RAAP 050506\05001

RADFORD ARMY AMMUNITION PLANT
RADFORD, VIRGINIA

SWMU 54 Additional Characterization: Work Instructions

FINAL DOCUMENT
JULY 2004

PREPARED BY:

URS

5540 FALMOUTH STREET, SUITE 201
RICHMOND, VIRGINIA 23230
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ARCHITECT-ENGINEER SERVICES
CONTRACT NO. DACA31-00-D-0011
DELIVERY ORDER NO. 0027

ATK
ALLIANT TECHSYSTEMS

Radford Army Ammunition Plant
Route 114, P.O. Box 1
Radford, VA 24143-0100
USA

March 6, 2006

Mr. Robert Thomson
U. S. Environmental Protection Agency
Region III
1650 Arch Street
Philadelphia, PA 19103-2029

Subject: EPA letter dated February 27, 2006 Subject SWMU 54 Request for data
Radford Army Ammunition Plant
EPA ID# VA1 210020730

Dear Mr. Thomson:

We received the subject letter on March 1, 2006. Enclosed is the information you requested. Copies will be sent under separate cover to the Virginia Department of Environment Quality (DEQ), U.S. Army Environmental Center, and U.S Army Center for Health Promotion and Preventive Medicine.

Note on or about March 1, 2006 several copies of the briefing package for SWMU 54 was sent to your office and the DEQ under separate cover from URS Corporation (URS), the firm under contract to the Corps of Engineers, Baltimore District (COE) to study this site. We submitted the briefing package so that it could be distributed to your internal team to prepare them for our March 29 and 30, 2006 meeting at EPA Region III. While the briefing package does not contain the specific information you requested, we strongly believe it is sufficient to describe the effort expended and the data collected to date. The briefing package also describes in detail our proposal for executing the additional work we feel is needed to complete the ongoing RCRA Facility Investigation (RFI) and Corrective Measures Study (CMS) at SWMU 54.

Several points are raised in the subject letter suggest that Radford AAP is not in compliance and/or is in some way dilatory in our reporting requirements with the RCRA Corrective Action Permit (permit), effective October 31, 2000 and/or the Code of Federal Regulations (CFR). We feel that this may be due to a misunderstanding of the history of what has transpired at SWMU 54. The following information is provided to clarify these points.

II. Section J. Emergency Response; Release Reporting and Paragraph J.2 (page 33) Releases

A RFI/CMS effort has been ongoing intermittently since 1996, in compliance with both the 1989 and 2000 RCRA Corrective Action Permits. Perchlorate issues were discussed and added as a constituent to our groundwater and surface water monitoring lists in 1999. The release was addressed by the interim remedial measure (IRM) conducted in 1999 that removed over 1,800 tons of soil from the source area and relocated the security fence to prevent direct exposure to the site.

Work Plan Addendum (WPA) 13 was certified and submitted to EPA and DEQ on April 12, 2002, that showed a release to groundwater. EPA approved this work plan as final on October 10, 2002. Therefore the WPA 13 submittal should suffice for purposes of notification under the permit

As the effort progressed under WPA 13 it became apparent that there were data gaps that needed to be filled. The data to date was shared with EPA and DEQ in a video-teleconference call held on January 20, 2004. A hard copy of the presentation was mailed to EPA and DEQ on January 29, 2004. Based on this consultation Radford AAP prepared, certified and submitted another document "SWMU 54 Additional Characterization: Work Instructions (work instructions) to EPA and DEQ on March 19, 2004. Similar to WPA 13, these work instructions summarized the findings to date and proposed a sampling effort to fill the specified data gaps. Additional ground water monitoring wells were included in the work instructions. EPA approved these work instructions as final on July 30,

2004 and in the approval letter EPA noted that "Additional work at SWMU 54 could be necessary in the future".

As the effort progressed under the work instructions, ground water monitoring wells were placed near the New River and sampled in 2004. Radford AAP in discussions with the COE and URS agreed with their assessments that additional work was needed to close more data gaps (one of which is the groundwater to surface water pathway) and complete the RFI/CMS. These discussions occurred during the course of calendar year 2005 and at times included representatives of the EPA and DEQ. This new data gap development has culminated in Radford AAP preparing another work proposal and is consistent with EPA's July 20, 2004 letter that "Additional work at SWMU 54 could be necessary...". The March 29 and 30, 2006 meeting we have coordinated with you is to discuss our new SWMU 54 work proposal with the EPA and DEQ project team as well as similar work proposals at other sites. Our meeting goal is to get approval on these work proposals and proceed with executing them.

During the consultation (Part II. E.) and notification process described above it was our understanding that the data would be submitted with the RFI/CMS reports along with the appropriate evaluations and assessments that make up the decision making process. While some data points may be above screening criteria it would not constitute an emergency under the permit. If this is not the case and EPA wishes interim data prior to the draft report submissions please notify us of the required information.

We understand and share EPA's concern to obtain information as quickly as possible and are redoubling our efforts in this regard. The enclosed information will assist the stakeholders in approving and perhaps expediting our work proposal/s to address the larger shared concern of what is needed to identify, assess and as necessary mitigate human health and environmental issues at SWMU 54 as well as other sites.

Please coordinate with and provide any questions or comments to myself at (540) 639-8266, Jerry Redder of my staff (540) 639-7536 or Jim McKenna, ACO Staff (540) 639-8641.

Sincerely,

Paige M. Holt

Paige Holt, Environmental Manager
Alliant Ammunition and Powder Company LLC

Enclosure

c: Russell Fish, P.E.,
EPA Region III
1650 Arch Street, 3WC23
Philadelphia, PA 19103-2029

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

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

E. A. Lohman
Virginia Department of Environmental Quality
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3019 Peters Creek Road
Roanoke, VA 24019

Tony Perry
U.S. Army Environmental Center

06-815-49
JMcKenna

5179 Hoadley Road, Attn: SFIM-AEC-CDN
Aberdeen Proving Ground, MD 21010-5401

Karen Colmie
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Aberdeen Proving Ground, MD 21010-5401

Dennis Druck
U.S. Army Center for Health Promotion and Preventive Medicine
5158 Blackhawk Road, Attn: MCHB-TS-REH
Aberdeen Proving Ground, MD 21010-5403

Tom Meyer
Corps of Engineers, Baltimore District
ATTN: CENAB-EN-HM
10 South Howard Street
Baltimore, MD 21201

bc: Administrative File
J. McKenna, ACO Staff
Rob Davie-ACO Staff
P. W. Holt
J. J. Redder
Env. File

Coordination: J. McKenna

M. A. Miano

06-815-49
JMcKenna

erning the following:

Radford AAP Response
to
EPA letter dated February 27, 2006 Subject SWMU 54 Request for data

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

SIGNATURE:
PRINTED NAME: Ronald F. Fizer
TITLE: Lieutenant Colonel, US Army
Commanding Officer

SIGNATURE:
PRINTED NAME: K. D. Dolph
TITLE: Vice President Operations
Alliant Ammunition and Powder Company, LLC

06-815-49
JMcKenna

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

February 27, 2006

In reply
Refer to 3HS11

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Commander,
Radford Army Ammunition Plant
Attn: SIORF-SE-EQ (Jim McKenna)
P.O. Box 2
Radford, VA 24141-0099

Paige Holt
Environmental Manager
Alliant Techsystems, Inc.
Radford Army Ammunition Plant
P.O. Box 1
Radford, VA 24141-0100

Re: Radford Army Ammunition Plant, Radford , Va
SWMU 54
Request for data

Dear Mr. McKenna and Ms. Holt:

The United States Environmental Protection Agency (EPA) issued a RCRA Corrective Action Permit to Allliant Ammunition and Powder Company LLC (operator) and the United States Department of the Army (Army) under the Army (owner) (together: Permittee) under the authority of the Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act of 1976 (RCRA) and the Hazardous and Solid Waste Amendments of 1084 (HSWA), 42 USC § et sec., and EPA regulations at 40 CFR Parts 260-271 and Part 124 to meet the requirements of HSWA at Radford Army Ammunition Plant (RFAAP). The Permittee must comply with all terms and conditions of this Permit. The RCRA Corrective Action Permit became effective on October 31, 2000, and remains in effect.

Paragraph J.2 (page 33) of the RCRA Corrective Action Permit concerns actions to be taken by the Permittee upon the discovery of a release at the facility.

