LETTERKENNY ARMY DEPOT

INTERAGENCY AGREEMENT (IAG)

FEDERAL FACILITY AGREEMENT

UNDER CERCLA SECTION 120

ADMINISTRATIVE DOCKET NUMBER: III-FCA-CERC-001

SIGNED 1989

IAG

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
AND THE
PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
AND THE
UNITED STATES ARMY

IN THE MATTER OF:	)	
The U.S. Army's Letterkenny Army Depot, Chambersburg, Pennsylvania and Impacted Environs	)	FEDERAL FACILITY AGREEMENT UNDER CERCLA SECTION 120
	)	Administrative Docket Number: III-FCA-CERC-001

Based on the information available to the Parties on the effective date of this FEDERAL FACILITY AGREEMENT (Agreement), and without trial or adjudication of any issues of fact or law, the Parties hereto agree and it is hereby agreed as follows:

I. JURISDICTION

Each Party is entering into this Agreement pursuant to the following authorities:

A. The U.S. Environmental Protection Agency (U.S. EPA), Region III, enters into those portions of this Agreement that relate to the Remedial Investigation/Feasibility Study (RI/FS) pursuant to Section 120(e)(1) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. Section 9620(e)(1), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), Pub. L. No. 99-499 (hereinafter jointly referred to as CERCLA/SARA or CERCLA), and Sections 6001, 3008(h) and 3004(u) and (v) of the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. Sections 6961, 6928(h), 6924(u) and (v), as amended by the Hazardous and Solid Waste Amendments of 1984 (HSWA) (hereinafter jointly referred to as RCRA/HSWA or RCRA) and Executive Order 12580;

B. U.S. EPA, Region III, enters into those portions of this Agreement that relate to accelerated remedial actions and final remedial actions pursuant to Section 120(e)(2) of CERCLA/SARA, Sections 6001, 3008(h) and 3004(u) and (v) of RCRA and Executive Order 12580;

C. The United States Department of the Army (Army) enters into those portions of this Agreement that relate to the RI/FS pursuant to Section 120(e)(1) of CERCLA, Sections 6001,

3008(h) and 3004(u) and (v) of RCRA, Executive Order 12580, the National Environmental Policy Act, 42 U.S.C. Section 4321, and the Defense Environmental Restoration Program (DERP), 10 U.S.C. Section 2701 et seq.;

D. The Army enters into those portions of this Agreement that relate to accelerated remedial actions and final remedial actions pursuant to Section 120(e)(2) of CERCLA/SARA, Sections 6001, 3004(u) and (v) and 3008(h) of RCRA, Executive Order 12580 and the DERP.

E. The Pennsylvania Department of Environmental Resources (PADER) enters into this Agreement pursuant to CERCLA/SARA, RCRA, the Clean Streams Law, (CSL) 35 P.S. Section 691.1 et seq.; the Solid Waste Management Act, (SWMA) 35 P.S. Section 6018.101 et seq.; Section 1917-A of the the Administrative Code, 71 P.S. Section 510-17; and the rules and regulations promulgated thereunder.

II. Parties

The Parties to this Agreement are the U.S. EPA, PADER and the Army. The terms of this Agreement shall apply to and be binding upon the U.S. EPA, the PADER, their agents, employees and response contractors for the Site and the Army, its agents, employees, response action contractors for the Site and all subsequent owners, operators and lessees of LEAD. When hiring contractors to perform work pursuant to this Agreement, the Army agrees to conduct a preaward survey prior to making a determination of responsibility and to solicit input from EPA and PADER as part of that preaward survey. The Army will notify U.S. EPA and PADER of the identity, qualifications and assigned tasks of each of its contractors performing work under this Agreement upon their selection. Release of potentially confidential information will be subject to Federal Regulations for handling confidential business information. This Agreement shall be enforceable against all of the foregoing via the Parties to this Agreement. This Section shall not be construed as an agreement to indemnify any person. The Army shall notify its agents, employees, response action contractors for the Site, and all subsequent owners, operators and lessees of LEAD of the existence of this Agreement. Each undersigned representative of a Party certifies that he or she is fully authorized to enter into the terms and conditions of this Agreement and to legally bind such Party to this Agreement.

III. Definitions

Except as noted below or otherwise explicitly stated, the definitions provided in CERCLA and SARA shall control the meaning of the terms used in this Agreement.

In addition:

A. "Accelerated Remedial Actions" or "ARA" shall mean Remedial Actions which prevent, control, or respond to a release or threatened release of hazardous substances where prompt action is necessary but a response under removal authorities is not appropriate or desirable.

B. "Agreement" shall mean this document and shall include all Attachments to this document referred to herein. All such Attachments shall be appended to and made an integral and enforceable part of this document.

C. "Closure Requirements" or "RCRA Closure" shall mean the requirements under RCRA, 40 C.F.R. Part 264, and the EPA authorized Pennsylvania program, 25 Pa. Code Section 75.259 et seq., pursuant to Section 3006 of RCRA, 42 U.S.C. Section 6926. These requirements include assessment, abatement, closure, and a post-closure permit.

D. "Days" shall mean calendar days, unless business days are specified. Any Submittal, Written Notice of Position or written statement of dispute that under the terms of this Agreement would be due on a Saturday, Sunday or federal holiday shall be due on the following business day.

E. "LEAD" shall mean the Letterkenny Army Depot, located in Chambersburg, Pennsylvania including all areas identified in Attachment 1.

F. "NPL Area" shall mean those areas of the Site included in the Hazard Ranking Packages which were the basis of published Proposals for inclusion on the National Priorities list.

G. "Non NPL Area" shall mean those areas of the site not included in Hazard Ranking Packages which were the basis of published Proposals for inclusion on the National Priorities List.

H. "PADER" shall mean the Commonwealth of Pennsylvania Department of Environmental Resources.

I. "Site" shall include LEAD and any other areas contaminated by the migration of a hazardous substance, pollutant or contaminant from LEAD as discussed in Section IV of this Agreement.

J. "Submittal" shall mean every document, report, schedule, deliverable, work plan or other item to be submitted by one party to another party pursuant to this Agreement.

K. "U.S. Army" or "Army" shall mean the U.S. Department of the Army.

L. "U.S. EPA" or "EPA" shall mean the United States Environmental Protection Agency.

IV. Site

For the purposes of this Agreement, the approximately twenty thousand (20,000) acre area comprising the LEAD and the off-post area contaminated by the migration of hazardous substances, pollutants, or contaminants, from LEAD shall constitute the Letterkenny Army Depot Site (hereafter referred to as the Site). Present information is inadequate to map the exact geographic extent of the Site. The necessary information will be developed during the LEAD RI/FS'S. The Parties may change the Site description on the basis of additional investigations including the Site Remedial Investigation performed by the Army, as described in Section IX below to more accurately reflect the areas contaminated by Volatile Organic Compounds (VOCs), other hazardous substances, pollutants or contaminants related in whole or in any part to the LEAD. The work to be performed under this Agreement will conform to the definition of the Site established by the Parties. LEAD lies within the boundaries of the current Site definition.

V. PURPOSE

A. The general purposes of this Agreement are to:

1. ensure that the environmental impacts associated with past and present activities at the Site are thoroughly investigated and appropriate remedial action taken as necessary to protect the public health, welfare and the environment;

2. establish a procedural framework and schedule for developing, implementing and monitoring appropriate response actions at the Site in accordance with CERCLA/SARA, the National Contingency Plan ("NCP"), Superfund guidance and policy, RCRA, RCRA guidance and policy; and, State statutes, regulations, and publicly available written guidance and policy.

3. facilitate cooperation, exchange of information and participation of the Parties in such actions.

B. Specifically, the purposes of this Agreement are to:

1. Identify Accelerated Remedial Action (ARA) alternatives which are appropriate at the Site prior to the implementation of final remedial action(s) for the Site. ARA alternatives shall be identified and proposed to the Parties as early as possible prior to formal proposal of ARAs to U.S. EPA and PADER pursuant to CERCLA/SARA and this Agreement. This process is designed to promote cooperation among the Parties in identifying ARA alternatives prior to selection of final ARAs.

2. Establish requirements for the performance of RI's to determine fully the nature and extent of the threat to the public health or welfare or the environment caused by the release

and threatened release of hazardous substances, pollutants or contaminants at the Site and to establish requirements for the performance of FS's for the Site to identify, evaluate, and select alternatives for the appropriate remedial actions(s) to prevent, mitigate, or abate the release or threatened release of hazardous substances, pollutants or contaminants at the Site in accordance with CERCLA/SARA.

3. Identify the nature, objective and schedule of response actions to be taken at the Site. Response actions at the Site shall attain that degree of cleanup of hazardous substances, pollutants or contaminants mandated by CERCLA/SARA.

4. Implement the selected remedial action(s) in accordance with CERCLA and meet the requirements of Section 120(e)(2) of CERCLA for an interagency Agreement between U.S. EPA and the Army.

5. Assure compliance, through this Agreement, with RCRA and other federal and state environmental laws and regulations for matters covered herein.

6. Coordinate response actions at the Site with the mission and support activities at the Letterkenny Army Depot.

7. Expedite the cleanup process consistent with protection of human health and the environment.

8. Preserve PADER's independent authority, as set forth in this Agreement and to the extent authorized by law, against the Army to address contamination and other pollution problems related to LEAD, including closure requirements for the Industrial Waste Treatment Plant (IWTP) Lagoons.

