equipment used); and

(VI) The results of such analyses.

11. Reporting Requirements

(i) The permittee shall give notice to the Commissioner as soon as possible of any planned physical alterations or additions to the permitted facility.

(ii) Monitoring results shall be reported at the intervals specified elsewhere in this permit.

(iii) The permittee shall report orally within 24 hours from the time the permittee becomes aware of the circumstances of any release, discharge, fire, or explosion from the permitted solid waste facility which could threaten the environment or human health outside the facility. Such report shall be made to the Tennessee Emergency Management Agency, using 24-hour toll-free number 1/800/262-3300.

(iv) Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Commissioner, it shall promptly submit such facts or information.

12. Periodic Survey

(i) Within 60 days of this receipt of the written request of the Commissioner to do so, the permittee shall cause to be conducted a survey of active and/or closed portions of his facility in order to determine if operations (e.g., cut and fill boundaries, grades) are being conducted in accordance with the approved design and operational plans. The permittee must report the results of such survey to the Commissioner within 90 days of his receipt of the Commissioner's request.

Registration Number SNL 371040185 EXT

(ii) The Commissioner may request such a survey:

(I) If he has reason to believe that operations are being conducted in a manner that significantly deviates from the approved plans; and/or

(II) As a periodic verification (but no more than annually) that operations are being conducted in accordance with the approved plans.

(iii) Any survey performed pursuant to this part must be performed by a qualified land surveyor duly authorized under Tennessee law to conduct such activities.

13. Duration of Permits - This permit shall be effective for the operating life of the facility.

14. Effect of Permit - The issuance of this permit does not authorize the permittee to injure persons or property or to invade other private rights, or to violate any local law or regulations.

15. Transfer, Modification, Revocation and Reissuance, and Termination of Permits - This permit may be transferred, modified, revocated or reissued, or terminated as set forth in 1200-1-7-.02(5).

16. Applicable Standards - All applicable facility standards of Rule Chapter 1200-1-7, Solid Waste Processing and Disposal Amendments shall be considered conditions of this registration.

17. Penalties - Any violation of the conditions or other terms of this registration may subject the registrant to the penalties set forth in Tennessee Code Annotated Section 68-211-114 and 68-211-117.

18. Hazardous Waste Restriction - No hazardous waste, as regulated by the Tennessee Hazardous Waste Management Act (TCA Section 68-212-101, et seq.), and the Rules adopted pursuant to that Act, shall be accepted at this facility.

19. Construction and Operation - The permittee shall construct and operate the facility in accordance with the approved engineering plans and operations manual which becomes a condition of this permit in Attachment I.

20. Financial Assurance - Prior to beginning operation, the permittee must file a Financial Assurance Instrument in accordance with Rule 1200-1-7-.03.

Registration Number SWL 57104018 5

FACILITY-SPECIFIC PERMIT CONDITIONS

The following conditions of this permit are established pursuant to Rule 1200-1-7-.02(4)(b):

1. The Carter Valley Landfill shall only accept waste from entities within the State of Tennessee, in the Virginia Counties of Russell, Buchanan, Dickenson and Tazewell, and from those areas in contiguous States which are within a 100 mile radius of the Carter Valley Landfill.

2. In order to verify the presence of the required minimum soil thickness, additional exploratory borings will be conducted prior to clay liner construction. Buffer verification will be performed in accordance with the Construction Quality Assurance Plan.

3. In the event that bedrock is encountered at an elevation greater than fifteen (15) feet below the proposed top of the clay liner, the minimum required soil thickness will be determined for the area from the data provided in the parametric stability analysis. If the minimum soil thickness is present the boring will be sealed. If the minimum soil thickness is not present, the rock and overburden will be removed in accordance with the Construction Quality Assurance Plan and the excavation backfilled with compacted soil to assure a maximum permeability of 1×10^{-6} cm/sec.

4. Controlled blasting will be done and monitored in accordance with the Construction Quality Assurance Plan. Peak particle velocity is limited to 5 in./sec. at a distance of fifteen (15) feet from the rock material being removed. A minimum distance of fifty (50) feet must be maintained between any blast and any previously constructed liner or previous fill area. The initial shots must be measured to show that the blast vibrations being generated are in the same range as those associated with the normal construction activities at this facility.

5. A professional hydrogeologist or geotechnical engineer shall be on-site to inspect the excavation of each phase as the base elevations are approached but prior to re-establishment of finished grade. Wet zones, porous zones and/or channels encountered during the excavation must be immediately reported to the Division. When base grades of excavation for a phase are reached, Division staff must inspect the site prior to further site preparation.

6. Any zones of unsuitable material must be treated according to the recommendations of the Division staff. Replacement clay must be compacted to achieve a permeability no greater than 1×10^{-6} centimeters per second. Soil selection, compaction, and verification procedures shall be conducted in accordance with the Construction Quality Assurance Plan.

7. The leachate collection system shall be installed in accordance with the approved plans. The Division shall be notified at least two weeks prior to completion of each phase of construction of this system in order that the system may be inspected.

8. An independent registered professional engineer shall certify each new section of the liner and leachate collection system before waste is placed over the section.

9. The Division will allow a maximum of 180 days to relocate the waste from the present Phase II once the process has been initiated. The Division may grant an extension of this activity after evaluation of a written request from the Permittee.

10. Soil sampling at the Phase II subgrade to verify lack of leachate impact must include at least one individual volatile organic compound screening for every five soil sampling stations.

11. The two holes referred to in the proposed hydrogeologic site investigation for Phase II must penetrate at least 20' into bedrock. Each must be offset by at least two holes, no closer than 5' and no further than 15', in a triangular pattern, and drilled to the soil/rock interface.

12. Storm water run-off will be monitored in accordance with Rule 1200-4-10-.04 National Pollution Discharge Elimination System Permit for storm water discharges associated with industrial activity at a landfill facility.

13. As part of the Groundwater Monitoring Program, surface water samples must be obtained from the west fork of Renfro Creek where it passes beneath the public road south of Cooper Spring, from the surface flow originating from Spring SB-21 where it flows under the Gravely Valley Road, and from Elm Springs Branch where it passes beneath Carter Valley Road. These samples are to be analyzed for the parameters of pH, specific conductivity, and temperature (field equipment may be used). The frequency of this testing shall be once every two weeks. The Cooper and Hurd Springs are to be monitored for the same chemical parameters and on the same schedule, as the on-site wells. This schedule will be maintained for a minimum of one year, until this condition is modified or until the site is closed.

14. Ambient air monitoring with portable methane detectors must be undertaken at surface stations at least quarterly. The surface stations should remain constant and weather conditions should be considered prior to sampling.

15. A cable extensionometer or other approved device must be installed to monitor ground movement beneath the liner system in the two areas within the proposed footprint where closed depressions exist. Details and locations of this monitoring device must be approved by the Johnson City Field Office.

16. The new monitoring well(s) designed to monitor groundwater flow towards Cooper Spring must be shown to be hydraulically/connected to the spring. A dye trace may be used to prove this connection.

6. Water Removal Methods

See Section 3 (Removal and Disposal Procedures), Paragraphs 3.1-A and 3.1-B.