The Permittee is in possession of sample results at SWMU 54 (Propellant Burning Ash Disposal Area), from a sampling event which occurred in December 2004, which indicate a release of contaminants of concern into the environment. Additionally, The RFAAP Summary of GW Strategy for IRP-DERA Sites spreadsheet summary for SWMU-54 comments provide information regarding sample results which exceed risk screening levels.

Further, the point of determination of the release is such that indicates the release may be transferring from ground water to surface water. The results of this sampling, among other sampling events at this SWMU, have not been forwarded to EPA for review.

40 CFR § 270.30(h) and 264.74(a) require, inter alia, that the owner or operator furnish to the Regional Administrator, upon request, copies of records required to be kept by this Permit. Additionally, Part I, B. 5. of the RCRA Corrective Action Permit requires the Permittee to furnish any relevant information which the Regional Administrator may request in connection with the performance of work under said permit. Part I, B. 12 of the RCRA Corrective Action Permit states that the Permitee shall submit such information, when requested, to the Regional Administrator within fourteen (14) days of becoming aware of the need to submit such information.

Therefore, in accordance with the conditions set forth in the RCRA Corrective Action Permit for the RFAAP, EPA is requesting that the Permittee submit all available sampling data for SWMU 54, including electronic data files or hardcopies of said data, along with groundwater well logs, to EPA-Region III for review. EPA is requesting the data be sent within fourteen (14) days of receipt of this letter. Time extensions can be requested under Part II, Section F. of the Permit.

If you have any questions, please call me at 215-814-3357.

Sincerely,

Robert Thomson, PE, REM
Office of Federal Facility Remediation

cc: Russell Fish, EPA
Leslie Romanchik, VDEQ-RCRA
James Cutler, VDEQ-CERCLA

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

Date: July 30, 2004

In reply
Refer to 3HS13

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Commander,
Radford Army Ammunition Plant
Attn: SIORF-SE-EQ (Jim McKenna)
P.O. Box 2
Radford, VA 24141-0099

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
SWMU 54
Draft revised *Additional Characterization Work Instructions*
Document submittal and review

Dear Mr. McKenna and Ms. Jake:

The U.S. Environmental Protection Agency (EPA) has reviewed the Army's July 2004 draft revised *Additional Characterization Work Instructions* for the investigation of SWMU 54, located at the Radford Army Ammunition Plant (RFAAP). Based upon our review, the draft revised *Additional Characterization Work Instructions* for the investigation of SWMU 54, located at the RFAAP, is conditionally approved.

The July 2004 *Additional Characterization Work Instructions* have addressed all of EPA's prior comments, with the exception of modifying the procedures for the installation of groundwater monitoring wells to identify discrete water-bearing zones within the aquifer. The current *Additional Characterization Work Instructions* rely on previous well installation practices, and do not acknowledge the need for identifying discrete water-bearing zones. While this issue is not critical at sites where the groundwater is not known to be contaminated, at sites where the

groundwater is known or suspected to be contaminated, it becomes critical in determining the nature and extent of the plume, as well as aiding in future feasibility studies surrounding the remediation of the plume. Please be aware of this situation and its impact on the evaluation of contaminated groundwater at SWMU 54. Additional work at SWMU 54 could be necessary in the future.

In accordance with Part II. (E)(5) of RFAAP's Corrective Action Permit, the *Additional Characterization Work Instructions* is now considered final, with the above conditional approval noted. Please forward two copies of the final *Additional Characterization Work Instructions* to EPA for insertion into the project files.

If you have any questions, please call me at 215-814-3357.

Sincerely,

Robert Thomson, PE, REM
Federal Facilities

cc: Russell Fish, EPA
Leslie Romanchik, VDEQ-RCRA
Durwood Willis, VDEQ-CERCLA

Radford Army Ammunition Plant
Route 114, P.O. Box 1
Radford, VA 24141
USA

July 16, 2004

Mr. Robert Thomson
U. S. Environmental Protection Agency
Region III
1650 Arch Street
Philadelphia, PA 19103-2029

Subject: SWMU 54 Additional Characterization: Work Instructions, Final Document July 2004
Radford Army Ammunition Plant
EPA ID# VA1 210020730

Dear Mr. Thomson:

Enclosed is one certified copy of SWMU 54 Additional Characterization: Work Instructions, Final Document July 2004 Radford Army Ammunition Plant for your review and comment or approval. Your additional three copies will be sent under separate cover as well as additional copies to the Virginia Department of Environmental Quality (VDEQ), U.S. Army Environmental Center, U.S. Army Center for Health Promotion and Preventive Medicine. Attached are our responses to the comments contained in your May 24, 2004 letter.

To assist the VDEQ in transitioning to a new manager, note their office approved this document on May 10, 2004. Please coordinate with and provide any questions or comments to myself at (540) 639-8266, Jerry Redder of my staff (540) 639-7536 or Jim McKenna, ACO Staff (540) 639-8641.

Sincerely,

C. A. Jake, Environmental Manager
Alliant Ammunition and Powder Company, LLC

Enclosure

w/o enclosure

c: Russell Fish, P.E., EPA Region III

Durwood Willis (2 copies)
Virginia Department of Environmental Quality
P. O. Box 10009
Richmond, VA 23240-0009

E. A. Lohman
Virginia Department of Environmental Quality
West Central Regional Office
3019 Peters Creek Road
Roanoke, VA 24019

Tony Perry
U.S. Army Environmental Center
5179 Hoadley Road, Attn: SFIM-AEC-ERP
Aberdeen Proving Ground, MD 21010-5401

04-815-106
JMcKenna/JJRedder

Katie Watson
Engineering & Environment, Inc.
7927 Camberley Drive
Powell, TN 37849

Dennis Druck
U.S. Army Center for Health Promotion and Preventive Medicine
5158 Blackhawk Road, Attn: MCHB-TS-HER
Aberdeen Proving Ground, MD 21010-5403

John Tesner
Corps of Engineers, Baltimore District
ATTN: CENAB-EN-HM
10 South Howard Street
Baltimore, MD 21201

Coordination: J. McKenna

bc: Administrative File
J. McKenna, ACO Staff
Rob Davie-ACO Staff
C. A. Jake
J. J. Redder
Env. File

04-815-106
JMcKenna/JJRedder

Concerning the following:

SWMU 54 Additional Characterization: Work Instructions, Final Document July 2004

Radford Army Ammunition Plant

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

SIGNATURE: For (CEA)
PRINTED NAME: Anthony R. Skinner
TITLE: LTC, CM, Commanding
Radford AAP

SIGNATURE: J.C. Bettcher
PRINTED NAME: for Anthony Miano
TITLE: Vice President Operations
Alliant Ammunition and Powder Company, LLC

04-815-106
JMcKenna/JJRedder

Response to EPA Comments May 24, 2004

SWMU 54 Additional Characterization:
Work Instructions
Radford Army Ammunition Plant

Comments from USEPA correspondence dated 24 May 2004

GENERAL COMMENTS

1. For the sampling of groundwater, please include three separate groundwater sampling events to include: (a) a sampling event at baseline flow conditions; (b) a sampling event at high flow conditions; and (c) a sampling event at low flow conditions within the aquifer system.

   RESPONSE: To account for variability in groundwater conditions during background groundwater sampling, at least one sampling event will be conducted during seasonally low flow conditions, during normal flow conditions, and during seasonally high flow conditions. It is expected that a range of flow conditions will be observed over the minimum six-month period of background monitoring. Identification of low, normal, and high flow conditions will be based on ongoing and long-term groundwater monitoring data for the Current Conditions Report, available observation well data from the Virginia Department of Environmental Quality (VDEQ) in the Radford/Blacksburg area, and monthly precipitation data for the Blacksburg/Radford area relative to mean monthly precipitation records.

2. Given the karst conditions at the Radford Army Ammunition Plant, one of the objectives of groundwater sampling should be to identify discrete water-bearing zones within the aquifer system. Since contamination has been identified in the groundwater system beneath SWMU 58 (sic), the need for identifying such zones is necessary to determine the extent of the contamination in the underlying aquifer. Given this requirement, the well installation protocols specified in the draft *Work Instructions* will need to be modified.