VI STATUTORY COMPLIANCE/RCRA-CERCLA INTEGRATION

A. The Parties intend to integrate the Army's CERCLA response obligations and RCRA corrective action obligations which relate to the release(s) of hazardous substances, hazardous wastes, pollutants or contaminants covered by this Agreement into this comprehensive Agreement. Therefore, the Parties intend that activities covered by this Agreement will achieve compliance with CERCLA, 42 U.S.C. Section 9601 et seq.; to satisfy the corrective action requirements of Sections 3004(u) and (v) of RCRA, 42 U.S.C. Section 6924(u) and (v), for a RCRA permit, and Section 3008(h), 42 U.S.C. Section 6928(h), for interim status facilities; and to meet or exceed all applicable or relevant and appropriate Federal and State Laws and requirements to the extent required by Section 121 of CERCLA, 42 U.S.C. Section 9621.

B. Based upon the foregoing, the Parties intend that any remedial action selected, implemented and completed under this Agreement shall also constitute corrective action under RCRA, and therefore, provided that the requirements of CERCLA and

RCRA are to be satisfied in the work performed under this Agreement, no further corrective action shall be required. The Parties agree that with respect to releases of hazardous waste covered by this Agreement, RCRA shall be considered an applicable or relevant and appropriate requirement pursuant to Section 121 of CERCLA.

C. The Parties recognize that the requirement to obtain permits for removal or remedial actions undertaken pursuant to this Agreement at the NPL Areas of the Site shall be as provided for in CERCLA and applicable regulations including the NCP pursuant to SARA. The Parties further recognize that other activities conducted on the non NPL areas of the site, including closure of the IWTP lagoons at LEAD require the issuance of permits under Federal and State laws. This Agreement does not affect any such permit requirements, nor shall it be construed to waive permit requirements for activities at the Site unrelated to the work conducted pursuant to CERCLA at the NPL areas.

D. In the event that a corrective action permit is issued to the Army for any portion of the Site, U.S. EPA shall reference and incorporate any appropriate provisions, including appropriate schedules (and the provision for extension of such schedules) of this Agreement into such permit. The parties intend that the judicial review of any portion of a corrective action permit issued by EPA which so references this Agreement shall, to the extent authorized by law, only be reviewed under the provisions of CERCLA. Provisions of any RCRA permit for the Site which are outside the scope of the CERCLA remediation as provided in this Agreement shall be reviewable as provided by law for RCRA permits and shall not be affected by this Section. Where RCRA permit conditions in any RCRA permits are based on requirement of State Law and are outside the scope of the CERCLA remediation as provided in this Agreement, such conditions shall be reviewed under Pennsylvania Law.

E. Nothing in this Section shall alter the Army's or EPA's authority with respect to removal actions conducted pursuant to Section 104 of CERCLA. Nothing in this Section shall alter PADER's rights with respect to such removal actions.

VII. Findings

For purposes of this Agreement, the following constitutes a summary of the findings upon which this Agreement is based.

1. The United States acquired approximately 20,000 acres of land in Chambersburg, Franklin County, Pennsylvania and began construction of LEAD in 1942. LEAD has operated consistently since 1942. Initially an ammunition depot, operations at LEAD evolved to include overhauling, rebuilding and testing of wheeled and tracked vehicles; issue and shipment of

Class III chemicals and petroleum; and storage, maintenance, demilitarization, and modification of non-nuclear munitions. Industrial operations associated with current or previous activities include stripping, plating, lubrication, demolition, washout/deactivation of munitions, electroplating, chemical conversion coating of aluminum, paint removal, and vehicular parts cleaning.

2. Some of the production, storage and disposal activities have caused or are contributing to the releases and threatened releases of hazardous substances, pollutants, contaminants and hazardous wastes and/or hazardous waste constituents at the Site.

3. In 1979, as part of the DOD's Installation Restoration Assessment Program, the U.S. Army Toxic Hazardous Materials Agency prepared a report entitled Installation Assessment of Letterkenny Army Depot, Report No. 161 (hereinafter "Report 161"). The report identified potential environmental contaminants at LEAD as trichloroethylene, other chlorinated organic compounds, hydrocarbons, solvents, heavy metals, pesticides, explosives, phenolics, and phosphorus. The Report recommended a survey be initiated and that LEAD expand its water quality program to include analysis of heavy metals, pesticides, and explosives at all stream exits.

4. Sampling and analysis of residential wells adjacent to LEAD detected the presence of contaminants, and in October of 1982 LEAD began providing bottled water to off-post residents with contaminated wells.

5. The environmental studies listed below were performed by the U.S. Army Toxic and Hazardous Materials Agency ("USATHMA") at the Site:

June 1983: "Geophysical Survey of the Southeast Area of LEAD" A geophysical survey consisting of magnetometer, metal detection, electromagnetic induction and ground-penetrating radar was performed over approximately 80 acres primarily in the Disposal Area ("DA"). Large amounts of buried metallic masses were identified in the DA.

September 1983: "Environmental Contamination Survey of LEAD: Southeast Industrial Area" Eight shallow and nine deep wells were installed in this initial RI-type investigation. Groundwater contamination in the Southeast Industrial Area ("SIA") by volatile organic hydrocarbons was confirmed, but no sources could be clearly defined, although it was determined that the most likely source was in the vicinity of building 350. A groundwater divide around Gate 6 was postulated.

October 1983: "Environmental Contamination Survey of LEAD: Property Disposal Office Drainage Area" A parallel effort with the September 1983 study at the SIA, this effort involved four monitoring wells in the PDO Area. In addition, 9

groundwater samples, 2 surface water samples, 5 sediment samples and 8 soil samples were taken.

December 1983: "Environmental Contamination Survey of LEAD: Exploratory and Confirmatory Phases" Fifteen additional wells were installed under the Exploratory Phase. The sampling effort encompassed 50 groundwater, 14 surface water, 14 sediment and 1 background soil samples. This study concluded that the source areas in the PDO included the revetted area, the Fire Training Oil Burn Pit and the Security Landfill.

February 1984: "LEAD Remedial Investigation and Feasibility Study" This study report represents an attempt to evaluate potential remedial actions that could be applied to the contamination source areas at LEAD. The alternatives assessed included Site Containment, Off-Site Disposal, Waste Decontamination and Soil Removal. Field investigations aimed at source definition included waste borings, soil borings, exploratory trench excavations, shallow trench pits and well points.

May 1984: "Environmental Contamination Survey of LEAD: Multi-Phase Investigation Summary" This report was generated as an integrated summary of the project efforts, major findings, conclusions and recommendations of the 1983 studies.

January 1986: "Environmental Contamination Survey of LEAD" This effort involved a year of quarterly sampling and analysis. Time-equivalent data on groundwater contamination levels were obtained from 13 monitoring wells in the PDO Area, and 22 wells in the SIA. Three new wells were installed at the southern end of Rocky Spring Lake.

February 1986: "Pilot Investigation of Low Temperature Thermal Stripping of Volatile Organic Compounds (VOC's) from Soil"

August 1986: "Remedial Investigation of the Disposal Area at LEAD" This report was generated in an attempt to provide EPA with a document acceptable in format and content with the newly-published "Guidance for Remedial Investigations under CERCLA." The report incorporated all previous studies.

October 1986: "Records Search of the Southeast Industrial Area at LEAD" A second, intensive record search of previous activities in the SIA was performed. A reassessment of Report 161 was conducted including an intensive records search of previous activities of the SIA.

March 1987: "Fracture Trace Analysis of Letterkenny Army Depot" The U.S. EPA EPIC laboratory performed a fracture trace analysis for USATHMA. The study included both on and off-post areas.

May 1987: "Geophysical Investigation of the Eastern

Boundary at LEAD" As part of the current RI/FS contract, further geophysical investigations were done to better define the fracture system and bedrock juxtapositioning along the eastern boundary of the Depot.

6. Funds were provided in 1984 by the Army to Guilford Water Authority for the installation of an alternative water supply for affected households.

7. In September 1987, the alternative water supply via the Guilford Water Authority was completed. Two additional residences are presently being supplied with bottled water, and permanent water supplies are planned.

8. The Southeast Industrial Area of LEAD was proposed for inclusion on the National Priorities List in Update Number 2, 49 Fed. Reg. 40320 (October 15, 1984). The listing was finalized in 52 Fed. Reg. 27620 (July 22, 1987).

9. The Property Disposal Area of LEAD was proposed for listing on the National Priorities List in Update Number 3, 50 Fed. Reg. 14115 (April 10, 1985).

10. On October 17, 1986, the Superfund Amendments and Reauthorization Act of 1986 (SARA) was signed into law by President Reagan. Section 120 of SARA specifically applies to federal facilities.

VIII. U.S. EPA AND PADER DETERMINATIONS

The Army specifically reserves its rights to challenge these determinations if and when it becomes appropriate.

1. There has been a release or substantial threat of release of hazardous substances in the vicinity of LEAD.

2. The actions provided for in this Agreement are consistent with the NCP.

3. The actions provided for in this Agreement are necessary to protect the public health or welfare or the environment.

4. This Agreement provides for the expeditious completion of all necessary remedial actions.

5. LEAD is a Facility as defined by Section 101(9) of CERCLA, 42 U.S.C. Section 9601(9).

6. The United States is a person as defined by Section 101(21) of CERCLA, 42 U.S.C. Section 9601(21). The United States is the owner and operator of LEAD as defined in Sections 101(20) and 107(a)(1) of CERCLA, 42 U.S.C. Sections 9601(20) and 9607(a)(1). The Army is the department of the United States

charged with fulfilling the obligations of the owner/operator under CERCLA at LEAD.

7. From approximately 1960 until January 1988, the Army accepted wastes at the IWTP Lagoons. From at least January 1982 to January 1988, the Army accepted wastes which were listed hazardous wastes pursuant to Section 103 of the SWMA, 35 P.S. Section 6018.103 and 25 Pa. Code Section 261, as well as Section 3001 of RCRA, 42 U.S.C. Section 6921, and 40 C.F.R. Parts 260 and 261, at the IWTP Lagoons.