7. Ciminelli Services Corp. intends to subcontract the services of R.L. Jones Trucking Co. All trucks will have the required State and Federal licenses.

8. CSC will use Browning-Ferris Industries Carter Valley Landfill as our disposal facility.

9. Borrow source is yet to be determined pending engineer's approval of backfill material.

10. Spill Contingency and Prevention Plan

Refer to the following:

- Erosion Control Plan
- CQC Plan
- SSHP Sections 9 and 11
- Alliant Tech Systems Safety Rules for Contractors and Subcontractors
- All applicable State and Federal regulations

11. Methods of Measurement

Volume of debris shall be measured in three phases:

- Phase 1 - The estimator's volumes derived by the use of the contract documents
- Phase 2 - Pre-construction physical measurement
- Phase 3 - Landfill's verification of loaded volume by physical measurement

12. Statements of Acceptance of Waste

See attached letter from BFI..

February 5, 1998

Mr. Ed Sullivan
Ciminelli Services Corp.
170 Cooper Ave.
Suite 112
Tonawanda, NY 14150

RE: Radford Army Ammunition Plant Debris

Dear Mr. Sullivan,

BFI has reviewed the TCLP data you submitted for RAAP. We have also discussed the situation with Nat Smith of the Tennessee Department of Environment and Conversation. It is Mr. Smith's opinion as well as BFI's that this waste is acceptable as construction and demolition debris. You may dispose of the waste in BFI Carter Valley Landfill at your convenience.

Sincerely,

Bruce A. Howard
Major Account Executive

Carter Valley Landfill · 2825 Carter's Valley Road · P.O. Box 234 (37642) · Church Hill, Tennessee 37642
Phone 423-357-6777 · Fax 423-357-3680

BioBASIN AST

ALLIANTTECHSYSTEMS

Memorandum

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

Date: March 2, 1998

Subject: AST at EQ Basin

To: Bob Richardson, ACO

From: Christel Compton
Organization: Alliant Techsystems, Inc.
Telephone: 639-8211

c: Jerry Redder, Alliant
Mark Bishop, Corps of Engineers
File

On February 25, 1998, Ciminelli Services Corporation contacted Mark Bishop regarding a 500-gallon above-ground storage tank (AST). The empty tank was at the EQ Basin project site. Ciminelli anticipated using the tank for diesel fuel for the equipment during the project. Mark Bishop, Bob Richardson and I met with Ciminelli at the project site to discuss the regulatory and plant requirements (Best Management Practices) for such a tank. The following information was presented to Ciminelli as conditions for locating the tank on the project site:

- The tank may have to be registered with the Virginia Department of Environmental Quality (DEQ), Water Division. The contact is Mike Sexton 540/562-6795.
- Secondary containment able to hold 110% of the tank volume.
- Protection from rain/storm water for the tank and containment.
- Daily stick/level check.
- Daily inventory check: Previous day level - usage = current day level
- If oil or oil/water mixture accumulates in the containment, this liquid can not be released. Alliant's used oil truck can be utilized to pump the containment, for a price.

The location of the AST was discussed. Although the area next to the trailer would provide more protection from vehicle traffic, Ciminelli preferred a location east of the trailer, next to material storage for the dam on the diffuser project. Joe Loveday, BioPlant approved the location.

On February 26, 1998, Ciminelli notified Alliant that discussions with the DEQ indicated registration of the tank may not be required. Because Ciminelli is leasing the tank, the owner of the tank may have the tank registered. If the owner has less than 1,320 gallons aggregate or less than a 660-gallon tank, registration is not required. Ciminelli will discuss with the owner of the tank. As long as DEQ does not require registration, Alliant accepts and waives the registration requirement but maintains the Best Management Practices identified above will still be required. Ciminelli agreed with this position.

Richardson, Robert

From: Compton, Christel
Sent: Monday, March 02, 1998 8:05 AM
To: Richardson, Robert
Cc: 'Mark.A.Bishop@NAO02.USACE.Army.mil'; Redder, Jerome
Subject: AST at EQ Basin

Enclosed is a memo summarizing the discussions and resolutions for the AST at the EQ Basin. Call me at 8211 if you have any questions or comments. Thanks.

AST Memo .doc

EQ Basin Closure

DEPARTMENT OF THE ARMY
US ARMY ENGINEER DISTRICT, NORFOLK
AREA ENGINEER, SOUTHWESTERN VIRGINIA AREA OFFICE
P.O. BOX 3, RADFORD ARMY AMMUNITION PLANT
RADFORD, VIRGINIA 24141-0098

REPLY TO
ATTN OF: CENAO-XR (415-10c)

February 6, 1998

MEMORANDUM FOR: See Distribution

Thursday
0900
Cof Eng office

SUBJECT: Pre-work Safety Conference

PROJECT: Bio Plant Equalization Basin Closure

CONTRACT NO: DACA65-98-C-0015

CONTRACTOR: Ciminelli Services Corporation
170 Cooper Avenue, Suite 112
Tonawanda, New York

Brennon Schl...
Ed Sullivan

DATE & TIME: Thursday, 12 February 1997; 0900 Hours

LOCATION: Main Conference Room
Southwestern Virginia Area Office
Radford Army Ammunition Plant, Bldg. 449
Radford, Virginia 24141-0098
Telephone No. (540) 639-7656

CONFERENCE LEADERS: Mark A. Bishop
Guy B. Rhodes, Jr.

ADMINISTRATIVE CONTRACTING OFFICERS: J. W. Blackburn, Jr., P.E.
Guy B. Rhodes, Jr. (Alternate)

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

DISTRIBUTION: Ch, Safety and Health Office (CENAO-SA)
Ch, Construction Branch (CENAO-CO-C)
Marc Gutterman, Geoenvironmental Branch (CENAO-EN-G)
Ch, Operations, RAAP (SIORF-OP)
Safety Manager, RAAP (SIORF-SE-SF)
Security Officer, RAAP (SIORF-CA)
Christel Compton, Alliant Techsystems
Michael Griffith, Alliant Techsystems
George Tilley, Wackenhut Security Systems

596041

PREWORK SAFETY CONFERENCE

12 FEBRUARY 1998

Name	Organization	Telephone Number
MARK A. BISHOP	SOUTHWEST VA AREA OFFICE	639-7656
Bobby CARNER	WSI Security	639-7220
J C E ZAGRAPAN	ACO SECURITY	639-8645
Christel Compton	Alliant Techsystems	639-8211
Robert RICHARDSON	ACO ENVIRONMENTAL	(540) 639-8641
Brandon Schlemmer	Ciminelli Services Corp	(716) 447-5684
Ed Sullivan	Ciminelli Services Corp	(716)-447-5684
Robert Kelly	ATK Safety	639-8643

EQ BASIN

Richardson, Robert

From: Redder, Jerome
Sent: Thursday, February 05, 1998 12:26 PM
To: Richardson, Robert
Subject: FW: EQ Basin Closure

CoE fun and games

From: Compton, Christel
Sent: Thursday, February 05, 1998 10:20 AM
To: 'Bishop, Mark A NAO02'
Cc: Redder, Jerome
Subject: RE: EQ Basin Closure

Hey Mark. I have discussed with Jerry. In the closure plan approved by the DEQ, the requirement is to decon in a decon pad. If you would like for us to contact Ms. Miller, DEQ and request a change, we can do that. However, her response time has been 30 to 60 days. Also, I spoke with Ms. Miller on Tuesday regarding the revised EQ Basin data and Risk-Based Closure Amendment. She indicated it would be an additional three weeks before she reviews these submittals. Again, if she has not reviewed by the time we are ready to backfill, let us meet with Jerry and the ACO staff to decide how to proceed. Let me know if you would like for us to call.