   RESPONSE: Given the site's proximity to the New River (the main groundwater discharge point at RFAAP), the new wells will be installed across the alluvial/weathered bedrock interface to characterize the zone of highest potential impact, consistent with previous well installations. Given the weathered nature of bedrock and lack of solution features observed during drilling of wells 54MW2 and 54MW3, local groundwater flow is expected to be through alluvium and weathered bedrock, with flow characteristics similar to porous media. Groundwater flow within the uppermost portion of this zone is expected to be primarily horizontal with a vertical component locally influenced by the New River. The need for additional vertical assessment of constituent concentrations in groundwater will be evaluated as

part of the RFI and the ongoing groundwater characterization study of the Horseshoe Area.

Consistent with previous well installations at SWMU 54, wells will be installed to an anticipated maximum depth of 30 ft bgs, with a 10-ft screened interval positioned across the overburden soil/weathered bedrock interface within the uppermost portion of alluvial/fractured bedrock aquifer. The actual completion depths of these wells will be dependent upon the depth to groundwater and weathered bedrock.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

May 24, 2004

In reply
Refer to 3HS13

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Commander,
Radford Army Ammunition Plant
Attn: SIORF-SE-EQ (Jim McKenna)
P.O. Box 2
Radford, VA 24141-0099

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
SWMU 54
Document submittal and review

Dear Mr. McKenna and Ms. Jake:

The U.S. Environmental Protection Agency (EPA) has reviewed the Army's draft March 2004 *Additional Characterization Work Instructions* for the investigation of SWMU 54, located at the Radford Army Ammunition Plant (RFAAP). Outlined below, please find EPA's comments based upon that review:

General Comments

1. For the sampling of groundwater, please include three separate groundwater sampling events to include: (a) a sampling event at baseline flow conditions; (b) a sampling event at high flow conditions; and (c) a sampling event at low flow conditions within the aquifer system.

2. Given the karst conditions at the Radford Army Ammunition Plant, one of the objectives of groundwater sampling should be to identify discrete water-bearing zones within the

aquifer system. Since contamination has been identified in the groundwater system beneath SWMU 58, the need for identifying such zones is necessary to determine the extent of the contamination in the underlying aquifer. Given this requirement, the well installation protocols specified in the draft *Work Instructions* will need to be modified.

This concludes EPA's review of the Army's draft March 2004 *Additional Characterization Work Instructions* for the investigation of SWMU 54, located at the RFAAP. The referenced draft *Work Instructions* document is disapproved by EPA in its current form, and must be revised to reflect the comments above. Per Part II, Section E.4.e. of the EPA RCRA Corrective Action Permit, the Army is required to revise the draft document and submit a revised draft copy to EPA for review within 60 days of the receipt of EPA comments on the draft document. Part II, Section E.4.f. of the Permit allows for an additional 20 days for issuing the revised draft document to EPA, provided that timely notice is given, i.e. within 10 days. Additional time extensions can be requested under Part II, Section F. of the permit.

If you have any questions, please call me at 215-814-3357.

Sincerely,

Robert Thomson

Robert Thomson, PE
Federal Facilities Branch

cc: Russell Fish, EPA
Leslie Romanchik, VDEQ-RCRA

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

Street address: 629 East Main Street, Richmond, Virginia 23219
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W. Tayloe Murphy, Jr.
Secretary of Natural Resources

Robert G. Burnley
Director

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

10 May 2004

Mr. James McKenna
Radford Army Ammunition Plant
SIORF-SE-EQ
P.O. Box 2
Radford, VA 24141-0099

RE: SWMU 54 Additional Characterization Work Instructions (SWMU 54)

Dear Mr. McKenna:

This office has reviewed the referenced draft document and concurs with SWMU 54. No revisions to the document are required. Please provide one copy of the Final SWMU 54 document to this office on CD when completed.

If you have any questions, please call me at 804.698.4308.

Sincerely,

Mark S. Leeper
Remedial Project Manager

cc: Norman L. Auldridge - WCRO, DEQ
Durwood Willis - DEQ
Robert Thompson, Region III, U.S.EPA, 3HS13

Radford Army Ammunition Plant
Route 114, P.O. Box 1
Radford, VA 24143-0100
USA

March 19, 2004

Mr. Robert Thomson
U. S. Environmental Protection Agency
Region III
1650 Arch Street
Philadelphia, PA 19103-2029

Subject: SWMU 54 Additional Characterization Sampling: Work Instructions
Final Document, March 2004
Radford Army Ammunition Plant
EPA ID# VA1 210020730

Dear Mr. Thomson:

Enclosed is one certified copy of SWMU 54 Additional Characterization Sampling: Work Instructions Final Document, February 2004 Radford Army Ammunition Plant (RFAAP) for your review and comment or approval.

The data gap analysis (i.e. basis for these instructions) was discussed with you and Mr. Mark Leeper in a January 20, 2004 video teleconference call. As agreed during this meeting, this work is to be accomplished in accordance with the procedures in Work Plan Addendum 13 that were used for performing the original SWMU 54 sampling work. Therefore the subject work instructions are in lieu of preparing and submitting a new work plan addendum.

Your additional three copies will be sent under separate cover as well as additional copies to the VDEQ, U.S. Army Environmental Center, U.S. Army Center for Health Promotion and Preventive Medicine. Please coordinate with and provide any questions or comments to myself at (540) 639-8266, Jerry Redder of my staff (540) 639-7536 or Jim McKenna, ACO Staff (540) 639-8641.

Sincerely,

C. A. Jake, Environmental Manager
Alliant Ammunition and Powder Company, LLC

Enclosure

w/o enclosure

c: Russell Fish, P.E., EPA Region III

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

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

04-815-42
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Aberdeen Proving Ground, MD 21010-5401

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Engineering & Environment, Inc.
7927 Camberley Drive
Powell, TN 37849

Dennis Druck
U.S. Army Center for Health Promotion and Preventive Medicine
5158 Blackhawk Road, Attn: MCHB-TS-HER
Aberdeen Proving Ground, MD 21010-5403

John Tesner
Corps of Engineers, Baltimore District
ATTN: CENAB-EN-HM
10 South Howard Street
Baltimore, MD 21201

Coordination: J. McKenna

bc: Administrative File
J. McKenna, ACO Staff
Rob Davie-ACO Staff
C. A. Jake
J. J. Redder
Env. File

04-815-42
JMcKenna/JJRedder

Concerning the following:

SWMU 54 Additional Characterization Sampling: Work Instructions
Finalt Document, February 2004
Radford Army Ammunition Plant

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

SIGNATURE: Anthony R. Skinner
PRINTED NAME: Anthony R. Skinner
TITLE: LTC, CM, Commanding
Radford AAP

SIGNATURE: Anthony Miano
PRINTED NAME: Anthony Miano
TITLE: Vice President Operations
Alliant Ammunition and Powder Company, LLC

04-815-42
JMcKenna/JJRedder

RADFORD ARMY AMMUNITION PLANT
RADFORD, VIRGINIA

SWMU 54 Additional Characterization: Work Instructions

FINAL DOCUMENT
JULY 2004

PREPARED BY:

URS

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RICHMOND, VIRGINIA 23230
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(804) 965-9764 FAX

ARCHITECT-ENGINEER SERVICES
CONTRACT NO. DACA31-00-D-0011
DELIVERY ORDER NO. 0027

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS AND ACRONYMS

ASTM .....ASTM International
CMS .....Corrective Measures Study
ft .....Feet
bgs .....Below Ground Surface
msl.....Mean Sea Level
GPS .....Global Positioning System
HSA .....Horseshoe Area
MHSP.....Master Health and Safety Plan
MQAP.....Master Quality Assurance Plan
MWP.....Master Work Plan
PAH .....Polynuclear Aromatic Hydrocarbon
PCB .....Polychlorinated Biphenyl
QA/QC .....Quality Assurance/Quality Control
RBC .....Risk-Based Concentration
RCRA.....Resource Conservation and Recovery Act
RFAAP.....Radford Army Ammunition Plant
RFI .....RCRA Facility Investigation
SOP .....Standard Operating Procedure
SVOC.....Semivolatile Organic Compound
SWMU .....Solid Waste Management Unit
TAL.....Target Analyte List
TCL.....Target Compound List
USACE .....U.S. Army Corps of Engineers
USEPA.....U.S. Environmental Protection Agency
URS.....URS Group, Inc.
VOC .....Volatile Organic Compound
WPA.....Work Plan Addendum

EXECUTIVE SUMMARY

In accordance with Contract Number DACA31-00-D-0011, Delivery Order No. 0027, URS Group Inc. (URS) has been tasked by the United States Army Corps of Engineers (USACE), Baltimore District to perform a Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) and Corrective Measures Study (CMS) at Solid Waste Management Unit (SWMU) 54, Propellant Burning Ash Disposal Area, located in the easternmost portion of the Horseshoe Area (HSA) at the Radford Army Ammunition Plant (RFAAP), Radford, Virginia (Figure 1-1).