8. The IWTP Lagoons are hazardous waste surface impoundments as defined in 40 C.F.R. Part 260 and 25 Pa. Code Section 75.260, and are subject to, inter alia, the SWMA, and 25 Pa. Code Sections 75.259 et seq., as well as RCRA and 40 C.F.R. Parts 264 et seq.

9. The Army is subject to, inter alia, the assessment, abatement, and closure requirements of 25 Pa. Code Sections 75.264 - 75.265 and 75.270 - 75.282, including the permit and planning requirements for closure and post-closure in 25 Pa. Code Sections 75.265 - 75.282, pursuant to 25 Pa. Code Section 75.264(a)(1).

IX. Work to be Performed

A. Integration With Ongoing Work

It is the intent of the Parties to this Agreement that work done and data generated prior to the effective date of this Agreement be retained and utilized as elements of the RI/FS to the maximum extent feasible without violating applicable or relevant and appropriate laws, regulations, or guidelines and without risking significant technical errors.

The Parties acknowledge that the Army is in the process of conducting some of the work to be performed pursuant to this Agreement. The Army need not halt currently ongoing work but shall be obligated to modify or supplement work previously done to produce a final product which passes the EPA and PADER review as set forth herein.

B. Initial Review of Existing Documents by EPA/PADER

The Parties recognize that a significant amount of background information exists, and must be reviewed prior to developing the Scopes of Work required by this Agreement.

The Army will provide EPA and PADER with copies of all relevant studies and reports within 14 days following the effective date of this Agreement.

Within 120 days following receipt of the studies and reports, EPA and PADER will each provide comments to the Army

identifying data gaps and quality control problems in the existing studies and reports. The Army shall utilize the EPA and PADER comments when preparing the Scope(s) of Work called for by this Agreement.

During the 120 day period, the project managers shall make themselves available to meet and confer as necessary to facilitate this process. The 120 day period may be extended for good cause as provided in Section XXX, Extensions, of this Agreement.

C. REMOVALS

Removal activities will be taken at LEAD if:

1. The Army determines that a removal is appropriate; or
2. EPA or PADER requests that a removal be conducted and
   a. The Army agrees to perform such removal; or
   b. It is determined through dispute resolution that a removal is appropriate.

Except as otherwise provided by this Section, prior to initiating removal activities, the Army shall notify EPA and PADER in writing by return receipt mail or hand delivery of its proposed removal action; and allow EPA and PADER an adequate opportunity for timely review and comment. The Army notification shall contain adequate specificity to permit meaningful review and comment. If EPA or PADER propose an overlapping or inconsistent Accelerated Remedial Action, the review and comment period on the removal activities shall last at least until any disputes over the need for the overlapping or inconsistent ARA are resolved in accordance with Section XI, (Resolution of Disputes) of this Agreement. An Emergency removal action taken because of imminent and substantial endangerment to human health or the environment may be taken by the Army without following the notice and comment procedures of this paragraph only if consultation would be impractical. The Army agrees to only exercise its removal authority in a manner which is consistent with the purposes of this Agreement, including the review and consultation provisions set forth herein.

D. ACCELERATED REMEDIAL ACTIONS

1) Accelerated Remedial Actions (ARAs) are Remedial Actions which prevent, control, or respond to a release or threatened release of hazardous substances where prompt action is necessary but a response under removal authorities is not appropriate or desirable. ARA's will follow a stream-lined remedial process as set forth below. Areas of the Site which are the subject of ARAs ordinarily will need to be evaluated in a subsequent ROD to determine whether or not the ARA meets final clean up standards. For ARAs performed in the non-NPL areas of

the Site, the Army will be required to obtain all appropriate State and local permits.

2) Within 60 days following the effective date of this Agreement, the Army shall complete a draft Focused Feasibility Study(FFS) and draft operable unit ROD for each of the following ARAs:

a. Contaminant source treatment/removal of volatile organic compounds (VOC's) at sites K-1, and K-2, the PDO drum storage revetments, and the clay lined burn pit (see Attachment 2 map).

b. Contaminant source treatment/removal of the fire training pit and surrounding contaminated soil (see Attachment 2 map).

3) The Army may evaluate the following proposed ARA's:

a. Groundwater treatment of VOC's at Rowe Spring.

b. Groundwater treatment of VOC's at Rocky Spring.

4) Additional ARA's may be proposed by any Party during the course of this Agreement as technical data becomes available. The Army shall evaluate all proposed ARAs unless it is decided, by agreement of the parties or through dispute resolution as provided by Section XI, that the proposed ARA should not be considered. Within 30 days following proposal of an ARA by any Party, or following resolution of any dispute regarding the need to evaluate a proposed ARA, the Army shall propose a deadline for completion of the draft FFS and draft Operable Unit ROD. The Parties shall consider and approve or modify the proposed deadlines. Once approved or modified by agreement of the Parties or through dispute resolution, the deadlines shall become requirements of this Agreement.

5) For each ARA to be evaluated the Army shall develop a draft FFS and Operable Unit ROD. The FFS shall be a primary document as defined in Section X. Following finalization of the FFS as provided in Section X, Consultation with EPA and PADER, the FFS and draft ROD shall be published for public review and comment. The Parties shall review the alternative remedial actions in the draft ROD and jointly select a remedial action(s). At a minimum, the parties shall have 15 days to attempt to jointly select a remedy. If, within this time, the Parties are unable to jointly select a remedy, the Administrator of EPA shall select a remedial action(s). Such selection shall not be subject to dispute by the Army. PADER reserves its rights, to the extent provided by law, to seek appropriate relief with respect to EPA's selection of a remedial action(s). Within 30 days after final selection of the ARA, the Army shall revise the draft ROD to conform to the selected remedial alternative and the Army shall submit a Work Plan for implementing the selected ARA. The ARA

Work Plan shall be a primary document as described in Section X and shall contain a schedule for completion of the ARA. The Army shall implement finalized ARA Work Plans.

6) Nothing in this Section shall be construed to affect the RCRA closure of the IWTP Lagoons.

E. Scope of Work

The Army shall develop and submit to EPA and PADER a Scope of Work (SOW) for the completion of an RI/FS for each operable unit other than ARA's within 45 days of receipt of EPA and PADER comments on existing reports and studies as described in this section. Each SOW shall describe an RI/FS which meets the requirements of all relevant laws and requirements and contains enough specificity for EPA and PADER to determine that all major elements of an RI/FS are provided for. Each SOW shall be a Primary Document as described in Section X (Consultation with EPA and PADER) of this Agreement.

F. Work Plans

The Army shall develop and submit to EPA and PADER a Work Plan (WP) for the completion of an RI/FS for each operable unit. Each WP shall provide for the performance of an RI/FS which meets the requirements of all relevant laws and requirements including EPA RI/FS guidance documents and contain enough specificity for EPA and PADER to determine that the subject RI/FS will be adequate. Each WP shall contain a schedule for the completion of the RI/FS. Each WP shall be a Primary Document as described in Section X (Consultation with EPA and PADER) of this Agreement. Each WP shall be delivered within 180 days following approval by EPA and PADER of the corresponding SOW.

G. Remedial Investigation

For each Operable Unit at the Site, the Army shall develop, implement and report upon an RI which shall be finalized as provided for by Section X (Consultation with EPA and PADER) of this Agreement, and which is in accordance with the requirements and time schedules set forth in the approved Work Plan. The RI shall meet the purposes set forth in Section IX (Remedial Action Selection) of this Agreement.

The Parties specifically agree that all criteria contained in the approved Work Plans relate solely to the scope of the RI's and do not reflect a predetermination of the Site cleanup level criteria. The parties further agree that final Site clean-up level criteria will only be determined following completion of the Endangerment Assessment, except as provided in Section IX (Remedial Action Selection) of this Agreement. The Army need not perform an RI for the IWTP Lagoons which will undergo RCRA closure.

H. Feasibility Study

For each operable unit at the Site, the Army shall design, propose, undertake and report upon an FS which shall be finalized as set forth in Section X (Consultation with EPA and PADER) and which is in accordance with the requirements and time schedules set forth in the approved Work Plan. The FS shall meet the purposes set forth in Section IX (Remedial Action Selection) of this Agreement. The Army need not perform an FS for the IWTP Lagoons which will undergo RCRA closure.

I. Remedial Action Selection and Implementation

Following completion of the RI and the FS for each operable unit, and review of those documents as defined in Section X of this Agreement by U.S. EPA and PADER, the Army shall, after consultation with U.S. EPA and PADER, publish its proposed plan for public review and comment. The Army shall submit its draft ROD to U.S. EPA and PADER within 30 days following the close of the public comment period. The Parties shall review the alternative remedial actions in the draft ROD and jointly select a remedial action(s). At a minimum, the parties shall have 15 days to attempt to jointly select a remedy. If the Parties are unable to jointly select a remedy within this time period, the Administrator of EPA shall select a remedial action(s). EPA shall provide PADER and the Army with a final draft copy of EPA's final selection of a remedial action, including attachments, by return receipt mail or hand delivery, at least five (5) days in advance of the effective date of such final selection. Within 30 days following selection of the Remedial Action(s), the draft ROD shall be revised to be consistent with the selected remedy (if necessary). The selection of remedial action(s) by the U.S. EPA Administrator shall be final and not subject to dispute by the Army. Within 21 days following the final selection of a remedial action, the Army will propose a remedial design due date. If EPA or PADER disagrees with this date, the date will be established through dispute resolution. Following final selection by U.S. EPA, the Army shall design, propose and submit a plan for implementation of the selected remedial action, including appropriate timetables and schedules, to U.S. EPA and PADER for review. Following the review, the Army shall implement the remedial action(s) as approved and in accordance with the requirements and time schedules set forth in the remedial design. A dispute arising under this Section, on any matter other than U.S. EPA's final selection of a remedial action, shall be resolved pursuant to Section XI (Resolution of Disputes), provided however, that PADER reserves its rights to the extent provided by law, to seek appropriate relief with respect to EPA's final selection of a remedial action.