Regarding the electrical service: Ciminelli will be responsible for hooking up their own breaker and conduit up to the top of the pole. Alliant will run the remaining wire and hook up at no cost. Joe Henerson will be glad to meet with contractor and show them what need

Rec'd ENV 1-23-98 -008 EQ BASIN

98-19

c: Jake
Kelley
Olsen
ENV files
Barker

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

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,

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

5962141
Bitte

Richardson, Robert

From: Compton, Christel
Sent: Monday, December 22, 1997 1:40 PM
To: 'Gutterman, Marc D NAO02'; Richardson, Robert; Bishop, Mark
Cc: Redder, Jerome
Subject: EQ Basin Closure

Enclosed is a brief telephone log of a December 19, 1997 conversation with Debbie Miller, DEQ regarding the Risk-Based Closure Amendment and basin resampling results. Ms. Miller will not be able to review for at least 30 days. It is anticipated that the data will be acceptable. However, if DEQ has not approved the amendment or data when **backfilling** activities are ready to begin, we suggest a meeting to discuss the next step in the project.

Miller FONE 121997.doc

If you have any questions, please contact myself or Jerry Redder. Thanks.

596941

RA-303 Rev. 8/77

c:

RADFORD ARMY AMMUNITION PLANT

ALLIANT TECHSYSTEMS

RADFORD, VIRGINIA

TELEPHONE CALL RECORD

CALL RECEIVED ( ) DATE 01/05/98 9:51 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.

EQ Basin

ALLIANTTECHSYSTEMS

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 0.330 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

Site 10
EQ Basin
596294-1

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 $1x10^{-06}$ and cumulative carcinogenic risk of $1x10^{-04}$. 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 requirement 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 modeling[1] 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 volitales 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 cm^2 for adults, which is the 50th percentile value for the arms, hands

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[1] *REAMS includes the unsaturated zone fate and transport model SESOIL. The purpose of running the model is two fold: a) rmine whether the contaminants will reach the groundwater table in next 30 years. b) calculate the risk associated with the ated concentration in the groundwater. For constituents with a promulgated MCL, the estimated concentration will be directl pared against the MCL. However, prior to running the SESOIL model the facility should obtain all the information identified on 62, of the Virginia guidance document. The closure report must include evaluation of model results (concentrations reaching th ndwater) 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 m^3/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 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 ([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:

$$RISK_c = CDI_{ingest} * SF_{ingest} + CDI_{derm} * SF_{derm} + CDI_{inhl\text{-}VOCs} * SF_{inh\text{-}VOCs} + CDI_{inh\text{-}part} * Sf_{inh\text{-}part}$$

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

$$Hi_c = CDI_{ingest}/RfD_{ingest} + CDI_{derm}/RfD_{derm} + CDI_{inhal\text{-}VOCs}/RfD_{inhal\text{-}VOCs} + CDI_{inh\text{-}part}/RfD_{inh\text{-}part}$$

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

Exposure Route	Chronic Daily Intake (CDI), mg/L-day	
	Residential Exposure	Occupational/Industrial Exposure
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	$\frac{PEF \times IRA_c \times ET \times EF \times ED_c}{}$	$\frac{PEF \times IRA_a \times ET \times EF_o \times ED_o}{}$

Exposure Route	Chronic Daily Intake (CDI), mg/L-day	
	Residential Exposure	Occupational/Industrial Exposure
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	Volatilazation 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.

EQ Basin

ALLIANT TECHSYSTEMS

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December 18, 1997

97-815-264

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

Subject: Revised Sampling Results
Closure of Equalization Basin HWMU 10
Radford Army Ammunition Plant
EPA ID # VA1210020730

Dear Ms. Miller:

Enclosed are revised analytical results for the Equalization Basin at the Radford Army Ammunition Plant to supplement the results submitted to the Department on January 28, 1997 in the "Site Investigation/Evaluation, BioPlant Equalization Basin Closure Site Investigation/Evaluation, Radford Army Ammunition Plant." In this report, three samples required dilution for SW-846 Methods 8090, 8121, and 8080A due to matrix interferences for which the non-detected results were not statistically similar to background. Although a duplicate was collected for one of the three locations, results from the remaining two locations, Basin Grid #1 and Grid #10, were not within the background constituent limits. In a telephone discussion with you regarding these results, Jerry Redder suggested we resample Basin Grid #1 and Grid #10.

Therefore, on November 11, 1997, Arne Olsen and Christel Compton of Alliant Techsystems, Inc. reconstructed the sampling grid used to collect the original basin samples in September 1996 and resampled Basin Grid #1 and Grid #10. In the process of collecting these samples, it appears the original sample collection effort included collection of part of the liner material. The liner is constructed of a soil/concrete material placed on top of a sealant which prevents moisture from moving to the soils beneath the liner. This sealant is a tar-based material which would account for the fluoranthene concentration identified in the January 1997 report. The liner materials will be removed during closure activities. A risk-based closure amendment will be submitted to the Department and a risk assessment performed to address the fluoranthene previously identified.

The samples were collected beneath the liner and analyzed using Methods 8090, 8121, and 8080A. The quality controls measures outlined in the closure plan were included as part of this sampling effort. All results were non-detect. Alliant would like to suggest these revised results be substituted for Grid #1 and Grid #10 results for the indicated methods in the January 1997 submission.

Site 10
EQ Basin
596941

If you have any questions or would like additional information, please contact J. Redder (540)639-7536 or C. Compton (540)639-8211.

Sincerely,

C.A. Jake, Supervisor
Environmental Affairs

Enclosure

cc. M. Scott, West Central Regional Office - Roanoke
M.D. Gutterman, Norfolk Corps of Engineers

Coordination: R. L. Richardson
M. L. Griffith

bc: Adm. File
Env. File
R.L. Richardson, ACO
J. J. Redder
C. A. Jake
C. E. Compton

ALLIANT TECHSYSTEMS INC.
P O BOX 1
RADFORD VIRGINIA 24141

REIC JOB #: 1197-56372
PROJECT ID: EQ BASIN (UNIT 10)
CUSTODY NO.: 56860 AND 56861

Prepared By:
REI Consultants, Inc.
P O Box 286
Beaver WV 25813

Phone: 304-255-2500
800-999-0105
Fax: 304-255-2572

ALLIANT SAMPLE #: GRID 1
REIC SAMPLE #: 56372-1

DATE SAMPLED: 11-11-97
MATRIX: SOLID
MOISTURE: 19%

SEMIVOLATILE ORGANIC COMPOUNDS

PARAMETER	RESULT	UNIT	METHOD	MQL	ANALYZED/BY
2,4-dinitrotoluene	ND	ug/kg	8090	12	11-22-97/JA
2,6-dinitrotoluene	ND	ug/kg	8090	12	11-22-97/JA