The proposed characterization activities were documented in Work Plan Addendum (WPA) 013 (URS 2002) to the Radford Army Ammunition Plant (RFAAP) Master Work Plan (MWP) (URS 2003). During the analysis of chemical data generated from WPA 013, additional data gaps were identified at SWMU 54.

Investigative activities in support of the RFI for SWMU 54 under WPA 013 identified constituents of potential concern in soil and groundwater. Assessments of the data collected to date indicate the lateral extent of constituents in soil and groundwater within the overburden/weathered bedrock has not been delineated. Additionally, data further indicate an exceedance of the screening criteria for manganese in groundwater, which requires assessment of the manganese background conditions in groundwater within the overburden/weathered bedrock. This assessment will not involve characterizing the solution enhanced-fractured bedrock aquifer system.

These work instructions are intended to be used in conjunction with WPA 013 and the MWP and do not duplicate information that is contained within those documents. Investigative activities will be conducted in accordance with the procedures specified within the MWP, the Master Quality Assurance Plan (MQAP), Master Health and Safety Plan (MHSP) (URS 2003), and WPA 013.

1.0 WORK INSTRUCTIONS

These Work Instructions are intended to guide the collection of supplemental data at SWMU 54 under WPA 013 (URS 2002). One of the primary objectives of WPA 013 was to sufficiently characterize SWMU 54 in order to conduct a CMS of potential remedial alternatives, if appropriate. Based on a review of the analytical data heretofore collected from Areas A and B (soil and groundwater), it has become necessary to include additional effort to meet this objective. These activities include the installation of permanent monitoring wells, the collection of soil and groundwater samples for chemical and physical analyses, obtaining additional hydrogeologic data from existing and newly installed monitoring wells, and the performance of data validation. The data resulting from this investigation will be used to complete a baseline risk assessment including a human health risk assessment and screening level ecological risk assessment. Results will be incorporated into the final RFI Report for SWMU 54.

A review of findings from the preliminary investigative activities at SWMU 54 indicates additional tasks are necessary to advance the RFI toward completion including:

- Performance of additional soil and groundwater sampling to fill data gaps;
- Further characterization and delineation of the constituents of potential concern in soil and groundwater; and
- Assessment of the manganese background conditions in groundwater.

This assessment will investigate shallow groundwater in the overburden and weathered bedrock aquifer system. Investigation into the solution enhanced-fractured bedrock aquifer at the SWMU will not be conducted. Sampling will be conducted in accordance with the procedures outlined within the RFAAP MWP (URS 2003) and WPA 013. Table 1-1 provides cross-references between the applicable sections in the MWP, WPA 013, and the Standard Operating Procedures (SOPs) that will be used to implement these Work Instructions.

Quality Assurance/Quality Control

Quality Assurance/Quality Control (QA/QC) procedures will follow those specified in the Master Quality Assurance Plan (URS 2003) and in *Section 2.0 – Quality Assurance Plan Addendum* of WPA 013.

Health and Safety

Health and Safety procedures, including monitoring and personal protection levels, will follow those specified in the Master Health and Safety Plan (URS 2003) and in *Section 3.0 – Health and Safety Plan Addendum* of WPA 013.

Table 1-1
Work Elements Referenced in the Master Work Plan and Addendum 013

Task Description	MWP Section	WPA 013 Section	MWP SOP #
Introduction	2.0	1.1	NA
Installation Setting and Site Descriptions	2.0	1.10.1	NA
Summaries of Previous Investigations	NA	1.10.2	NA
Direct Push Soil Sampling		NA	
Field Logbooks	NA		10.1
Sample Logbooks	NA		10.2
Chain-of-Custody	NA		10.4
Soil Sampling	5.2		30.1
Well and Boring Abandonment	5.2		20.3
Sample Labels	5.1		50.1
Sample Packaging	5.1		50.2
Investigation-Derived Material	5.13		70.1
Decontamination	5.12		80.1
Groundwater Sampling		NA	
Field Logbooks	NA		10.1
Sample Logbooks	NA		10.2
Chain-of-Custody	NA		10.4
Groundwater Sampling	5.2		30.2
Direct Push Sampling	5.2		20.12
Sample Labels	5.1		50.1
Sample Packaging	5.1		50.2
Water Level and Well Depth Measurements	5.2		40.2
Water Quality Monitoring	5.2		40.1
Monitoring Well Installation			20.1
Monitoring Well Development	5.2		20.2
Drilling Methods and Procedures	5.2		20.11
Boring Logs	5.2		10.3
Slug Tests	5.9	1.3.3.1	40.3
Pump Test	5.9	1.3.3.2	NA
Decontamination	5.12		80.1

1.1 SITE DESCRIPTION AND HISTORY

SWMU 54 consists of two inactive areas formerly used for disposal of propellant ash (Figure 1-1). Area A is an approximate 0.58-acre elongated, triangular, grassy area in the southern portion of SWMU 54. Area B is an approximate 1.09-acre irregularly shaped area in the northern portion of SWMU 54.

SWMU 54 is located within the easternmost portion of the HSA at RFAAP, adjacent to the New River (Figure 1-1). The SWMU 54 area slopes to the east, with ground surface elevations ranging from approximately 1,710 to 1,695 feet (ft) above mean sea level (msl). SWMU 54 is located upon a terrace of the New River flood plain, approximately 20 ft above the elevation of the New River, which is located approximately 150 ft east of SWMU 54. The RFAAP Installation perimeter fence separates SWMU 54 from the New River and prevents access by trespassers attempting to enter RFAAP from the New River. The area in and around SWMU 54 is an open field with irregular surface topography. SWMU 54 is bordered on the west by a steep upward incline to an access road; to the east by woods; and to the south by a grassy area and an access road.

1.2 SUMMARY OF PREVIOUS INVESTIGATIONS

Investigative activities in support of the RFI for SWMU 54 completed by URS under WPA 013 identified constituents of potential concern in soil and groundwater. Assessments of the data collected to date indicate the lateral extent of constituents in soil and groundwater has not been delineated at Area A (Figure 1-2). At Area B, the lateral and vertical extent of pesticides/polychlorinated biphenyls (PCBs) in soil requires confirmation through additional sampling at previous boring locations (Figure 1-3). Additionally, data further indicate an exceedance of the screening criteria for manganese in groundwater at Areas A and B, which requires an assessment of manganese background conditions in groundwater.

Constituent concentrations exceeding screening criteria at SWMU 54 include Target Analyte List (TAL) metals (manganese, lead, chromium, and copper), explosives, one polynuclear aromatic hydrocarbon (PAH, benzo(a)pyrene), one pesticide (heptachlorepoxide), and one PCB (Aroclor 1254). Additionally, perchlorate was detected in groundwater at Area A above its reporting limit. It should be noted that perchlorate does not have a Region III Tap Water risk based concentration (RBC) screening value.

Based on the results of the 2002 RFI, in conjunction with the previously collected data at the site (Parsons 1996, MSE 1998, and Dames and Moore 1992), volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs) are not a concern at SWMU 54. Results from historical investigations and the 2002 RFI sampling show that the extent of perchlorate, explosives, metals, pesticides, and PCBs has not been delineated for SWMU 54.

Evaluating the combined chemical dataset from the SWMU 54 investigations, the chemical parameters of concern include:

- Perchlorate in groundwater;
- Explosives in groundwater;
- PAHs in soil (benzo(a)pyrene);
- Pesticides/PCBs in soil (heptachlorepoxide and Aroclor 1254); and
- Metals in groundwater (manganese) and in soil (lead, copper, and chromium).

Elevated concentrations of manganese, perchlorate, and explosives in groundwater detected during the 2002 RFI sampling event require additional investigative activities to delineate the extent of these

constituents at SWMU 54. Additional sampling is also required to delineate the vertical and horizontal extent of constituents in soil in these areas.