The purpose of the plan for remedial action is to establish procedures for implementation of selected response actions.

J. Site Investigation

The RCRA Facility Assessment (RFA) of LEAD identified seventy one grouped Solid Waste Management Units (SWMU's). Two additional areas of concern were identified during the EPA/Army/PADER field verification of the RFA.

Of the seventy one SWMU's, fifty seven are included in the ongoing CERCLA RI/FS activities. The Army will initiate a site investigation to determine if there have been releases of hazardous wastes or hazardous materials to the environment from the SWMU's which are not included in the current RI/FS's.

The Army will conduct a Site Investigation for the fourteen remaining SWMU's and the areas of concern associated with the Strategic Materials Storage areas in accordance with current CERCLA/SARA guidance for conducting Extended Site Investigations (SI). The SWMU's to be studied are identified in Attachment 3 to this Agreement.

Within 14 days of the effective date of this Agreement the Army shall submit to the other Parties a proposed schedule for completion of the Site Investigation including the submission of a work plan which will be subject to review as a primary document. The Parties shall consider and approve or modify the proposed deadlines. Once approved the deadlines shall become requirements of this Agreement. Any disputes shall be subject to the provisions of Section XI (Resolution of Disputes).

Based on the review of the SI, the Parties will determine which (if any) of the SWMU's will move into the RI/FS process. If a new RI/FS is required, the Army shall submit to EPA and PADER a Scope of Work which will contain a schedule for completion of the RI/FS within 45 days of notification by EPA and PADER of the requirement. The Scope of Work shall be a primary document. If the Parties cannot agree on the need for additional RI/FS work, the Dispute Resolution provisions of this Agreement shall be invoked.

K. Closure Requirements

A. LEAD shall perform closure, including assessment and abatement, at the Industrial Waste Treatment Plant Lagoons (IWTP Lagoons) as required by PADER and described in Attachment 4. Nothing in this Agreement shall be construed to affect in any way the requirements for RCRA closure of the IWTP Lagoons required by PADER.

B. The closure requirements for the IWTP Lagoons shall be performed such that remedial action under CERCLA will not be necessary. The Lagoons shall not be the basis of an RI/FS or ROD unless, following completion of the RCRA closure, the following conditions are met:

1) A determination is made that:

a. as a result of the release or threat of release of a hazardous substance, pollutant, or contaminant at or from the Site, an additional response action is necessary and appropriate to assure the protection of human health and the environment; or

b. there is or has been a release of hazardous waste into the environment and corrective action is necessary to protect human health or the environment.

2) The determination is based on significant new information which was not considered in scoping and designing the RCRA Closure.

C. Any dispute arising under Section IX Subsection K (Closure) shall be resolved following the process set forth in Section XI (Resolution of Disputes) except that following resolution attempts by the SEC, the Secretary of PADER shall make the final decision. The Army and EPA each reserve the right, to the extent provided by law, to seek appropriate relief of the Secretary's final decision.

X. CONSULTATION WITH EPA and PADER

Review and Comment Process for Draft and Final Documents

A. Applicability:

The provisions of this Section establish the procedures that shall be used by the Army, PADER and U.S. EPA to provide the Parties with appropriate notice, review, comment, and responses regarding RI/FS and RD/RA documents, specified herein as either primary or secondary documents. In accordance with Section 120 of CERCLA and 10 U.S.C. Section 2705, the Army will normally be responsible for issuing primary and secondary documents to U.S. EPA and PADER. As of the effective date of this Agreement, all draft and final reports for any document identified herein shall be prepared, distributed and subject to dispute in accordance with Paragraphs B through J below.

The designation of a document as "draft" or "final" is solely for purposes of consultation with U.S. EPA and PADER in accordance with this Section. Such designation does not affect the obligation of the Parties to issue documents, which may be referred to herein as "final", to the public for review and comment as appropriate and as required by law. All documents identified below shall be considered "reports" pursuant to Section XVI (Notification).

B. General Process for RI/FS and RD/RA documents:

1. Primary documents include those reports that are major, discrete portions of RI/FS or RD/RA activities. Primary documents are initially issued by the Army in draft subject to review and comment by U.S. EPA and PADER. Following receipt of comments on a particular draft primary document, the Army will respond to the comments received and issue a draft final primary document subject to dispute resolution. The draft final primary

document will become the final primary document either 45 days after receipt of a draft final document if dispute resolution is not invoked or as modified by decision of the dispute resolution process. The 45 day period for review of a draft final document may be extended for good cause using the procedures and standards set forth in paragraph G of this Section.

2. Secondary documents include those reports that are discrete portions of the primary documents and are typically input or feeder documents. Secondary document are issued by the Army in draft subject to review and comment by PADER and U.S. EPA. Although the Army will respond to comments received, the draft secondary documents may be finalized in the context of the corresponding primary documents. A secondary document may be disputed at the time the corresponding draft final primary document is issued.

C. Primary Reports:

1. The Army shall complete and transmit draft reports for the following primary documents for each study area to U.S. EPA and PADER for review and comment in accordance with the provisions of this Section:

1. Scope of Work
2. RI/FS Work Plan, including Sampling and Analysis Plan and QAPP
3. Endangerment Assessment
4. RI Reports
5. Initial Screening of Alternatives
6. FS Reports (including Focused FS's)
7. Proposed Plans
8. Remedial Designs
9. Remedial Action Work Plans
10. Community Relations Plan
11. Site Investigation Work Plan

2. Only the draft final reports for the primary documents identified above shall be subject to dispute resolution. The Army shall complete and transmit draft primary documents in accordance with the timetable and deadlines established in Section XXIX, Deadlines, of this Agreement.

D. Secondary Documents:

1. The Army shall complete and transmit draft reports for the following secondary documents to U.S. EPA and PADER for review and comment in accordance with the provisions of this Section:

1. Detailed Analysis of Alternatives

2. Post-screening Investigation Work Plan

3. Treatability Studies

4. Sampling and Data Results

2. Although U.S. EPA and PADER may comment on the draft reports for the secondary documents listed above, such documents shall not be subject to dispute resolution except as provided by Paragraph B hereof. Target dates shall be established for the completion and transmission of draft secondary reports pursuant to Section XXIX (Deadlines) of this Agreement.

E. Meeting of the Project Managers on Development of Reports:

The Project Managers shall meet approximately every thirty (30) days, except as otherwise agreed by the Parties, to review and discuss the progress of work being performed at the Site on the primary and secondary documents. Prior to preparing any draft report specified in paragraphs C and D above, the Project Managers shall meet to discuss the report results in an effort to reach a common understanding, to the maximum extent practicable, with respect to the results to be presented in the draft report.

F. Identification and Determination of Potential ARARs:

1. For those primary reports or secondary documents that consist of or include ARAR determinations, prior to the issuance of a draft report, the Project Managers shall meet to identify and propose, to the best of their ability, all potential ARARs pertinent to the report being addressed. Draft ARAR determinations shall be prepared by the Army in accordance with Section 121(d)(2) of CERCLA, the NCP, pertinent guidance issued by U.S. EPA, and publicly available written PADER guidance which is not inconsistent with CERCLA and the NCP.

2. In identifying potential ARARs, the Parties recognize that actual ARARs can be identified only on a site-specific basis and that ARARs depend on the specific hazardous substances, pollutants and contaminants at a site, the particular actions proposed as a remedy and the characteristics of a site. The Parties recognize that ARAR identification is necessarily an iterative process and that potential ARARs must be identified throughout the response process.

G. Review and Comment on Draft Reports:

1. The Army shall complete and transmit each draft primary report to U.S. EPA and PADER on or before the corresponding deadline established for the issuance of the report. The Army shall complete and transmit the draft secondary document in accordance with the target dates established for the issuance of such reports established pursuant to Section XXIX, Deadlines, of this Agreement.

2. Unless the Parties mutually agree to another time period, all draft reports shall be subject to a 45 day period for review and comment. Review of any document by the EPA or PADER may concern all aspects of the report (including completeness) and should include, but not be limited to, technical evaluation of any aspect of the document, and consistency with CERCLA, the NCP and any pertinent requirements. Comments shall be provided with adequate specificity so that the Army may respond to the comment, and if appropriate, make changes to the draft report. Comments shall refer to any pertinent sources of authority or references upon which the comments are based, and upon request of the Army, the EPA or PADER shall provide a copy of the cited authority or reference. In cases of complex, or unusually lengthy reports, EPA or PADER may extend the 45 day comment period for an additional 20 days by written notice to the other Parties prior to the end of the 45 day period. The time for review of any submittal by EPA or PADER may be further extended for good cause. Good cause shall include force majeure events as defined in this Agreement, and any other situation which the Parties agree justify an extension of time. The extension provided for in this Section shall be for only the duration of the force majeure event, or for such other period as the Parties agree is justified. An environmental emergency of a magnitude that requires a major and unexpected reallocation of resources shall constitute good cause for an extension. On or before the close of the comment period, the EPA and PADER shall transmit by next day mail their written comments to the other Parties.

3. Representatives of the Army shall make themselves readily available to U.S. EPA and PADER during the comment period for purposes of informally responding to questions and comments on draft reports. Oral comments made during such discussions need not be the subject of a written response by the Army on the close of the comment period.

4. In commenting on a draft report which contains a proposed ARAR determination, U.S. EPA and PADER shall include a reasoned statement of whether they object to any portion of the proposed ARAR determination. To the extent that U.S. EPA or PADER does object, it shall explain the bases for its objection in detail and shall identify any ARARs which it believes were not properly addressed in the proposed ARAR determination.