Surrogate	% Recovery
tetrachloro-m-xylene	36

SEMIVOLATILE ORGANIC COMPOUNDS

PARAMETER	RESULT	UNIT	METHOD	MQL	ANALYZED/BY
hexachloroethane	ND	ug/kg	8121	4	11-22-97/JA
hexachlorocyclopentadiene	ND	ug/kg	8121	4	11-22-97/JA
hexachlorobenzene	ND	ug/kg	8121	4	11-22-97/JA

Surrogate	% Recovery
tetrachloro-m-xylene	27

PCBs

PARAMETER	RESULT	UNIT	METHOD	MQL	ANALYZED/BY
arochlor 1016	ND	ug/kg	8080A	40	11-20-97/JA
arochlor 1221	ND	ug/kg	8080A	81	11-20-97/JA
arochlor 1232	ND	ug/kg	8080A	40	11-20-97/JA
arochlor 1242	ND	ug/kg	8080A	40	11-20-97/JA
arochlor 1248	ND	ug/kg	8080A	40	11-20-97/JA
arochlor 1254	ND	ug/kg	8080A	40	11-20-97/JA
arochlor 1260	ND	ug/kg	8080A	40	11-20-97/JA

Surrogate	% Recovery
tetrachloro-m-xylene	96

ND - None Detected at MQL
MQL - Minimum Quantifying Level

ALLIANT SAMPLE #: GRID 1
REIC SAMPLE #: 56372-1

DATE SAMPLED: 11-11-97
MATRIX: SOLID
MOISTURE: 19%

SEMIVOLATILE ORGANIC COMPOUNDS

PARAMETER	RESULT	UNIT	METHOD	MQL	ANALYZED/BY
aldrin	ND	ug/kg	8080A	2	11-20-97/JA
chlordane	ND	ug/kg	8080A	20	11-20-97/JA
dieldrin	ND	ug/kg	8080A	4	11-20-97/JA
endosulfan I	ND	ug/kg	8080A	2	11-20-97/JA
endosulfan II	ND	ug/kg	8080A	4	11-20-97/JA
endrin	ND	ug/kg	8080A	4	11-20-97/JA
heptachlor	ND	ug/kg	8080A	2	11-20-97/JA
heptachlor epoxide	ND	ug/kg	8080A	2	11-20-97/JA
methoxychlor	ND	ug/kg	8080A	20	11-20-97/JA
toxaphene	ND	ug/kg	8080A	200	11-20-97/JA

Surrogate	% Recovery
tetrachloro-m-xylene	96

ND - None Detected at MQL
MQL - Minimum Quantifying Level

ALLIANT SAMPLE #: GRID 10
REIC SAMPLE #: 56372-2

DATE SAMPLED: 11-11-97
MATRIX: SOLID
MOISTURE: 20%

SEMIVOLATILE ORGANIC COMPOUNDS

PARAMETER	RESULT	UNIT	METHOD	MQL	ANALYZED/BY
2,4-dinitrotoluene	ND	ug/kg	8090	12	11-22-97/JA
2,6-dinitrotoluene	ND	ug/kg	8090	12	11-22-97/JA

Surrogate	% Recovery
tetrachloro-m-xylene	43

SEMIVOLATILE ORGANIC COMPOUNDS

PARAMETER	RESULT	UNIT	METHOD	MQL	ANALYZED/BY
hexachloroethane	ND	ug/kg	8121	4	11-22-97/JA
hexachlorocyclopentadiene	ND	ug/kg	8121	4	11-22-97/JA
hexachlorobenzene	ND	ug/kg	8121	4	11-22-97/JA

Surrogate	% Recovery
tetrachloro-m-xylene	49

PCBs

PARAMETER	RESULT	UNIT	METHOD	MQL	ANALYZED/BY
arochlor 1016	ND	ug/kg	8080A	40	11-20-97/JA
arochlor 1221	ND	ug/kg	8080A	81	11-20-97/JA
arochlor 1232	ND	ug/kg	8080A	40	11-20-97/JA
arochlor 1242	ND	ug/kg	8080A	40	11-20-97/JA
arochlor 1248	ND	ug/kg	8080A	40	11-20-97/JA
arochlor 1254	ND	ug/kg	8080A	40	11-20-97/JA
arochlor 1260	ND	ug/kg	8080A	40	11-20-97/JA

Surrogate	% Recovery
tetrachloro-m-xylene	93

ND - None Detected at MQL
MQL - Minimum Quantifying Level

ALLIANT SAMPLE #: GRID 10
REIC SAMPLE #: 56372-2

DATE SAMPLED: 11-11-97
MATRIX: SOLID
MOISTURE: 20%

SEMIVOLATILE ORGANIC COMPOUNDS

PARAMETER	RESULT	UNIT	METHOD	MQL	ANALYZED/BY
aldrin	ND	ug/kg	8080A	2	11-20-97/JA
chlordane	ND	ug/kg	8080A	20	11-20-97/JA
dieldrin	ND	ug/kg	8080A	4	11-20-97/JA
endosulfan I	ND	ug/kg	8080A	2	11-20-97/JA
endosulfan II	ND	ug/kg	8080A	4	11-20-97/JA
endrin	ND	ug/kg	8080A	4	11-20-97/JA
heptachlor	ND	ug/kg	8080A	2	11-20-97/JA
heptachlor epoxide	ND	ug/kg	8080A	2	11-20-97/JA
methoxychlor	ND	ug/kg	8080A	20	11-20-97/JA
toxaphene	ND	ug/kg	8080A	200	11-20-97/JA

Surrogate	% Recovery
tetrachloro-m-xylene	93

ND - None Detected at MQL
MQL - Minimum Quantifying Level

ALLIANT SAMPLE #: EQUIPMENT BLANK **DATE SAMPLED:** 11-11-97
REIC SAMPLE #: 56372-3 **MATRIX:** LIQUID

SEMIVOLATILE ORGANIC COMPOUNDS

PARAMETER	RESULT	UNIT	METHOD	MQL	ANALYZED/BY
2,4-dinitrotoluene	ND	ug/l	8090	12	11-22-97/JA
2,6-dinitrotoluene	ND	ug/l	8090	12	11-22-97/JA

Surrogate	% Recovery
tetrachloro-m-xylene	*2

SEMIVOLATILE ORGANIC COMPOUNDS

PARAMETER	RESULT	UNIT	METHOD	MQL	ANALYZED/BY
hexachloroethane	ND	ug/l	8121	4	11-22-97/JA
hexachlorocyclopentadiene	ND	ug/l	8121	4	11-22-97/JA
hexachlorobenzene	ND	ug/l	8121	4	11-22-97/JA

Surrogate	% Recovery
tetrachloro-m-xylene	*7

PCBs

PARAMETER	RESULT	UNIT	METHOD	MQL	ANALYZED/BY
arochlor 1016	ND	ug/l	8080A	40	11-20-97/JA
arochlor 1221	ND	ug/l	8080A	81	11-20-97/JA
arochlor 1232	ND	ug/l	8080A	40	11-20-97/JA
arochlor 1242	ND	ug/l	8080A	40	11-20-97/JA
arochlor 1248	ND	ug/l	8080A	40	11-20-97/JA
arochlor 1254	ND	ug/l	8080A	40	11-20-97/JA
arochlor 1260	ND	ug/l	8080A	40	11-20-97/JA

Surrogate	% Recovery
tetrachloro-m-xylene	*12

ND - None Detected at MQL
MQL - Minimum Quantifying Level
* - Surrogate recovery exceeds REIC control limits due to loss of extract during EPA Method 3510 liquid-liquid extraction.