1.3 PROPOSED ACTIVITIES

As previously stated, the results from fieldwork conducted under WPA 013 indicate data gaps remain; therefore, additional investigation is required to advance the RFI towards completion.

1.3.1 Soil Sample Collection and Analysis

To delineate the extent of constituents of potential concern in soil, 21 soil borings will be advanced using a hydraulic push rig (i.e., Geoprobe®). This will consist of 15 locations at Area A and six locations at Area B.

To collect samples, the rig will advance the soil borings with 4-ft Macro-Core® samplers with disposable liners. The 21 soil borings will be completed to an approximate depth of 20 feet below ground surface (ft bgs). As shown in Table 1-2, three discrete soil samples will be collected from the 15 soil borings in Area A and three discrete samples will be collected from five of the soil borings in Area B. A single discrete sample will be collected from the sixth proposed boring location (at previous soil boring location 54SB46) in Area B. This sample will be collected from the termination depth to assess the vertical extent of pesticides and PCBs in soil. One boring will be advanced at the location of former boring 54SB6 to confirm the results of the deep sample collected by Parsons (1996) that indicated screening level exceedances for explosives and lead.

Soil samples in Area A will be analyzed for TAL metals (SW-846 Methods 6010B and 7471A), explosives (Methods 8330 and 8332 including PETN), and Target Compound List (TCL) pesticides/PCBs (Methods 8081A and 8082) and soil samples in Area B will be analyzed for pesticides/PCBs (Methods 8081A and 8082). Geologic logging shall be performed at each boring location to characterize the physical nature of the materials. The vertical coordinate of each boring location will be assessed using a metal measuring tape and the horizontal coordinates (using North American Datum of 1983) will be recorded using the existing topographic survey and Global Positioning System (GPS) equipment with sub-meter accuracy.

1.3.2 Monitoring Well Construction and Testing

It is anticipated that three additional permanent groundwater monitoring wells (54MW8, 54MW9, and 54MW10) will be needed to adequately define the horizontal extent of constituents in groundwater. Given the site's proximity to the New River (groundwater discharge point at RFAAP), the wells will be installed across the alluvial/weathered bedrock interface to characterize the zone of highest potential impact, consistent with previous well installations. Given the weathered nature of bedrock and lack of solution features observed during drilling of wells 54MW2 and 54MW3, local groundwater flow is expected to be through alluvium and weathered bedrock, with flow characteristics similar to porous media. Groundwater flow within the uppermost portion of this zone is expected to be primarily horizontal with an upward component locally influenced by the New River. The need for additional vertical assessment of constituent concentrations in groundwater will be evaluated as part of the RFI and the ongoing groundwater characterization study of the Horseshoe Area.

Consistent with previous well installations at SWMU 54, wells will be installed to an anticipated maximum depth of 30 ft bgs, with a 10-ft screened interval positioned across the overburden soil/weathered bedrock interface within the uppermost portion of alluvial aquifer/fractured bedrock aquifer. The completion depths of these wells will be dependent on the depth to groundwater and weathered bedrock.

The direct push data will be reviewed to assess if constituents exceed USEPA Region III Tap Water RBCs and whether perchlorate has been detected. RBC exceedances and/or detections of perchlorate will

guide the placement of the permanent wells. It is anticipated that wells will be placed in the following locations (see Figure 1-5):

- Between the eastern-most direct push sample and the New River (54MW8);
- Outside the northern-most direct push sample (54MW9); and
- Outside the southern-most direct push sample (54MW10).

Each well will be drilled to its termination depth using an 8-inch air rotary or air hammer bit. In soil overburden, temporary steel casing shall be advanced during drilling using the underreaming method. The temporary steel casing shall be simultaneously removed during placement of sand pack in the well annulus.

Split-spoon samples will be collected at 5-ft intervals or based on stratum changes by hydraulically pushing the sampler (standard penetration test will not be performed). The depth to direct push refusal is estimated to be 22 to 25 ft; therefore, it is expected that four to five split-spoon samples will be collected from each well location.

1.3.3 Groundwater Sampling and Analysis

Explosives and Perchlorate Groundwater Sampling

Fifteen groundwater samples will be collected from the direct push soil borings associated with Area A and analyzed for explosives (Methods 8330 and 8332 including PETN), and perchlorate (USEPA Method 314.0). Due to concern regarding the potential for false positives for perchlorate, a decontamination agent known to be perchlorate free (as certified by the manufacturer) will be used and equipment blanks will be collected. These samples will be collected during each sampling event and analyzed for perchlorate. A summary of the proposed sampling is presented in Table 1-2 and is presented graphically on Figure 1-5.

Groundwater samples will be collected from newly installed monitoring wells 54MW8, 54MW9, and 54MW10 and analyzed for total and dissolved manganese (Method 6010B), explosives (Methods 8330 and 8332 including PETN), and perchlorate (USEPA Method 314.0).

Manganese Assessment

An assessment of manganese concentrations in groundwater at Areas A and B will be conducted to further investigate the nature and occurrence of total and dissolved manganese concentrations above the tap water RBC at wells 54MW5, 54MW7, and direct push location 54DPW3. The objectives of this assessment are to further characterize the spatial distribution of manganese in groundwater and evaluate whether concentrations are potentially attributable to: 1) natural background conditions, 2) activities at SWMU 54, or 3) geochemical interactions associated with the nearby New River.

Sampling for total and dissolved manganese (analyzed by Method 6010B) will be conducted at each existing and newly installed monitoring well at SWMU 54 (54MW1 through 54MW10). Upgradient monitoring wells 54MW1 and 54MW6 will be used to establish naturally occurring background for manganese; these wells are located at a sufficient distance upgradient of SWMU 54 to be unaffected by SWMU 54-related activities and will address natural variation of manganese concentrations. Four independent sampling events will be conducted over a minimum six-month period (no more than one sampling event per 30 days) to establish an appropriate set of pooled background data (8 samples). Each background-sampling event will include the collection of one sample from each upgradient well (54MW1 and 54MW6).

To account for variability in groundwater conditions, at least one sampling event will be conducted during seasonally low flow conditions, during normal flow conditions, and during seasonally high flow conditions. It is expected that a range of flow conditions will be observed over the minimum six-month period of background monitoring. Identification of low, normal, and high flow conditions will be based

on ongoing and long-term groundwater monitoring data for the Current Conditions Report, available observation well data for Virginia Department of Environmental Quality (VDEQ) in the Radford/Blacksburg area, and monthly precipitation data for the Blacksburg/Radford area relative to mean monthly precipitation records.

In accordance with SOP 30.2 of the MWP, water quality parameters will be assessed during each sampling event to assess the spatial geochemistry of the groundwater. Prior to collecting the water sample, pH, oxidation/reduction potential (Eh), dissolved oxygen, specific conductance and temperature will be recorded. These data along with the chemical data will be evaluated to assess if groundwater at Areas A and B is geochemically different from groundwater closer to the New River.

Two methods of statistical analysis will be conducted to evaluate manganese concentrations at SWMU 54. An upgradient to downgradient statistical comparison will be conducted to evaluate whether groundwater concentrations for manganese are statistically different upgradient from SWMU 54 compared to downgradient from SWMU 54. A statistical interval test, consisting of a 95% upper tolerance limit (UTL) will be used for the upgradient versus downgradient assessment (inter-well statistical comparison). For normal or lognormal distributions, a minimum of eight background samples is recommended by USEPA and VDEQ for development of a passable estimate of the standard deviation to construct a tolerance interval with 95% coverage (USEPA 1992 and VDEQ 2003). Data from downgradient wells (and 54MW5) will be compared with the 95% UTL point estimate to indicate whether concentrations in downgradient wells are statistically significantly higher than established background levels; thereby providing an indication of whether SWMU 54 is a potential source of manganese in groundwater. Data analysis procedures for calculating the 95% UTL and resultant data evaluations will follow methods outlined by USEPA for RCRA facilities (USEPA 1989 and 1992), by VDEQ for Solid Waste Facilities (VDEQ 2003), and guidance provided by ASTM International (ASTM) for statistical approaches for detection monitoring programs (ASTM 1998).

The second method of statistical evaluation will consist of a comparison of downgradient manganese data to the USEPA Tap Water RBC using the lower confidence limit (LCL) method as outlined by USEPA and VDEQ statistical guidance (USEPA 1992 and VDEQ 2003). An LCL on the sample mean will be calculated for each downgradient well location (and 54MW5) from the four sampling values collected during the four-month sampling period. Using this statistical method, a LCL value lower than the RBC does not indicate evidence of a statistical exceedance of the RBC value at the location evaluated.