5. Following the close of the comment period for a draft report, the Army shall give full consideration to all written comments on the draft report submitted during the comment period. Within 30 days of the close of the comment period on a draft secondary report, the Army shall transmit to U.S. EPA and PADER its written response to comments received within the comment period. Within 30 days of the close of the comment period on a draft primary report, the Army shall either transmit to U.S. EPA and PADER a draft final primary report, which incorporates all comments received from EPA and PADER within the comment period, or dispute any comment provided by EPA or PADER to which the Army objects. While the resulting draft final report shall be the responsibility of the Army, it shall be the product of consensus to the maximum extent possible.

6. The Army may extend the 30-day period for either responding to comments on a draft report or for issuing the draft final primary report for an additional 20 days by providing notice to U.S. EPA and PADER. In appropriate circumstances, this time period may be further extended in accordance with Section XXX (Extensions) of this Agreement.

H. Availability of Dispute Resolution for Draft Final Primary Documents:

1. Dispute resolution shall be available to the Parties for draft final primary reports as set forth in Section XI (Resolution of Disputes) of this Agreement.

2. When dispute resolution is invoked on a draft primary report, work may be stopped in accordance with the procedures set forth in Section XI (Resolution of Disputes).

I. Finalization of Report:

The draft final primary report shall serve as the final primary report if no party invokes dispute resolution regarding the document or, if invoked, at completion of the dispute resolution process should the Army's position be sustained. If the Army's determination is not sustained in the dispute resolution process, the Army shall prepare, within not more than 35 days, a revision of the draft final report which conforms to the results of dispute resolution. In appropriate circumstances, the time period for this revision may be extended in accordance with Section XXX (Extensions) hereof.

J. Subsequent Modifications of Final Reports:

Following finalization of any primary report pursuant to Paragraph I above, U.S. EPA, PADER, or the Army may seek to modify the report, including seeking additional field work, pilot studies, computer modeling or other supporting technical work, only as provided in Paragraphs 1 and 2 below.

1. PADER, U.S. EPA or the Army may seek to modify a

primary report after finalization if it determines, based on new information (i.e., information that became available, or conditions that became known, after the report was finalized) that the requested modification is necessary. PADER, U.S. EPA or the Army may seek such a modification by submitting a concise written request to the Project Manager of the other Parties. The request shall specify the nature of the requested modification and how the request is based on new information.

2. In the event that a consensus is not reached by the Project Managers on the need for a modification, any party may invoke dispute resolution to determine if such modification shall be conducted. Modification of a report shall be required only upon a showing that: 1) the requested modification is based on significant new information, and 2) the requested modification could be of significant assistance in evaluating the selection of remedial alternatives, or in protecting human health or welfare or the environment.

3. Nothing in this Subpart shall alter PADER or U.S. EPA's ability to request the performance of additional work which was not contemplated by this Agreement. The Army's obligation to perform such work must be established by either a modification of a report or document or by amendment to this Agreement.

XI. Resolution of Disputes

Except as specifically set forth elsewhere in this Agreement, if a dispute arises under this Agreement the procedures of this Section shall apply.

All Parties to this Agreement shall make reasonable efforts to informally resolve disputes at the Project Manager or immediate supervisor level. If resolution cannot be achieved informally, the procedures of this Section shall be implemented to resolve a dispute.

A. Within thirty (30) days after: (1) receipt of a draft final primary document pursuant to Section XXIX (Deadlines) of this Agreement, or (2) any action which leads to or generates a dispute, the disputing Party shall submit to the Dispute Resolution Committee (DRC) a written statement of dispute setting forth the nature of the dispute, the work affected by the dispute, the disputing Party's position with respect to the dispute, and the technical, legal or factual information the disputing Party is relying upon to support its position.

B. Prior to any Party's issuance of a written statement of dispute, the disputing Party shall engage the other Parties in informal dispute resolution among the Project Managers and/or their immediate supervisors. During this informal dispute resolution period the Parties shall meet as many times as are reasonably necessary to discuss and attempt resolution of the dispute.

C. The DRC will serve as a forum for resolution of disputes for which agreement has not been reached through informal dispute resolution. The Parties shall each designate one individual and an alternate to serve on the DRC. The individuals designated to serve on the DRC shall be employed at the policy level (SES or equivalent) or be delegated the authority to participate on the DRC for the purposes of dispute resolution under this Agreement. The U.S. EPA representative on the DRC is the Hazardous Waste Management Division Director of U.S. EPA's Region III. The Army's designated member is the Letterkenny Army Depot Commander. PADER's representative on the DRC is the Regional Solid Waste Manager. Written notice of any delegation of authority from a Party's designated representative on the DRC shall be provided to all other Parties pursuant to the procedures of Section XVI, Notifications.

D. Following elevation of a dispute to the DRC, the DRC shall have twenty one (21) days to unanimously resolve the dispute and issue a written decision. If the DRC is unable to unanimously resolve the dispute within this twenty-one (21) day period the written statement of dispute shall be forwarded to the Senior Executive Committee (SEC) for resolution, within seven (7) days after the close of the twenty-one (21) day resolution period.

E. The SEC will serve as the forum for resolution of disputes for which agreement has not been reached by the DRC. The U.S. EPA representative on the SEC is the Regional Administrator of U.S. EPA's Region III. The Army's representative on the SEC is the Assistant Secretary of the Army. PADER's representative on the SEC is the Regional Environmental Protection Director. The SEC members shall, as appropriate, confer, meet and exert their best efforts to resolve the dispute and issue a written decision. If unanimous resolution of the dispute is not reached within twenty-one (21) days, U.S. EPA's Regional Administrator shall issue a written position on the dispute. The Army or PADER may, within fourteen (14) days of the Regional Administrator's issuance of U.S. EPA's position, issue a written notice elevating the dispute to the Administrator of U.S. EPA for resolution in accordance with all applicable laws and procedures. In the event that the Army and PADER elect not to elevate the dispute to the Administrator within the designated fourteen (14) day escalation period, the Army and PADER shall be deemed to have agreed with the Regional Administrator's written position with respect to the dispute.

F. Upon escalation of a dispute to the Administrator of U.S. EPA pursuant to Subpart E, the Administrator will review and resolve the dispute within twenty-one (21) days. Upon request, and prior to resolving the dispute, the U.S. EPA Administrator shall meet and confer with the Army's Secretariat Representative and the Secretary of PADER or his representative to discuss the issues(s) under dispute. Upon resolution, the Administrator shall provide the Army and PADER with a written

final decision by the U.S. EPA setting forth resolution of the dispute. The duties of the Administrator set for in this Section shall not be delegated.

G. The pendency of any dispute under this Section shall not affect the Army's responsibility for timely performance of the work required by this Agreement, except that the time period for completion of work affected by such dispute shall be extended for a period of time usually not to exceed the actual time taken to resolve any good faith dispute in accordance with the procedures specified in paragraph H below. All elements of the work required by this Agreement which are not affected by the dispute shall continue and be completed in accordance with the applicable schedule.

H. When dispute resolution is in progress, work affected by the dispute will immediately be discontinued if the Hazardous Waste Division Director for U.S. EPA's Region III or the Regional Solid Waste Manager for PADER requests in writing, that work related to the dispute be stopped because, in U.S. EPA's or PADER's opinion, such work is inadequate or defective, and such inadequacy or defect is likely to yield an adverse effect on human health or welfare or the environment, or is likely to have a substantial adverse affect on the remedy selection or implementation process. To the extent possible, U.S. EPA and PADER shall consult with the other parties prior to initiating a work stoppage request. After stoppage of work, if the other parties believe that the work stoppage is inappropriate or may have potential significant adverse impacts, the other parties may meet with the Hazardous Waste Division Director or Solid Waste Manager to discuss the work stoppage. Following this meeting, and further consideration of the issues, the Hazardous Waste Division Director or Solid Waste Manager will issue, in writing, a final decision with respect to the work stoppage. The final written decision of the Hazardous Waste Division Director or Solid Waste Manager may immediately be subjected to formal dispute resolution. Such dispute may be brought directly to either the DRC or the SEC, at the discretion of the disputing party. The Army shall comply with any work stoppage request pending resolution of the dispute.

I. Within twenty-one (21) days of resolution of a dispute pursuant to the procedures specified in this Section, the Army shall incorporate the resolution and final determination into the appropriate plan, schedule or procedures and proceed to implement this Agreement according to the amended plan, schedule or procedures.

J. Resolution of a dispute pursuant to this Section of the Agreement constitutes a final resolution of any dispute arising under this Agreement. All Parties shall abide by all terms and conditions of any final resolution of dispute obtained pursuant to this Section of this Agreement.

K. In the event that PADER continues to dispute the

position of the Administrator of EPA, PADER reserves its rights, to the extent provided by law including Sections 113(h), 121 and 310 of CERCLA, Section 7002 of RCRA, and Section XXXII (Enforceability) of this Agreement, to bring an action in federal court to seek relief regarding such dispute and to seek injunctive relief to preserve the dispute pending resolution.

XII. Additional Work Or Modification To Work

A. In the event that the U.S. EPA or PADER determine that additional work, or modification to work, including but not limited to remedial investigatory work and/or engineering evaluation, is necessary to accomplish the objectives of this Agreement, notification of such additional work or modification to work shall be provided to the Army. The Army agrees, subject to the dispute resolution procedures set forth in Section XI (Resolution of Disputes), to implement any such work.

B. Any additional work or modification to work determined to be necessary by the Army shall be proposed in writing by the Army and will be subject to review as a primary document in accordance with Section X (Consultation with EPA and PADER) of this Agreement prior to initiating any work or modification to work.

C. Any additional work or modification to work approved pursuant to subpart A or B shall be completed in accordance with the standards, specifications, and schedule determined or approved by U.S. EPA and PADER. If any additional work or modification to work will adversely affect work scheduled or will require significant revisions to an approved Work Plan, the U.S. EPA and the PADER Project Managers shall be notified immediately of the situation followed by a written explanation within five (5) business days of the initial notification.