ALLIANT SAMPLE #: EQUIPMENT BLANK **DATE SAMPLED:** 11-11-97
REIC SAMPLE #: 56372-3 **MATRIX:** LIQUID

SEMIVOLATILE ORGANIC COMPOUNDS

PARAMETER	RESULT	UNIT	METHOD	MQL	ANALYZED/BY
aldrin	ND	ug/l	8080A	2	11-20-97/JA
chlordane	ND	ug/l	8080A	20	11-20-97/JA
dieldrin	ND	ug/l	8080A	4	11-20-97/JA
endosulfan I	ND	ug/l	8080A	2	11-20-97/JA
endosulfan II	ND	ug/l	8080A	4	11-20-97/JA
endrin	ND	ug/l	8080A	4	11-20-97/JA
heptachlor	ND	ug/l	8080A	2	11-20-97/JA
heptachlor epoxide	ND	ug/l	8080A	2	11-20-97/JA
methoxychlor	ND	ug/l	8080A	20	11-20-97/JA
toxaphene	ND	ug/l	8080A	200	11-20-97/JA

Surrogate	% Recovery
tetrachloro-m-xylene	*12

ND - None Detected at MQL
MQL - Minimum Quantifying Level
* - Surrogate recovery exceeds REIC control limits due to loss of extract during EPA Method 3510 liquid-liquid extraction.

ALLIANT SAMPLE #: FIELD BLANK **DATE SAMPLED:** 11-11-97
REIC SAMPLE #: 56372-4 **MATRIX:** LIQUID

SEMIVOLATILE ORGANIC COMPOUNDS

PARAMETER	RESULT	UNIT	METHOD	MQL	ANALYZED/BY
2,4-dinitrotoluene	ND	ug/l	8090	12	11-22-97/JA
2,6-dinitrotoluene	ND	ug/l	8090	12	11-22-97/JA

Surrogate	% Recovery
tetrachloro-m-xylene	49

SEMIVOLATILE ORGANIC COMPOUNDS

PARAMETER	RESULT	UNIT	METHOD	MQL	ANALYZED/BY
hexachloroethane	ND	ug/l	8121	4	11-22-97/JA
hexachlorocyclopentadiene	ND	ug/l	8121	4	11-22-97/JA
hexachlorobenzene	ND	ug/l	8121	4	11-22-97/JA

Surrogate	% Recovery
tetrachloro-m-xylene	68

PCBs

PARAMETER	RESULT	UNIT	METHOD	MQL	ANALYZED/BY
arochlor 1016	ND	ug/l	8080A	40	11-20-97/JA
arochlor 1221	ND	ug/l	8080A	81	11-20-97/JA
arochlor 1232	ND	ug/l	8080A	40	11-20-97/JA
arochlor 1242	ND	ug/l	8080A	40	11-20-97/JA
arochlor 1248	ND	ug/l	8080A	40	11-20-97/JA
arochlor 1254	ND	ug/l	8080A	40	11-20-97/JA
arochlor 1260	ND	ug/l	8080A	40	11-20-97/JA

Surrogate	% Recovery
tetrachloro-m-xylene	105

ND - None Detected at MQL
MQL - Minimum Quantifying Level

ALLIANT SAMPLE #: FIELD BLANK **DATE SAMPLED:** 11-11-97
REIC SAMPLE #: 56372-4 **MATRIX:** LIQUID

SEMIVOLATILE ORGANIC COMPOUNDS

PARAMETER	RESULT	UNIT	METHOD	MQL	ANALYZED/BY
aldrin	ND	ug/l	8080A	2	11-20-97/JA
chlordane	ND	ug/l	8080A	20	11-20-97/JA
dieldrin	ND	ug/l	8080A	4	11-20-97/JA
endosulfan I	ND	ug/l	8080A	2	11-20-97/JA
endosulfan II	ND	ug/l	8080A	4	11-20-97/JA
endrin	ND	ug/l	8080A	4	11-20-97/JA
heptachlor	ND	ug/l	8080A	2	11-20-97/JA
heptachlor epoxide	ND	ug/l	8080A	2	11-20-97/JA
methoxychlor	ND	ug/l	8080A	20	11-20-97/JA
toxaphene	ND	ug/l	8080A	200	11-20-97/JA

Surrogate	% Recovery
tetrachloro-m-xylene	105

ND - None Detected at MQL
MQL - Minimum Quantifying Level

ALLIANT SAMPLE #: TRIP BLANK **DATE SAMPLED:** 11-11-97
REIC SAMPLE #: 56372-5 **MATRIX:** LIQUID

SEMIVOLATILE ORGANIC COMPOUNDS

PARAMETER	RESULT	UNIT	METHOD	MQL	ANALYZED/BY
2,4-dinitrotoluene	ND	ug/l	8090	12	11-22-97/JA
2,6-dinitrotoluene	ND	ug/l	8090	12	11-22-97/JA

Surrogate	% Recovery
tetrachloro-m-xylene	44

SEMIVOLATILE ORGANIC COMPOUNDS

PARAMETER	RESULT	UNIT	METHOD	MQL	ANALYZED/BY
hexachloroethane	ND	ug/l	8121	4	11-22-97/JA
hexachlorocyclopentadiene	ND	ug/l	8121	4	11-22-97/JA
hexachlorobenzene	ND	ug/l	8121	4	11-22-97/JA

Surrogate	% Recovery
tetrachloro-m-xylene	53

PCBs

PARAMETER	RESULT	UNIT	METHOD	MQL	ANALYZED/BY
arochlor 1016	ND	ug/l	8080A	40	11-20-97/JA
arochlor 1221	ND	ug/l	8080A	81	11-20-97/JA
arochlor 1232	ND	ug/l	8080A	40	11-20-97/JA
arochlor 1242	ND	ug/l	8080A	40	11-20-97/JA
arochlor 1248	ND	ug/l	8080A	40	11-20-97/JA
arochlor 1254	ND	ug/l	8080A	40	11-20-97/JA
arochlor 1260	ND	ug/l	8080A	40	11-20-97/JA

Surrogate	% Recovery
tetrachloro-m-xylene	74

ND - None Detected at MQL
MQL - Minimum Quantifying Level

ALLIANT SAMPLE #: TRIP BLANK **DATE SAMPLED:** 11-11-97
REIC SAMPLE #: 56372-5 **MATRIX:** LIQUID

SEMIVOLATILE ORGANIC COMPOUNDS

PARAMETER	RESULT	UNIT	METHOD	MQL	ANALYZED/BY
aldrin	ND	ug/l	8080A	2	11-20-97/JA
chlordane	ND	ug/l	8080A	20	11-20-97/JA
dieldrin	ND	ug/l	8080A	4	11-20-97/JA
endosulfan I	ND	ug/l	8080A	2	11-20-97/JA
endosulfan II	ND	ug/l	8080A	4	11-20-97/JA
endrin	ND	ug/l	8080A	4	11-20-97/JA
heptachlor	ND	ug/l	8080A	2	11-20-97/JA
heptachlor epoxide	ND	ug/l	8080A	2	11-20-97/JA
methoxychlor	ND	ug/l	8080A	20	11-20-97/JA
toxaphene	ND	ug/l	8080A	200	11-20-97/JA