Aquifer Testing

Aquifer testing will be conducted at Area A after completion of the groundwater sampling following the procedures outlined in Section 1.3.3 of WPA 013, Section 5.9 of the MWP, and SOP 40.3. Slug tests (rising and falling head) will be conducted at monitoring wells 54MW8, 54MW9, and 54MW10 to provide estimates of hydraulic conductivity at each location. A constant rate pump test will be performed at Area A to provide estimated values for aquifer hydraulic conductivity, transmissivity, storage, specific capacity, and well yield of the pumping well. Based on the well recharge data collected during the 2002 RFI and the location of wells relative to Area A and the New River, 54MW3 will be used as the pumping well. Pressure transducers will be placed in the pumping well and Area A wells 54MW2, 54MW5, 54MW8, 54MW9, and 54MW10 to monitor water level changes in response to pumping and post-pumping recovery. Additionally, a temporary piezometer will be installed in the direct push boring located closest to 54MW3 (in the cross-gradient direction) to monitor water level changes in the area most likely to be influenced by pumping.

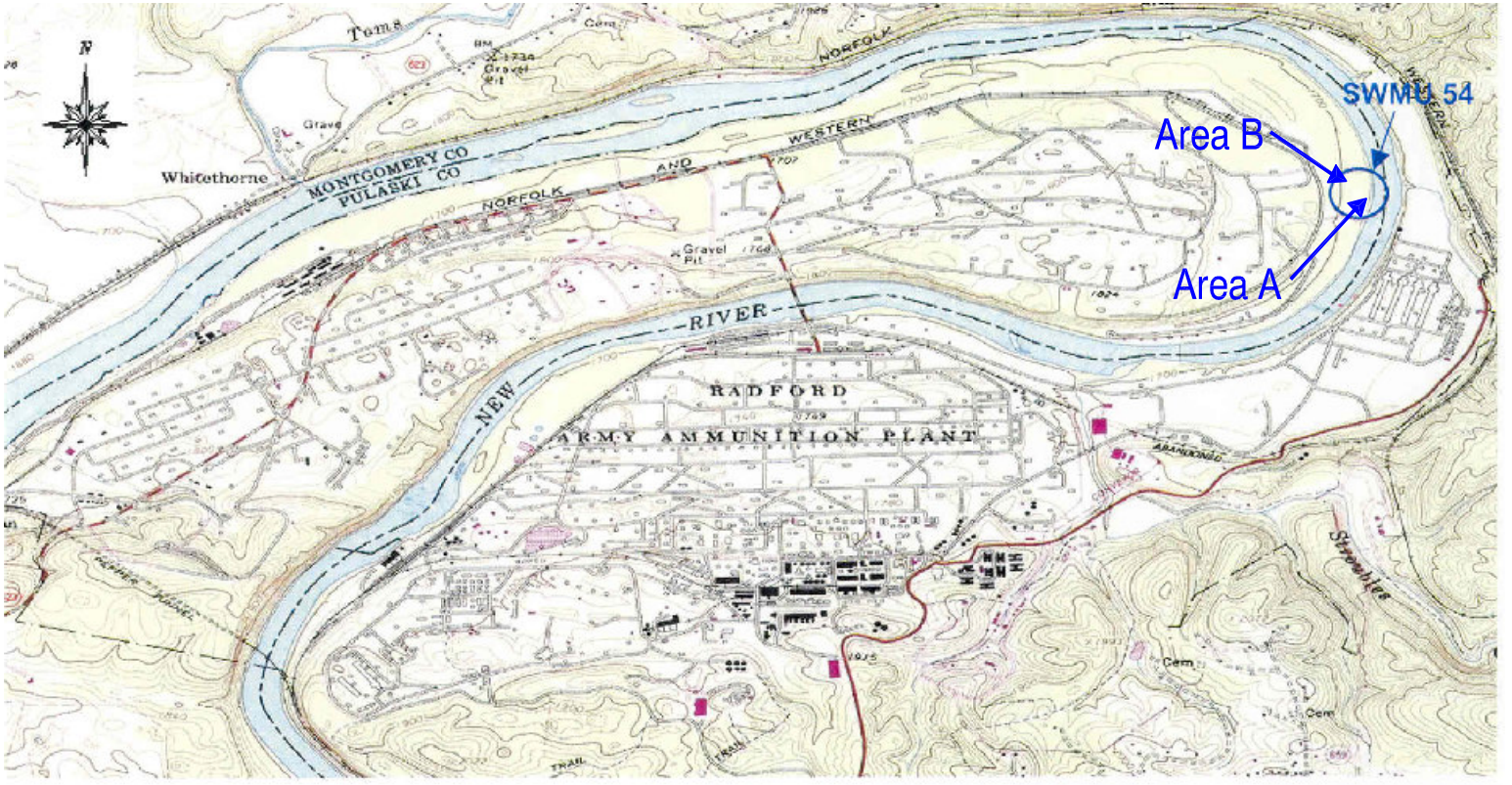
Based on observed recovery rates, it is expected that the lower flow rate (maximum of one gallon per minute) will be used for the pumping test and that the duration of pumping will be 12 hours or less. Discharge water from the pump test will be containerized and managed as Investigation-Derived Material consistent with the requirements outlined in Section 1.3.6 of WPA 013.

1.3.4 Groundwater to Surface Water Pathway Investigation

To assess the potential groundwater to surface water pathway, a field-monitoring program will be conducted consisting of recording water level changes in monitoring wells 54MW3, 54MW8, 54MW9, 54MW10, and the New River simultaneously. Each of these monitoring wells and the New River will be equipped with continuous data loggers (e.g., In-Situ MiniTroll®) to electronically record fluctuating groundwater levels and river stage over a period of two months.

The stage gage will be installed within the New River adjacent to the SWMU 54 Area A to a depth below the anticipated low-water level. A stainless steel slotted well screen with a well point will be driven into the bed of the New River and the data logger will be installed. The gage location will be selected to minimize the likelihood of damage from floating debris or passing boats. After installation of the monitoring well and river data loggers, the monitoring well and river gage network will be inspected and verified biweekly for continued operation. During the biweekly verification inspection, data will be downloaded and biweekly verification inspections will continue until at least two months of consecutive data has been collected successfully (a minimum of five events).

The nature of groundwater-surface water interaction in the SWMU 54 area, potential constituent migration, and the groundwater to surface water pathway will then be evaluated using the hydrogeologic and hydrologic data collected during the RFI and previous investigations including the continuous water-level data, site-wide groundwater level measurements, aquifer test data, and geochemical data.