XIII. Permits

A. The Parties recognize that under Sections 121(d) and 121(e)(1) of CERCLA/SARA, 42 U.S.C. Sections 9621(d) and 9621(e)(1), and the NCP, portions of the response actions called for by this Agreement and conducted entirely on the NPL areas of the Site are exempted from the procedural requirement to obtain a federal, state, or local permit but must satisfy all the applicable or relevant and appropriate federal and state standards, requirements, criteria, or limitations which would have been included in any such permit. For the purpose of this subpart, "NPL Area" shall include any groundwater plume of contaminants migrating from the NPL area on LEAD, and the area vertically above and below such plume.

When the Army proposes a response action other than an emergency removal action to be conducted entirely on the NPL area, which in the absence of Section 121(e)(1) of CERCLA/SARA and the NCP would require a federal or state permit, the Army shall include in the Work Plan:

(1) Identification of each permit which would otherwise be required;

(2) Identification of the standards, requirements, criteria, or limitations which would have had to have been met to obtain each such permit;

(3) Explanation of how the response action proposed will meet the standards, requirements, criteria or limitations identified in paragraph (2) immediately above.

Upon request of the Army, U.S. EPA and the PADER will provide their position with respect to (2) and (3) above in a timely manner.

B. Subpart A above is not intended to relieve the Army from the requirement(s) of obtaining a permit or other authorization whenever it proposes a response action involving the shipment or movement off the LEAD of a hazardous substance, or undertakes any activities not directly related to response actions at the NPL areas.

C. The Army shall notify PADER and U.S. EPA in writing of any permits or other authorizations required for non-NPL area activities as soon as it becomes aware of the requirement. Upon request, the Army shall provide the PADER and U.S. EPA copies of all such permit applications and other documents related to the permit or authorization process.

D. If a permit or other authorization which is necessary for implementation of this Agreement is not issued, or is issued or renewed in a manner which is materially inconsistent with the requirements of this Agreement, the Army agrees to notify the PADER and U.S. EPA of its intention to propose modifications to this Agreement to obtain conformance with the permit (or lack thereof). Notification by the Army of its intention to propose modifications shall be submitted within seven (7) calendar days of receipt by the Army of notification that: (1) a permit will not be issued; (2) a permit has been issued or reissued; or (3) a final determination with respect to any appeal related to the issuance of a permit has been entered. Within thirty (30) days from the date it submits its notice of intention to propose modifications, the Army shall submit to PADER and U.S. EPA its proposed modifications to this Agreement with an explanation of its reasons in support thereof.

E. The PADER and the U.S. EPA shall subject the Army's proposed modifications to this Agreement to review as a primary document in accordance with Section X (Consultation with EPA and PADER) of this Agreement. If the Army submits proposed modifications prior to a final determination of any appeal taken on a permit needed to implement this Agreement, PADER and the U.S. EPA may elect to delay review of the proposed modifications

until after such final determination is entered. If PADER or the U.S. EPA elect to delay review, the Army shall continue implementation of this Agreement as provided in subpart F of this Section.

F. During any appeal of any permit required to implement this Agreement or during review of any of the Army's proposed modifications as provided in subpart D above, the Army shall continue to implement those portions of this Agreement which can be reasonably implemented pending final resolution of the permit issue(s).

G. Except as otherwise provided in this Agreement, the Army shall comply with all state and federal laws and regulations which the Army is subject to at the Site. Nothing in this Agreement shall be construed to affect LEADs obligation to obtain a RCRA permit for its hazardous waste management units.

XIV. Imminent and Substantial Endangerments

In the event that PADER or the U.S. EPA determines that activities conducted pursuant to this Agreement, or any other circumstances or activities, are creating an imminent and substantial endangerment to the health or welfare of the people on the Site or in the surrounding area or to the environment, PADER or the U.S. EPA may order the Army to halt further implementation of this Agreement for such period of time as needed to take appropriate action, including abating the danger. The Army shall arrange to have an individual with Emergency Response Training, Hazardous Materials Handling Training, and Contract Officer's Powers present at any time that work pursuant to this Agreement is being carried out by Army contractors at the Site.

XV. Reporting

The Army shall submit to the PADER and the U.S. EPA quarterly written progress reports which describe the actions which the Army has taken during the previous quarter to implement the requirements of this Agreement. Progress reports shall also describe the activities scheduled to be taken during the upcoming quarter. Progress reports shall be submitted by the tenth (10) day of each quarter following the effective date of this Agreement. The progress reports shall include a detailed statement of the manner and extent to which the requirements and time schedules set out in this Agreement and approved Work Plans are being met. In addition, the progress reports shall identify any anticipated delays in meeting time schedules, the reason(s) for the delay and actions taken to prevent or mitigate the delay.

XVI. Notification

A. Unless otherwise specified, the following shall be sent by a method of mail or other delivery providing a return receipt:

1. Any report provided pursuant to a schedule or deadline identified in or developed under this Agreement.

2. Any remedial action, including ARAs, selected by EPA.

3. Any notice of dispute and response thereto submitted under Section XI (Resolution of Disputes).

4. Any request, and response thereto, for extensions under Section XXX (Extensions).

5. Any notice of force majeure.

B. The items listed in "A" above shall be addressed as shown below:

LEAD Project Manager
Bureau of Waste Management
Pennsylvania Department of Environmental Resources
1 Ararat Blvd.
Harrisburg, PA 17110

and

U.S. Environmental Protection Agency Region III
Attn: LEAD Project Manager (3HW17)
841 Chestnut Building
Philadelphia, PA 19107

Documents sent to the Army shall be addressed as follows unless the Army specifies otherwise by written notice:

Commander
Letterkenny Army Depot
Attn: SDSLE-EN
Chambersburg, PA 17201

Unless otherwise requested, all routine correspondences may be sent via regular mail to the above-named persons.

C. U.S. EPA shall provide the Secretary of the Army and the PADER with a forty-five (45) day advance notice of the U.S. EPA Administrator's intention to delegate the authority to select appropriate remedial actions pursuant to this Agreement.

XVII. Project Managers

The U.S. EPA, PADER and the Army shall each designate a Project Manager and Alternate (hereinafter jointly referred to as Project Manager) for the purpose of overseeing the implementation of this Agreement. Within ten (10) days of the effective date of this Agreement, each Party shall notify the other Parties of the name and address of their Project Manager. Any Party may change its designated Project Manager by notifying the other Parties, in

writing, within five days of the change. To the maximum extent possible, communications between the Parties concerning the terms and conditions of this Agreement shall be directed through the Project Managers as set forth in Section XVI (Notification) of this Agreement. Each Project Manager shall be responsible for assuring that all communications from the other Project Managers are appropriately disseminated and processed by the entities which the Project Managers represent.

The PADER and U.S. EPA Project Managers shall have the authority to: (1) take samples, request split samples of Army samples and ensure that work is performed properly and pursuant to U.S. EPA and PADER protocols as well as pursuant to the Attachments and plans incorporated into this Agreement; (2) observe all activities performed pursuant to this Agreement, take photographs and make such other reports on the progress of the work as the Project Managers deem appropriate; (3) review records, files and documents relevant to this Agreement; (4) recommend and request minor field modifications to the work to be performed pursuant to this Agreement, or in techniques, procedures or design utilized in carrying out this Agreement, which are necessary to the completion of the project; and (5) exercise the authorities granted to them in this Section.

The Army Project Manager may also recommend and request minor field modifications to the work to be performed pursuant to this Agreement, or in techniques, procedures or designs utilized in carrying out this Agreement, which are necessary to the completion of the project.

Any field modifications proposed under this Section by any Party must be approved orally by all three (3) Project Managers to be effective. If agreement cannot be reached on the proposed additional work or modification to work, dispute resolution as set forth in Section XI may be used in addition to this Section. Within five (5) business days following a modification made pursuant to this Section, the Project Manager who requested the modification shall prepare a memorandum detailing the modification and the reasons therefore and shall provide or mail a copy of the memorandum to the other Project Managers.

The Army Project Manager or his designated representative shall be physically present on LEAD or reasonably available to supervise work performed at LEAD during implementation of the work performed pursuant to this Agreement and shall make himself available to U.S. EPA and PADER Project Managers for the pendency of this Agreement. The absence of the U.S. EPA or PADER Project Managers from the Site shall not be cause for work stoppage.

XVIII Technical Review Committee

Pursuant to 10 U.S.C. Section 2705(c), the Army shall

establish a Technical Review Committee ("TRC") and, in consultation with the Parties, shall provide for representatives from the following organizations to serve as members of the TRC:

a. A representative of LEAD

b. A representative of EPA;

c. A representative of PADER;

d. A representative from the local government;

e. Public representatives of the local communities.

The purpose of the TRC is to afford a forum for cooperation between the Army and concerned local officials and citizens and to provide a meaningful opportunity for the members of the TRC to become informed and to express their opinion about significant aspects of the RI/FS and RD/RA process.

The LEAD Commander shall serve as the chairman of the TRC meetings. The chairman shall schedule regular meetings of the TRC approximately every three months. Regular meetings of the TRC shall be for the purpose of reviewing progress under the RI/FS or the RD/RA and discussing other matters of interest to the TRC. Special meetings of the TRC shall be held at the request of the members.

XIX. Sampling and Data/Document Availability

The Parties shall make available to each other quality assured results of sampling, tests or other data generated by such Party, or on their behalf, with respect to the implementation of this Agreement within forty five (45) days of their collection or performance. If quality assurance is not completed within forty-five (45) days, raw data or results shall be submitted within the forty-five (45) day period and quality assured data or results shall be submitted as soon as they become available.

At the request of either the PADER or U.S. EPA Project Manager, the Army shall allow split samples to be taken by PADER or U.S. EPA during sample collection conducted during the implementation of this Agreement. The Army's Project Manager shall endeavor to notify the U.S. EPA and PADER Project Managers not less than ten (10) business days in advance of any sample collection. If it is not possible to provide ten (10) business days prior notification, the Army shall notify the PADER and U.S. EPA Project Managers as soon as possible after becoming aware that samples will be collected.