Surrogate	% Recovery
tetrachloro-m-xylene	74

ND - None Detected at MQL
MQL - Minimum Quantifying Level

DATE 12-4-97 APPROVED Janet M Satterfield
Janet M. Satterfield

CHAIN OF CUSTODY RECORD NO. 5[illegible]11

REIC Laboratory
225 Industrial Park Rd.
P.O. Box 286, Beaver, WV 25813
Phone: 304-255-2500 or 800-999-0105
FAX: 304-255-2572

CLIENT: Alliant Techsystems Inc.
ADDRESS: P.O. Box 1
CITY/STATE/ZIP: Radford, VA 24141
BILL TO: Same
CITY/STATE/ZIP: —

CONTACT PERSON: Christel Compton
TELEPHONE/FAX: 540/639-8211 fax 7214
SITE ID & STATE:
PROJECT ID: EQ Basin (Unit ID)
SAMPLER: C. Compton

SAMPLE LOG AND ANALYSIS REQUEST

TURNAROUND TIME REQUIREMENTS
REGULAR: ✓
*RUSH: ___ 5-Day ___ 3-Day ___ 2-Day ___ 1-Day
*Rush work needs prior Laboratory approval and will include surcharges

PRESERVATIVES
0 No Preservative
1 Hydrochloric Acid
2 Nitric Acid
3 Sulfuric Acid
4 Sodium Thiosulfate
5 Sodium Hydroxide
6 Zinc Acetate
7 EDTA

PRESERVATIVE CODES — NOTE PRESERVATIVES →

SAMPLE ID	NO. & TYPE OF CONTAINERS	SAMPLING DATE / TIME	MATRIX	SAMPLE COMP / GRAB	2,4-Dinitrotoluene - 8090	2,6-Dinitrotoluene - 8090	Hexachlorobenzene - 8121	Hexachlorocyclopentadiene - 8121	Hexachloroethane - 8121	Aldrin - 3050A	Chlordane - 3050A	Dieldrin - 3050A	Endosulfan I - 3050A	Endosulfan II - 3050A	Endrin - 3050A	Heptachlor - 3050A	Heptachlor Epoxide - 3050A	Methoxychlor 3050A	COMMENTS
Grid 1	3 glass	11/11/97	Soil	Grab	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Grid 10	3 glass	11/11/97	Soil	Grab	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Equipment Blank	3 glass	11/11/97	H_2O	Grab	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Field Blank	3 glass	11/11/97	H_2O	Grab	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Trip Bank	3 glass	11/11/97	H_2O	Grab	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
					✓														

Christel Compton — Relinquished by: (Signature) — 11/11/97 Date/Time — Received by: (Signature)
Date/Time — Relinquished by: (Signature) — Date/Time — Received by: (Signature) — 11-14-97 11:45 Date/Time

Special Requests: Note Background PAL's Attached !!
Sample Condition: Good? Y N
Temperature Upon Arrival 4.3 °C

Shipment: Hand Del: Courier: UPS: FedEx:
Shipment Date: FAX Results: Y N

CHAIN OF CUSTODY RECORD NO. [illegible]

REIC Laboratory
225 Industrial Park Rd.
P.O. Box 286, Beaver, WV 25813
Phone: 304-255-2500 or 800-999-0105
FAX: 304-255-2572

CLIENT: Alliant Techsystems Inc.
ADDRESS: P.O. Box 1
CITY/STATE/ZIP: Radford, VA 24141
BILL TO: Same
CITY/STATE/ZIP:

CONTACT PERSON: Christel Compton
TELEPHONE/FAX: 540/639-8211
SITE ID & STATE:
PROJECT ID: EQ Basin (Unit 10)
SAMPLER: C. Compton

SAMPLE LOG AND ANALYSIS REQUEST

TURNAROUND TIME REQUIREMENTS
REGULAR: ✓
*RUSH: ___ 5-Day ___ 3-Day ___ 2-Day ___ 1-Day
*Rush work needs prior Laboratory approval and will include surcharges

PRESERVATIVES
0 No Preservative
1 Hydrochloric Acid
2 Nitric Acid
3 Sulfuric Acid
4 Sodium Thiosulfate
5 Sodium Hydroxide
6 Zinc Acetate
7 EDTA

PRESERVATIVE CODES — NOTE PRESERVATIVES →

SAMPLE ID	NO. & TYPE OF CONTAINERS	SAMPLING DATE / TIME	MATRIX	SAMPLE COMP / GRAB	Aroclor 1016 8080A	Aroclor 1221 8080A	Aroclor 1232 8080A	Aroclor 1242 8080A	Aroclor 1248 8080A	Aroclor 1254 8080A	Aroclor 1260 8080A	Toxaphene 8080A	COMMENTS
Grid 1	3 glass	11/11/97	Soil	Grab	✓	✓	✓	✓	✓	✓	✓	✓	
Grid 10	3 glass	"	Soil	"	✓	✓	✓	✓	✓	✓	✓	✓	
Equip. Blank	3 glass	"	H_2O	"	✓	✓	✓	✓	✓	✓	✓	✓	
Field Blank	3 glass	"	H_2O	"	✓	✓	✓	✓	✓	✓	✓	✓	
Trip Blank	3 glass	"	H_2O	"	✓	✓	✓	✓	✓	✓	✓	✓	

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
Christel Compton	11/11/97						

Special Requests: Note Background PQL's Attached!
Sample Condition: Good? Y N
Temperature Upon Arrival °C

Shipment: Hand-Del: Courier: UPS: FedEx:
Shipment Date: FAX Results: Y N

Unit 10
Closure Analytical Results
Laboratory PQLs
Closure Plan

Parameter	Background (ppb)	Method	Limit (ppb)
2,4-Dinitrotoluene	< 12	8090	12
2,6-Dinitrotoluene	< 12	8090	12
Hexachlorobenzene	< 4.0	8121	4
Hexachlorocyclopentadiene	< 4.0	8121	4
Hexachloroethane	< 4.0	8121	4
Aldrin	< 2.0	8080A	2
Chlordane	< 20	8080A	20
Dieldrin	< 4.0	8080A	4
Endosulfan I	< 2.0	8080A	2
Endosulfan II	< 4.0	8080A	4
Endrin	< 4.0	8080A	4
Heptachlor	< 2.0	8080A	2
Hepatachlor epoxide	< 2.0	8080A	2
Methoxychlor	< 20	8080A	20
Arochlor 1016	< 40	8080A	40
Arochlor 1221	< 81	8080A	81
Arochlor 1232	< 40	8080A	40
Arochlor 1242	< 40	8080A	40
Arochlor 1248	< 40	8080A	40
Arochlor 1254	< 40	8080A	40
Arochlor 1260	< 40	8080A	40
Toxaphene	< 200	8080A	200

EQ BASIN

Richardson, Robert

From: Goodnight, Rex
Sent: Thursday, November 06, 1997 10:01 AM
To: Richardson, Robert; Barker, Shelley
Subject: FW: EQ Basin Closure

FYI

From: Meals, Thomas A NAO02[SMTP:Thomas.A.Meals@NAO02.USACE.ARMY.MIL]
Sent: Thursday, November 06, 1997 9:35 AM
To: 'Goodnight, Rex'
Cc: Blackburn, Joseph W NAO02
Subject: RE: EQ Basin Closure

Randolph -

The contractor (Ciminelli) has now confirmed his bid to Contracting Division and the award package is being finalized to make award by Friday, 7 Nov 97.