0 100

1 inch = 100 feet

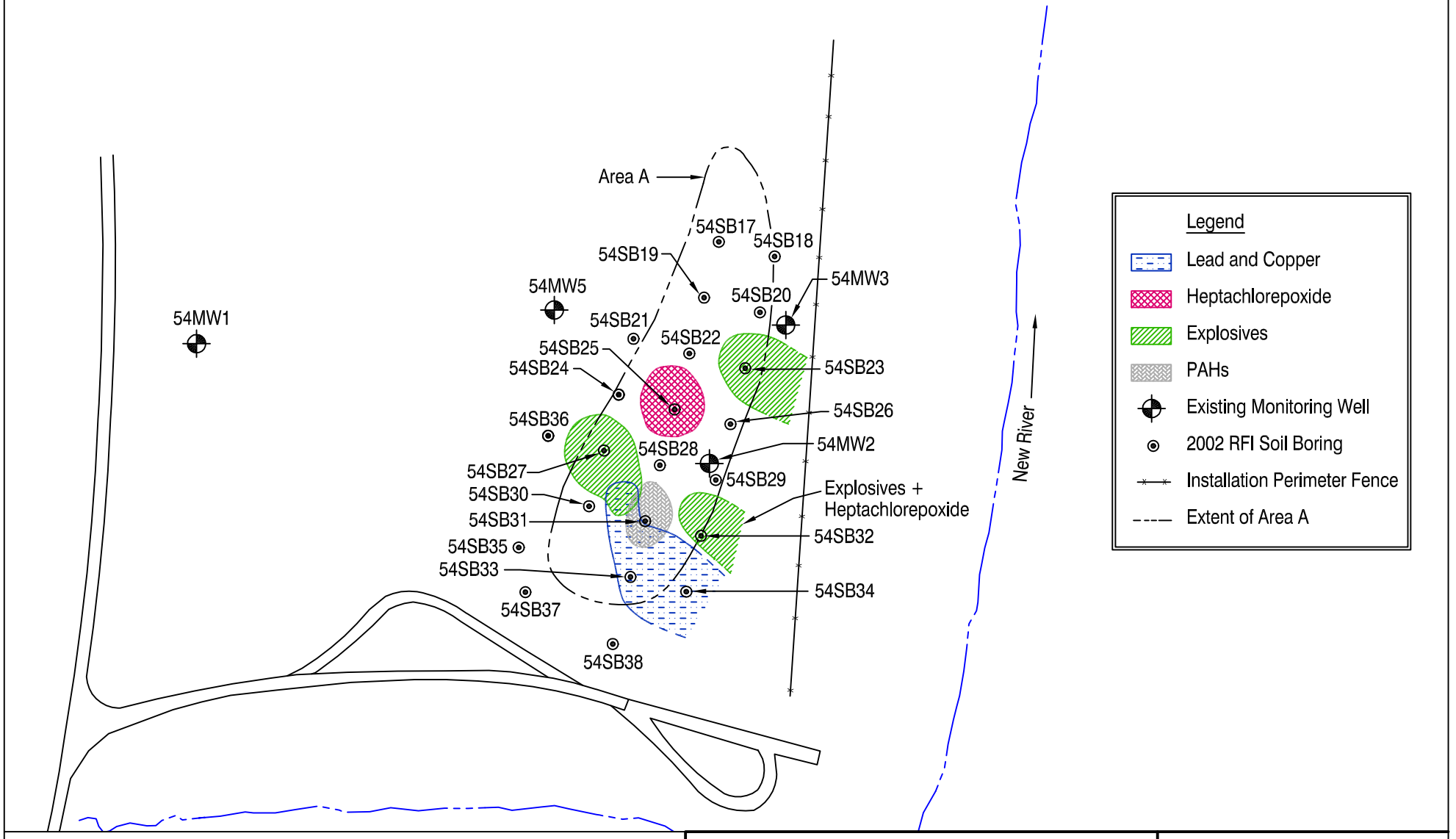
RFAAP

SWMU 54 RFI ADDITIONAL CHARACTERIZATION

Date:	Prepared By:
January 2004	*KDC/TMK*
Scale:	**File Name:**
1"=100'	*09604-263-155*

FIGURE 1-1

SWMU 54
LAYOUT MAP



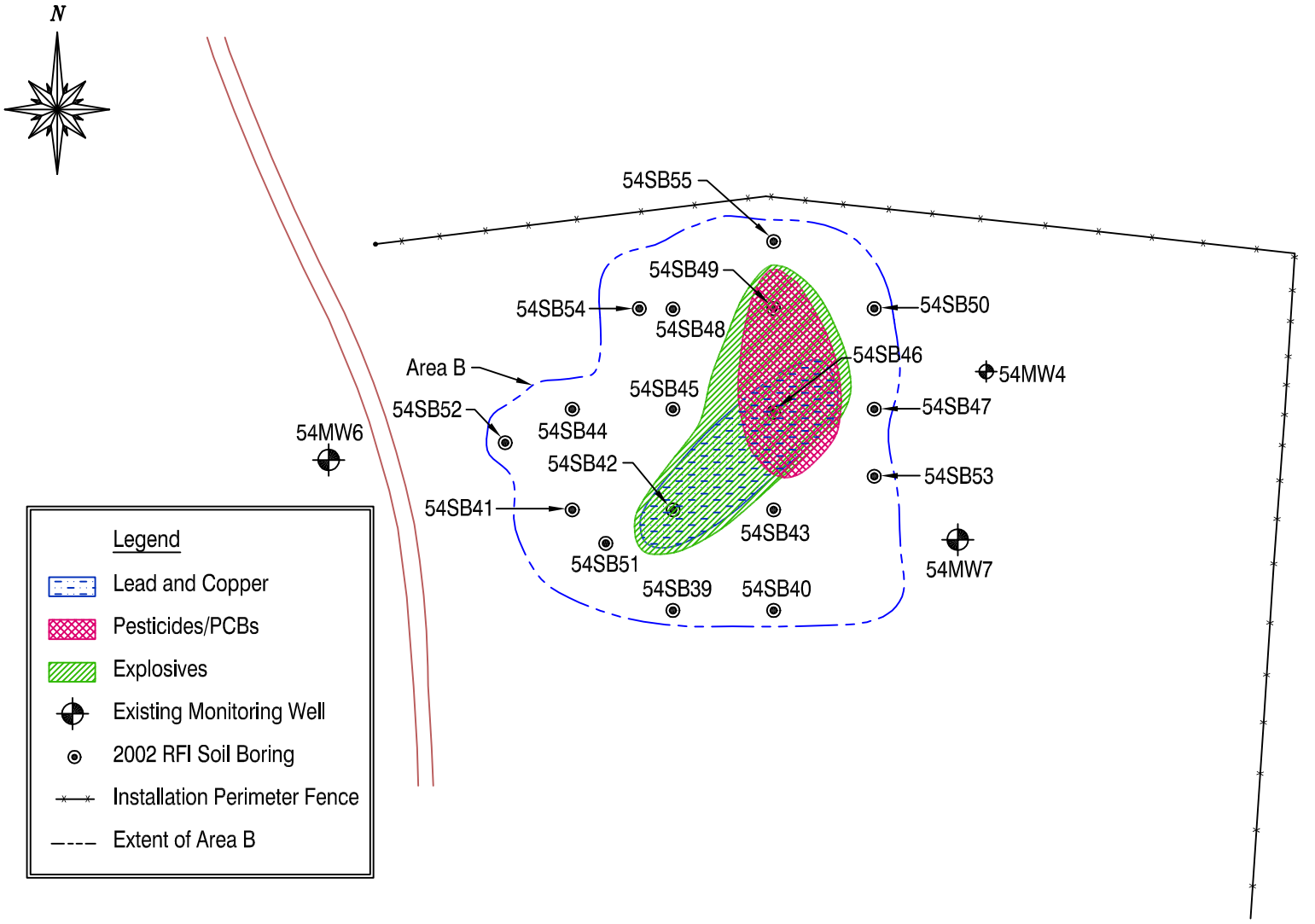
RFAAP

SWMU 54 RFI ADDITIONAL CHARACTERIZATION

Date: *January 2004*	**Prepared By:** *KDC/TMK*
Scale: *1"=100'*	**File Name:** *09604-263-155*

FIGURE 1-2

AREA A
LAYOUT AND PREVIOUS SOIL INVESTIGATION RESULTS (ABOVE RESIDENTIAL RBCs)