XX. Retention of Records

Each Party to this Agreement shall preserve for a minimum of ten (10) years after termination of this Agreement all

records and documents in its possession or in the possession of its divisions, employees, agents, accountants, contractors or attorneys which relate in any way to the presence of hazardous substances, pollutants and contaminants at the Site or to the implementation of this Agreement, despite any document retention policy to the contrary. After this ten (10) year period, the Army shall notify the U.S. EPA and PADER at least forty-five (45) days prior to destruction or disposal of any such documents or records. Upon request by the U.S. EPA or PADER, the Army shall make available such records or documents to the U.S. EPA or PADER.

XXI. Access

A. Without limitation on any authority conferred on U.S. EPA or PADER by statute or regulation, the U.S. EPA, PADER and/or their authorized representatives, shall have authority to enter the Site at all reasonable times for the purposes of, among other things: (1) inspecting records, operating logs, contracts and other documents relevant to implementation of this Agreement; (2) reviewing the progress of the Army, its response action contractors or lessees in implementing this Agreement; (3) conducting such tests as the PADER and the U.S. EPA Project Managers deem necessary; and (4) verifying the data submitted to the U.S. EPA and PADER by the Army. The Army shall honor all reasonable requests for such access by the U.S. EPA and PADER conditioned only upon presentation of proper credentials. However, such access shall be obtained in conformance with Army security regulations and in a manner minimizing interference with any military operations at LEAD.

B. To the extent that access is required to areas of the Site presently owned by or leased to parties other than the Army, the Army agrees to exercise its authorities to obtain access pursuant to Section 104(e) of CERCLA/SARA from the present owners and/or lessees within thirty (30) calendar days after the execution by the Parties of this Agreement or, where appropriate, within thirty (30) days after the relevant Submittals which require access are finalized pursuant to Section X (Consultation with EPA and PADER) of this Agreement. The Army shall use its best efforts to obtain access agreements which shall provide reasonable access to U.S. EPA and PADER and/or their authorized representatives. With respect to non-Army property upon which monitoring wells, pumping wells, treatment facilities or other response actions are to be located, the access agreements shall also provide that no conveyance of title, easement, or other interest in the property shall be consummated without provisions for the continued operation of such wells, treatment facilities, or other response actions on the property. The access agreements shall also provide that the owners of LEAD or of any property where monitoring wells, pumping wells, treatment facilities or other response actions are located shall notify the Army, PADER, and U.S. EPA by certified mail, at least thirty (30) days prior to any conveyance, of the property owner's intent to convey any interest in the property and of the provisions made for the

continued operation of the monitoring wells, treatment facilities, or other response actions installed pursuant to this Agreement.

C. In the event that Site access is not obtained within the thirty (30) day time period set forth in subpart B above, within fifteen (15) days after the expiration of the thirty (30) day period the Army shall notify the PADER and U.S. EPA regarding the lack of, and efforts to obtain, such access agreements. Within fifteen (15) days of any such notice, the Army shall submit appropriate modification(s) in response to such inability to obtain access.

D. The Army may request the assistance of U.S. EPA and PADER where access problems arise. If requested, EPA will take reasonable steps to assist the Army in gaining access.

XXII. Five Year Review

Consistent with Section 121(c) of CERCLA/SARA, and in accordance with this Agreement, the Army agrees that U.S. EPA and PADER will review the remedial action no less often than each five years after the initiation of the final remedial action to assure that human health and the environment are being protected by the remedial action being implemented. If upon such review it is the judgment of U.S. EPA and PADER that additional action or modification of the remedial action is appropriate in accordance with Section 104 or 106 of CERCLA/SARA, the Army shall implement such additional or modified action.

Any dispute by the Army of the determination by U.S. EPA and PADER under this Section shall be resolved under Section XI (Resolution of Disputes) of this Agreement. If PADER disagrees with U.S. EPA on whether additional or modified action is appropriate under this Section, the dispute shall be resolved under Section XI (Resolution of Disputes) of this Agreement.

XXIII. Other Claims

Nothing in this Agreement shall constitute or be construed as a bar or release from any claim, cause of action or demand in law or equity by or against any person, firm, partnership or corporation not a signatory to this Agreement for any liability it may have arising out of or relating in any way to the generation, storage, treatment, handling, transportation, release, or disposal of any hazardous substances, hazardous wastes, pollutants, or contaminants found at, taken to, or taken from LEAD.

The U.S. EPA and PADER shall not be held as a party to any contract entered into by the Army to implement the requirements of this Agreement.

This Agreement shall not restrict U.S. EPA or PADER from taking any legal or response action for any matter not

specifically part of the work covered by this Agreement.

XXIV. Confidential Information

The Army may assert a confidentiality claim as described in 40 C.F.R. Section 2.203(b) covering all or part of the information requested by any Party under this Agreement. Analytical data shall not be claimed as confidential by the Army. Information determined to be confidential by U.S. EPA pursuant to 40 C.F.R. Part 2 shall be afforded the protection specified therein and such information shall be treated by the PADER as confidential when so marked. The Army hereby waives any and all claims to confidentiality under Pennsylvania law for any information determined by U.S. EPA not to be confidential pursuant to 40 C.F.R. Part 2. If no claim of confidentiality accompanies the information when it is submitted to the U.S. EPA or PADER, the information may be made available to the public without further notice to the Army.

XXV. EPA'S Covenant Not to Sue And Reservation of Rights

In consideration for the Army's compliance with this Agreement, and based on the information known to the Parties on the effective date of this Agreement, U.S. EPA agrees that compliance with this Agreement shall stand in lieu of any administrative, legal and equitable remedies against the Army to address the currently known releases or threatened releases of hazardous substances including hazardous wastes, pollutants or contaminants at the Site which are the subject of the RI/FS's and which will be addressed by the remedial action provided for under this Agreement; except that nothing in this Agreement shall preclude the U.S. EPA from exercising any administrative, legal or equitable remedies available to them to require additional response actions by the Army in the event that: (1) conditions previously unknown to the parties or undisclosed to U.S. EPA arise or are discovered at the Site; or (2) U.S. EPA receives information which indicates that the requirements of this Agreement are not adequately protective of public health or welfare or the environment. This Covenant Not To Sue does not affect any claims for natural resource damage assessments or for damages to natural resources.

XXVI. PADER'S Covenant Not To Sue

A. Except as provided herein, the State covenants not to sue the Army concerning any liability to PADER under CERCLA resulting from any release or threatened release of a hazardous substance, which release or threatened release is addressed by this Agreement. This Section is not, and shall not be construed as, a covenant not to sue (1) the Army in the event that all of the requirements of this Agreement are not carried out, or (2) any other person or entity not a party to this Agreement. This covenant not to sue does not apply to any future removal or remedial actions taken at the Site beyond those actions specified

in this Agreement. The covenant not to sue shall take effect upon the certification by PADER that the remedial actions have been completed in accordance with the approved workplans and the remedial actions meet the standards set forth in Sections 121 and 122 of CERCLA.

B. The provisions of paragraph A of this Section shall not apply to the following claims:

1. Claims based on a failure by the Army to fulfill the requirements of this Agreement;

2. Claims for costs incurred by PADER as a result of the failure of the Army to fulfill the requirements of this Agreement;

3. Claims based on criminal liability;

4. Claims based on liability for damage to natural resources, past or future, as defined in CERCLA;

5. Claims based on liability for hazardous substances removed from the Site;

6. Claims based on liability for monitoring or oversight expenses incurred by PADER except as those expenses are reimbursed to PADER pursuant to this Agreement;

7. Claims based on failure to perform any remedial actions in accordance with state ARARs; or,

8. Claims for costs recoverable under CERCLA or other laws.

C. Notwithstanding any other provisions of this Agreement, PADER reserves the right to seek modification of this Agreement or to institute a new action to seek additional removal or remedial measures at the Site through an action to compel the Army to perform removal or remedial work or to institute an action to compel the Army to reimburse PADER for response costs if (1) conditions previously unknown to the parties or undisclosed to PADER arise or are discovered at the Site; or (2) PADER receives information which indicates that the requirements of this Agreement are not adequately protective of public health or welfare or the environment.

XXVII. PADER's Reservation of Rights

Nothing herein shall be construed to affect PADER's rights to seek appropriate relief, to the extent authorized by law and this Agreement, against EPA, the Army, or any other party, to obtain compliance with the law at the Site including, but not limited to, state law governing hazardous or solid waste storage, treatment, or disposal, state law concerning removal or remedial actions, or liability or compliance with respect to the release of hazardous substances or other pollutants or

contaminants.

XXVIII Prior Drafts

This Agreement shall constitute the entire integrated agreement of the Parties. No prior or contemporaneous communications or prior drafts shall be relevant or admissible for purposes of determining the meaning or extent of any provisions herein in any litigation or any other proceeding.

XXIX. DEADLINES

A. The following deadlines have been established by the parties for the submittal of draft primary documents pursuant to this Agreement:

1. Scope of Work: Within 45 days of receipt from the other Parties of comments on existing documents as described in the Initial Review of Existing Documents Section the Army shall submit a Scope of Work.

2. RI/FS Work Plans, including Sampling and Analysis Plan and QAPP: Within 180 days of approval of the Scope of Work by the other Parties as described in the Scope of Work Section the Army shall submit a Work Plan for each Operable Unit.

B. In each Work Plan the Army shall propose deadlines for completion of the following draft primary documents:

1. Endangerment Assessment
2. RI Reports
3. Initial Screening of Alternatives
4. FS Reports
5. Proposed Plans
6. Community Relations Plan

The final deadlines established pursuant to this Section shall be published by U.S. EPA, in conjunction with the State.