Hope this helps. Please call if you have questions.

Tom M.
6 Nov 97

-----Original Message-----
From: Goodnight, Rex [SMTP:Rex_Goodnight@atk.com]
Sent: Wednesday, November 05, 1997 1:01 PM
To: Meals, Thomas A NAO02
Cc: Evans, Randolph; 'Joseph.W.Blackburn@usace.army.mil'
Subject: RE: EQ Basin Closure

Tom,

We need to stay on schedule with the award of this project. By the time the contractor receives a NTP, mobilizes, and removes the liner, the sampling data should be in order. The first priority is removing the liner. The lab issue is independent of the liner removal.

Once the liner is removed, we will have a bargaining lever to extend our consent order date if required. Our current compliance date is May 7, 1998.

Please advise me if you need additional information to keep this project moving.

Thanks,

Rex

From: Meals, Thomas A NAO02[SMTP:Thomas.A.Meals@NAO02.USACE.ARMY.MIL]
Sent: Wednesday, November 05, 1997 7:14 AM

59529-1

To: Gutterman, Marc D NAO02
Cc: Blackburn, Joseph W NAO02; 'Goodnight, Rex'
Subject: RE: EQ Basin Closure

Marc -

Obviously this needs to be resolved and it appears you are headed in that direction. We must continue. If this were to be cause for a modification to the construction contract, then that will have to be dealt with. Meanwhile the Contractor has confirmed his bid and we are looking to make award likely by Friday, 7 November.

Please keep the field office and me advised.

Thanks.

Tom M.
5 Nov 97

-----Original Message-----
From: Gutterman, Marc D NAO02
Sent: Tuesday, November 04, 1997 9:09 AM
To: Meals, Thomas A NAO02
Cc: Byrne, Matthew T NAO02; Lantz, Steven M NAO02; 'Jerry Redder'
Subject: FW: EQ Basin Closure

Tom - I received this E-mail from Jerry Redder yesterday afternoon. I just got off a conference call with Jerry Redder, Arne Olsen, Bob Richardson, and Christel Compton at RAAP. It appears that VDEQ is not going to accept our subsoil confirmation data. We had three samples that experienced matrix interference from some unknown non-chlorinated hydrocarbon. VDEQ initially requested additional documentation, so Radian provided a memo from the lab and the lab's back-up worksheets. By all indications the matrix interference occurred as a result of some hydrocarbon, most likely from the asphaltic liner. Since the lab diluted the samples to try and see through the matrix interference, VDEQ appears to be not willing to accept the results of those samples. We have QC data for one of the diluted samples that indicates it is OK. Unfortunately, we do not have that back-up for the others.

During our conference call, it was decided that Alliant would go to the two locations with the suspect data and collect a sample from the same depth. Depending on the results we will then present the new data to VDEQ or come up with a different plan. This presents a problem since we have already received bids. How long is a Contractor's bid good for? It will take approximately 30 days to receive the new data and depending on the results even longer for VDEQ concurrence or non-concurrence. In the event we do not receive favorable results from the resampling, then VDEQ will most likely require a Risk Assessment (REAMS) be run. This will take additional time.

Please advise, as we are proceeding with the sample collection and analysis. - Marc

-----Original Message-----
From: Redder, Jerome [SMTP:Jerome_Redder@ATK.COM]
Sent: Monday, November 03, 1997 3:57 PM
To: Gutterman, Marc D NAO02

Cc: Richardson, Robert; Compton, Christel
Subject: EQ Basin Closure

Marc:
Bob Richardson and I will try to call you tomorrow morning concerning the results from the subsurface investigation. The two samples with the 'matrix interference" may cause DEQ a concern. We'll call around 7:30 AM EST .

EQ Basin

Richardson, Robert

From: Goodnight, Rex
Sent: Wednesday, November 05, 1997 8:04 AM
To: Richardson, Robert
Cc: Barker, Shelley
Subject: FW: EQ Basin Closure

Bob,
Should this hold up award of the contract? Why can't they award, mobilize, and start removing the liner? During this time the sampling issue should be resolved and closure completed. Please advise.
Rex

From: Meals, Thomas A NAO02[SMTP:Thomas.A.Meals@NAO02.USACE.ARMY.MIL]
Sent: Wednesday, November 05, 1997 7:14 AM
To: Gutterman, Marc D NAO02
Cc: Blackburn, Joseph W NAO02; 'Goodnight, Rex'
Subject: RE: EQ Basin Closure

Marc -

Obviously this needs to be resolved and it appears you are headed in that direction. We must continue. If this were to be cause for a modification to the construction contract, then that will have to be dealt with. Meanwhile the Contractor has confirmed his bid and we are looking to make award likely by Friday, 7 November.

Please keep the field office and me advised.

Thanks.

Tom M.
5 Nov 97

-----Original Message-----
From: Gutterman, Marc D NAO02
Sent: Tuesday, November 04, 1997 9:09 AM
To: Meals, Thomas A NAO02
Cc: Byrne, Matthew T NAO02; Lantz, Steven M NAO02; 'Jerry Redder'
Subject: FW: EQ Basin Closure

Tom - I received this E-mail from Jerry Redder yesterday afternoon. I just got off a conference call with Jerry Redder, Arne Olsen, Bob Richardson, and Christel Compton at RAAP. It appears that VDEQ is not going to accept our subsoil confirmation data. We had three samples that experienced matrix interference from some unknown non-chlorinated hydrocarbon. VDEQ initially requested additional documentation, so Radian provided a memo from the lab and the lab's back-up worksheets. By all indications the matrix interference occurred as a result of some hydrocarbon, most likely from the asphaltic liner. Since the lab diluted the samples to try and see through the matrix interference, VDEQ appears to be not willing to accept the results of those samples. We have QC data for one of the diluted samples that indicates it is OK. Unfortunately, we do not have that back-up for he others.

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5963 74

locations with the suspect data and collect a sample from the same depth. Depending on the results we will then present the new data to VDEQ or come up with a different plan. This presents a problem since we have already received bids. How long is a Contractor's bid good for? It will take approximately 30 days to receive the new data and depending on the results even longer for VDEQ concurrence or non-concurrence. In the event we do not receive favorable results from the resampling, then VDEQ will most likely require a Risk Assessment (REAMS) be run. This will take additional time.

Please advise, as we are proceeding with the sample collection and analysis. - Marc

-----Original Message-----
From: Redder, Jerome [SMTP:Jerome_Redder@ATK.COM]
Sent: Monday, November 03, 1997 3:57 PM
To: Gutterman, Marc D NAO02
Cc: Richardson, Robert; Compton, Christel
Subject: EQ Basin Closure

Marc:
Bob Richardson and I will try to call you tomorrow morning concerning the results from the subsurface investigation. The two samples with the 'matrix interference" may cause DEQ a concern. We'll call around 7:30 AM EST .