0 100

1 inch = 100 feet

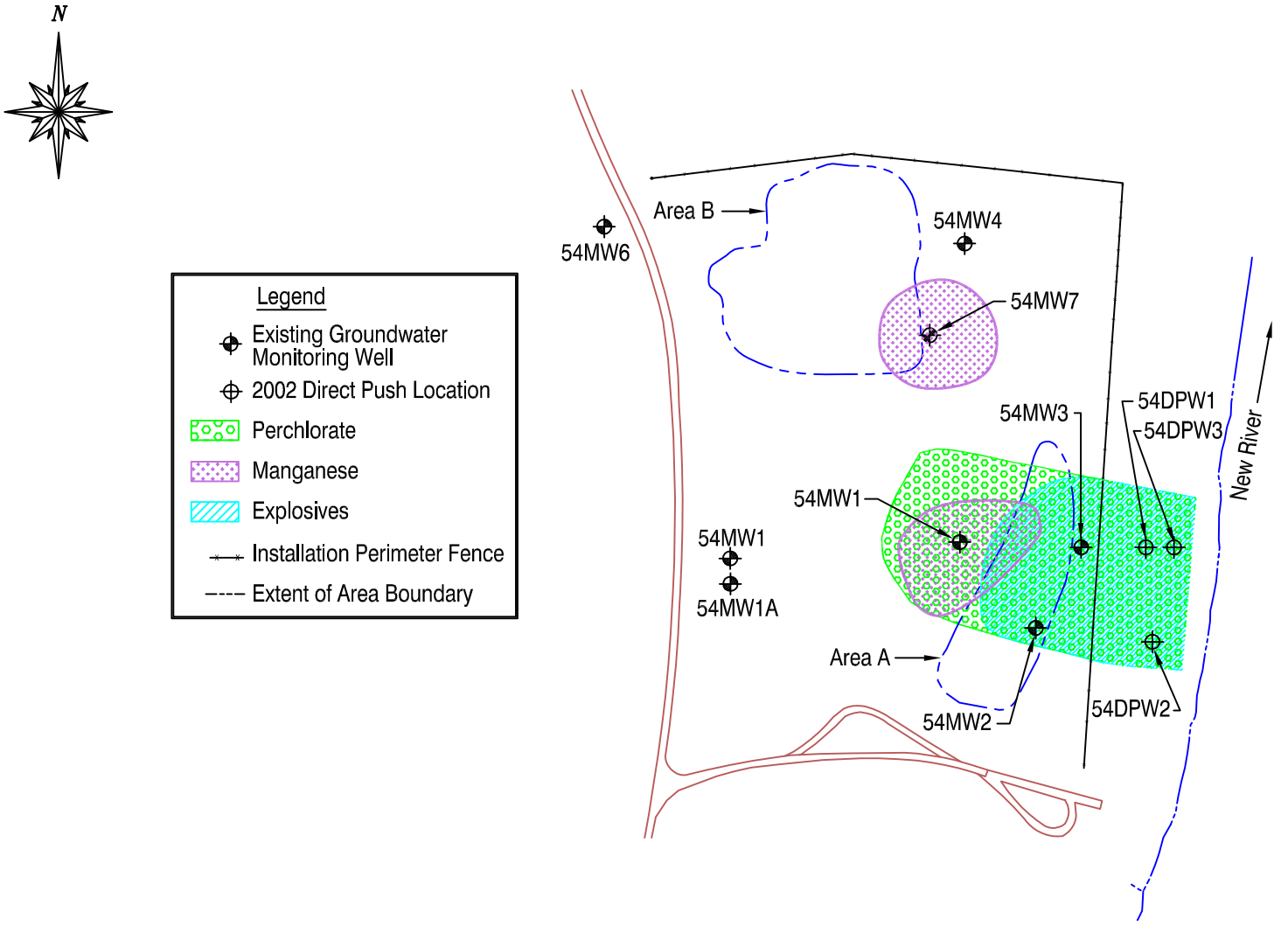
RFAAP

SWMU 54 RFI ADDITIONAL CHARACTERIZATION

Date:	Prepared By:
January 2004	*KDC/TMK*
Scale:	**File Name:**
1"=100'	*09604-263-155*

FIGURE 1-3

AREA B
LAYOUT AND PREVIOUS SOIL INVESTIGATION RESULTS (ABOVE RESIDENTIAL RBCs)



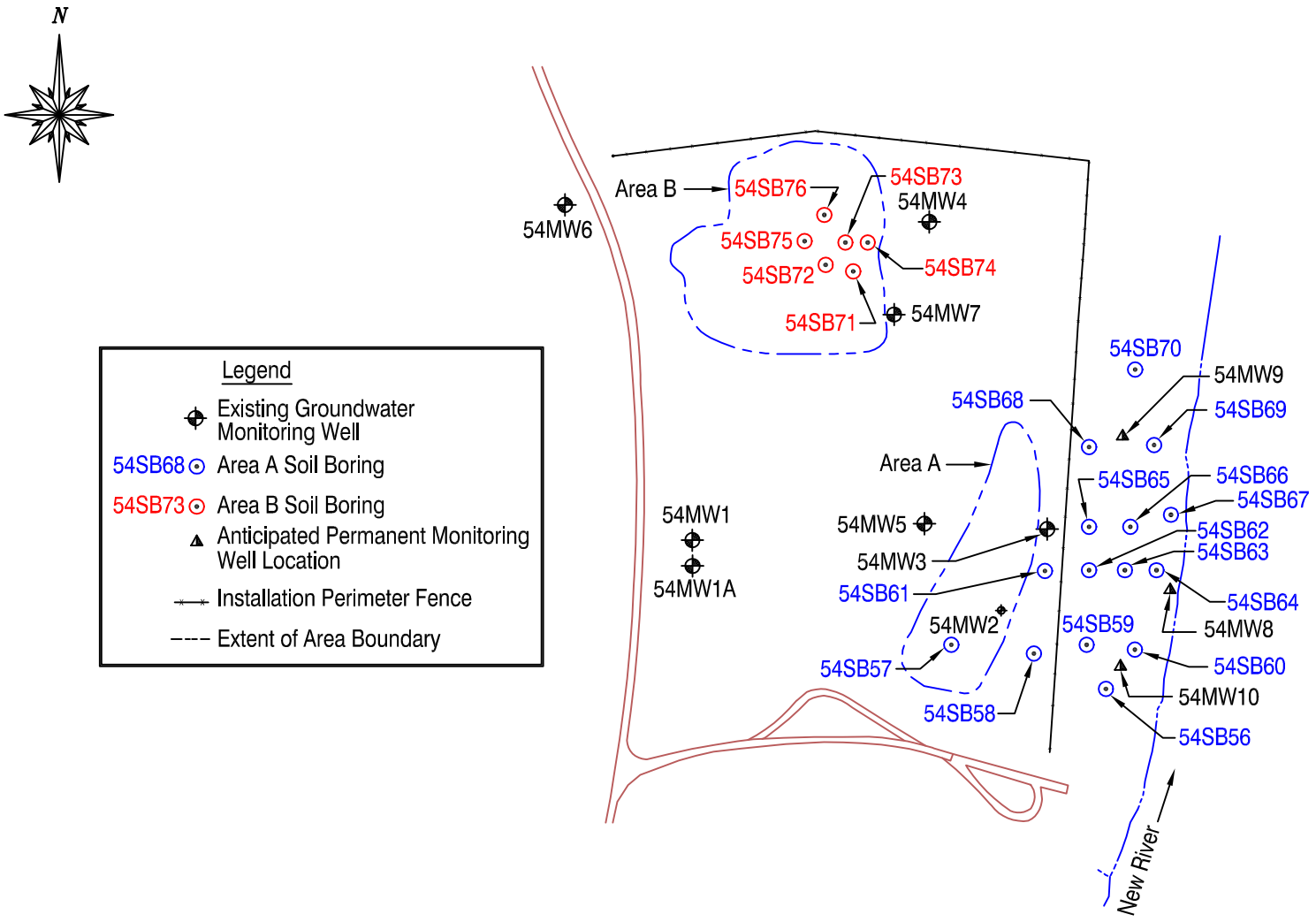
RFAAP

SWMU 54 RFI ADDITIONAL CHARACTERIZATION

Date: *January 2004*	**Prepared By:** *KDC/TMK*
Scale: *1"=200'*	**File Name:** *09604-263-155*

FIGURE 1-4

SWMU 54
PREVIOUS GROUNDWATER INVESTIGATION RESULTS
(ABOVE REGION III TAP WATER RBCs)



RFAAP

SWMU 54 RFI ADDITIONAL CHARACTERIZATION

Date:	Prepared By:
January 2004	*KDC/TMK*
Scale:	**File Name:**
1"=200'	*09604-263-155*

FIGURE 1-5

SWMU 54
PROPOSED SAMPLING LOCATIONS

Table 1-2

Proposed Sampling and Analysis
SWMU 54

Media	Number of Samples	Sample Depth (feet)	Analysis	Objective
Surface Soil	20	0-1	TAL metals, explosives (including PETN), TCL pesticides/PCBs	Characterize the lateral extent of metals, PCBs, and explosives in Areas A and B
Subsurface Soil	20	9-10	TAL metals, explosives (including PETN), TCL pesticides/PCBs	Characterize the vertical extent of metals, PCBs, and explosives in Areas A and B.
	21	16-18		
Groundwater	43	--	Total and dissolved manganese, explosives (including PETN), perchlorate	Characterize the lateral extent of explosives, manganese, and perchlorate east of Area A. Assess background 95% UTL at SWMU 54.

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SWMU 54 ADDITIONAL CHARACTERIZATION: WORK INSTRUCTIONS

RADFORD ARMY AMMUNITION PLANT, RADFORD, VIRGINIA
FINAL DOCUMENT
JULY 2004