EQ Basin

Richardson, Robert

From: Compton, Christel
Sent: Tuesday, November 04, 1997 10:10 AM
To: Redder, Jerome; Richardson, Robert
Subject: EQ Basin-Phone log with marc Gutterman

Enclosed is a telephone log summarizing our conversation with Marc Gutterman this morning (11/04/97). Arne and I are seting up the sampling event. Call if you have any questions.

Corps FONE 110497.doc

RA-303 Rev. 8/77

RADFORD ARMY AMMUNITION PLANT

ALLIANT TECHSYSTEMS

RADFORD, VIRGINIA

TELEPHONE CALL RECORD

CALL RECEIVED ( ) DATE 11/04/97 7:40am

CALL PLACED (X) BY: JERRY REDDER

NAME OF PARTY Marc Gutterman

COMPANY OR ORGANIZATION Corps of Engineers

ADDRESS Virginia

SUBJECT OF CALL Equalization Basin (Unit 10)

757-441-7669

SUMMARY OF CONVERSATION

Jerry Redder, Bob Richardson, Arne Olsen, and Christel Compton were in attendance. On October 16, 1997, Debra Miller, DEQ sent an E-Mail expressing concern over the dilutions in the basin samples, especially basin grid sample numbers 1 and 10. Even though the samples are reported as being non-detect, the PQLs are not statistically similar. Alliant reviewed the data and found that only three methods were affected by this dilution - Methods 8090, 8080A, and 8121. Alliant suggested to Marc that we resample basin sample grid numbers 1 and 10 for the three methods listed above at a cost of less than $4,000. Alliant will use some of the oversight funds to complete the sampling effort. If the results of the resampling effort indicate non-detects in the background PQL range, then we will use that data for closure, heading off any contention from DEQ over the original data. By resampling now, this would also assist the Corps in keeping the project on schedule.

Jerry and Marc discussed using the RBC table to evaluate risk of those HCOCs not within the background PQL range. Jerry reminded Marc that the RBCs can be used as a screening tool. However, DEQ requires a risk assessment using REAMS. Marc said he would need to discuss the resampling with his boss but it sounded fine to him. Alliant will make preparations to sample and begin sampling upon the Corps approval. The results should be back within two weeks of sampling. Marc will be on vacation 11/24/97 to 12/7/97.

A discussion ensued of the Risk-Based Closure Amendment and DEQs withdrawal of only submitting a letter to address fluoranthene. Alliant offered to submit a generic risk-based closure amendment that was approved in the last month to Marc for review. DEQ and Alliant would like to keep these amendments somewhat flexible so that if additional HCOCs need to be included in the risk assessment, the closure plan does not have to be amended. Christel to send the amendment to Marc. He will review and send back to Alliant for submittal to DEQ.

Recvd ENV 11-4-97-ads EQ BASIN
Extension to MAY 7, 199
97-182 c: Jake
Ridder
Olsen
B. Richardson-RC
ENV file

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

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.

596294/
E/

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

EQ BASIN Bob Richardson ARNC Christel

COMMONWEALTH of VIRGINIA

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Thomas L. Hopkins
Director

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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.

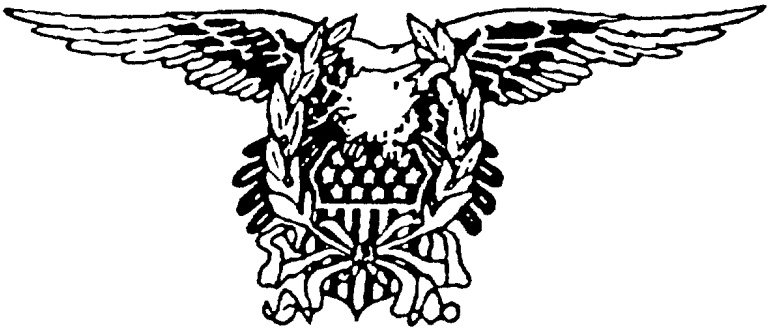
Sincerely,

Debra A. Miller
Environmental Engineer Senior

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

5902+1

RADFORD ARMY AMMUNITION PLANT



RADFORD, VIRGINIA

FAX NUMBERS
(540) 639-8635
DSN 931-8635

TO: Tom Meals **DATE:** 27 Oct 97

FAX NO: (757)441-7813 **TIME:** _____

ATTN: _____ **EXT:** 7682

FROM: Bob Richardson **EXT:** (540)639-8641

NUMBER OF PAGES: 4+1

REMARKS: Tom, Would you please give A copy of the DEQ letter to Marc Gutterman. This is the DEQ letter approving the background data for the EQ BASIN.

Bob Richardson

****
***** ACTIVITY REPORT *****
****

TRANSMISSION OK

TX/RX NO.	1890
CONNECTION TEL	9p1p757p4417813
CONNECTION ID	
START TIME	10/27 11:44
USAGE TIME	00'53
PAGES	2
RESULT	OK

EQ Basin

DEQ Background Approve

Richardson, Robert

From: Redder, Jerome
Sent: Tuesday, October 21, 1997 4:34 PM
To: Davie, Robert; 'Marc Gutterman, Corps of Engineers'; Richardson, Robert
Cc: Olsen, Arne; Compton, Christel
Subject: EQ basin background

Looks like background will be approved. I suggest that the subsurface samples be reviewed for detection limits that exceed the background detection limits.

From: damiller@deq.state.va.us[SMTP:damiller@deq.state.va.us]
Sent: Friday, October 17, 1997 10:19 AM
To: Jerome_Redder@ATK.COM
Subject: #10

Eqq Basin background got okay for approval. I will be sending the letter out next Tues morning.

REX GOODNIGHT → FAX : 540-639-8635

Site 10
EQ BASIN

IFB 97-B-0056

15 OCT. 97

BIO EQ BASIN CLOSURE, RAAP

	BIDDER	AMT
1.	D.R. Phillips Contr Co. Robinsville, NC	# 912,701.14
2.	Millbourn Constr. Co. Oak Ridge, TN	587,100.
3.	~~Koester Environmental Chattanooga, TN~~ APPARENT LOW BIDDER 10/15	520,449.
4.	Ciminelli Svcs Corp. Tonawanda, NY	324,720. X
5.	Environ Restor. Mgmt Svcs Fredericksburg, Va.	399,158. 2nd
6.	Earth Tech Remed. Long Beach, Calif	457,722.30 3rd
7.	All State Power Vac. Linden, N.J.	598,320.
8.	Natl Environ Corp Clear Creek, IND	476,759.
9.	WEL, Inc. Concord Va	494,804.

GOVT EST. # 621,421.

TOTAL P.01

ALLIANTTECHSYSTEMS

EQ Basin Extension Request

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

for C. A. Jake, Supervisor
Environmental Affairs

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

97-89
c: Jake
Ledder
Olsen
Barker
ENV file

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Thomas L. Hopkins
Director

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Certified Mail
Return Receipt Requested

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.

5102+

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