C. Within twenty-one (21) days of issuance of each Record of Decision, the Army shall propose deadlines for completion of the following draft primary documents:

1. Remedial Design
2. Remedial Action Work Plan

These deadlines shall be proposed, finalized and published utilizing the same procedures set forth in Paragraph B above.

D. The deadlines set forth in this Section, or to be established as set forth in this Section, may be extended pursuant to Section XXX (Extensions) of this Agreement. The Parties recognize that one possible basis for extension of the deadlines for completion of the RI/FS Reports is the identification of significant new Site conditions during the performance of the remedial investigation.

XXX EXTENSION

A. Either a timetable and deadline or a schedule shall be extended upon receipt of a timely request for extension and when good cause exists for the requested extension. Any request for extension by any party shall be submitted in writing and shall specify:

1. The timetable and deadline or the schedule that is sought to be extended

2. The length of the extension sought;

3. The good cause(s) for the extension; and

4. Any related timetable and deadline or schedule that would be affected if the extension were granted.

B. Good cause exists for an extension when sought in regard to:

1. An event of force majeure;

2. A delay caused, or which is likely to be caused, by the grant of an extension in regard to another timetable and deadline or schedule; and

3. Any other event or series of events mutually agreed to by the Parties as constituting good cause.

C. Good cause may exist for an extension when sought in regard to:

1. A delay caused by another party's failure to meet any requirements of this Agreement;

2. A delay caused by the good faith invocation of dispute resolution or the initiation of judicial action;

D. Absent agreement of the Parties with respect to the existence of good cause, any party may seek and obtain a determination through the dispute resolution process that good

cause exists.

E. Within seven days of receipt of a request for an extension of a timetable and deadline or a schedule, the other parties shall each advise the requesting party in writing of its respective position on the request. Any failure by the other parties to respond within the 7-day period shall be deemed to constitute concurrence by that Party in the request for extension. If a party does not concur in the requested extension, it shall include in its statement of nonconcurrence an explanation of the basis for its position.

F. If there is consensus among the Parties that the requested extension is warranted, the United States Department of the Army shall extend the affected timetable and deadline or schedule accordingly. If there is no consensus among the Parties as to whether all or part of the requested extension is warranted, the timetable and deadline or schedule shall not be extended except in accordance with a determination resulting from the dispute resolution process.

G. Within seven days of receipt of a statement of nonconcurrence with the requested extension, any Party may invoke dispute resolution in accordance with Section XI of this Agreement. Failure of any Party to invoke dispute resolution within the seven day period shall be deemed to waive all objections by that Party to the statement of nonconcurrence.

H. A timely and good faith request for an extension shall toll any assessment of stipulated penalties, forfeiture of comment rights, or application for judicial enforcement of the affected timetable and deadline or schedule until a decision is reached on whether the requested extension will be approved. If dispute resolution is invoked and the requested extension is denied, stipulated penalties may be assessed and may accrue from the date of the original timetable, deadline or schedule. Following the granting of an extension, an assessment of stipulated penalties or an application for judicial enforcement may be sought only to compel compliance with the timetable and deadline or schedule as most recently extended.

XXXI. FORCE MAJEURE

A Force Majeure shall mean any event arising from causes beyond the control of a Party that causes a delay in or prevents the performance of any obligation under this Agreement, including, but not limited to, acts of God; fire; war; insurrection; civil disturbance; explosion; unanticipated breakage or accident to machinery, equipment or lines of pipe despite reasonably diligent maintenance; adverse weather conditions that could not be reasonably anticipated; unusual delay in transportation; restraint by court order or order of public authority; inability to obtain, at reasonable cost and after exercise of reasonable diligence, and compliance with Section XIII (Permits) of this Agreement any necessary

authorizations, approvals, permits or licenses due to action or inaction of any governmental agency or authority other than the Party claiming the Force Majeure; inability to obtain Site access after giving advance notice of access problems to the other Parties and compliance with Section XXV (Site Access) of this Agreement; delays caused by compliance with applicable statutes or regulations governing contracting, procurement or acquisition procedures, despite the exercise of reasonable diligence, and insufficient availability of appropriated funds, if the Army shall have made timely request for such funds as part of the budgetary process as set forth in Section XXXIX (Funding) of this Agreement. A Force Majeure shall also include any strike or other labor dispute, whether or not within the control of the Parties affected thereby. Force Majeure shall not include increased costs or expenses of Response Actions, whether or not anticipated at the time such Response Actions were initiated, or nonattainment of the requirements set forth in this Agreement except as provided herein. An extension of time for compliance shall be granted if it is determined through the disputes resolution process that such an extension is justified to compensate for any unavoidable delay occasioned by a Force Majeure.

In order for any Party to take advantage of these Force Majeure provisions, the Party claiming the Force Majeure shall inform the other Parties of any delay incurred due to an alleged Force Majeure event within two days, by telephone, and within seven business days, in writing, of the date of discovery of the event causing the delay. Notification shall be made to appropriate project officers, and shall include all relevant documentation such as third party correspondence, and any other non-confidential or unprivileged records, papers or correspondence in the possession or reasonably available to the Party claiming Force Majeure. This notification should substantiate the cause for the delay and all steps taken by the Party claiming Force Majeure to mitigate, limit or remedy the delay. A Party who fails to provide the notice required by this paragraph forfeits their right to claim the benefits of this Force Majeure Section unless the failure to give notice is itself caused by a Force Majeure event.

Any Party who receives notice from another Party that a Force Majeure event has occurred and disagrees that the event constitutes a Force Majeure must notify the other Parties within fourteen days after receipt of the written notice of Force Majeure that a disagreement exists.

In any judicial action in which a Force Majeure is an issue, the Party claiming the existence of a Force Majeure event shall have the burden of proving that delays were unavoidable, the duration of the unavoidable delays, and that the required notices were given.

XXXII. ENFORCEABILITY

A. The Parties agree that:

1. Upon the effective date of this Agreement, any standard, regulation, condition, requirement or order which has become effective under CERCLA and is incorporated into this Agreement is enforceable by any person pursuant to Section 310 of CERCLA, and any violation of such standard, regulations, condition, requirement or order will be subject to civil penalties under Sections 310(c) and 109 of CERCLA; and Section 3008 of RCRA.

2. All timetables or deadlines associated with the RI/FS shall be enforceable by any person pursuant to Section 310 of CERCLA, and any violation of such timetable or deadlines will be subject to civil penalties under Sections 310(c) and 109 of CERCLA;

3. All terms and conditions of this Agreement which relate to remedial actions, including corresponding timetables, deadlines or schedules, and all work associated with the remediation actions, shall be enforceable by any person pursuant to Section 310 of CERCLA, and any violation of such terms or conditions will be subject to civil penalties under Sections 310(c) and 109 of CERCLA; and

4. Any final resolution of a dispute pursuant to Section XI (Resolution of Disputes) of this Agreement which establishes a term, condition, timetable, deadline or schedule shall be enforceable by any person pursuant to Section 310 of CERCLA, and any violation of such term, condition, timetable, deadline or schedule will be subject to civil penalties under Sections 310(c) and 109 of CERCLA and Section 3008 of RCRA.

B. Nothing in this Agreement shall be construed as authorizing any person to seek judicial review of any action or work where review is barred by any provision of CERCLA, including Section 113(h) of CERCLA.

C. The Parties agree that all Parties shall have the right to enforce the terms of this Agreement in any manner provided by law.

D. With respect to the Army's obligations under Section XI K (Closure), PADER may seek any appropriate relief to enforce those requirements, or any other term of this Agreement relating to those requirements, by bringing any action authorized by law, including an action under Section 7002 of RCRA, 42 U.S.C. Section 6972 for any relief allowed by law.

XXXIII. STIPULATED PENALTIES

A. In the event that the Army fails to submit a primary document (i.e., Scope of Work, RI/FS Work Plan, Endangerment Assessment, RI Report, Initial Screening of Alternatives, FS Report, Proposed Plan, Community Relations Plan,

Remedial Design, Remedial Action Work Plan) to U.S. EPA and PADER pursuant to the appropriate timetable or deadline in accordance with the requirements of this Agreement, or fails to comply with a term or condition of this Agreement which relates to a remedial action, U.S. EPA may assess and PADER may demand a stipulated penalty against the Army. In the case of a PADER demand for issuance of a stipulated penalty, the matter will be referred to the DRC for an assessment determination. A stipulated penalty may be assessed in an amount not to exceed $5,000 for the first week (or part thereof), and $10,000 for each additional week (or part thereof) for which a failure set forth in this Paragraph occurs. Such amount shall not be subject to dispute resolution.

B. In the event that the Army fails to submit the Closure Plan, or any other required report, plan, data or other document or notice as required by Section IX.K (Closure Requirements) to PADER pursuant to the appropriate timetable or deadline, or fails to comply with a term, condition or approved/finalized plan which relates to RCRA Closure under this Agreement, PADER may assess a stipulated penalty against the Army. The Stipulated Penalty shall be $5,000 for the first week (or part thereof), and $10,000 for each additional week (or part thereof) for which a failure set forth in this paragraph occurs. Such amount shall not be subject to dispute resolution. Any dispute raised by the Army regarding the grounds for such assessment by PADER shall be resolved using the process set forth in Section IX (Resolution of Disputes) except that following resolution attempts by the SEC, the Secretary of PADER shall make the final decision.

C. Upon determining that the Army has failed in a manner set forth in paragraph A or B, U.S. EPA or PADER shall so notify the Army in writing. If the failure in question is not already subject to dispute resolution at the time such notice is received, the Army shall have fifteen (15) days after receipt of the notice to invoke dispute resolution on the question of whether the failure did in fact occur. The Army shall not be liable for the stipulated penalty assessed by U.S. EPA or PADER if the failure is determined, through the dispute resolution process, not to have occurred. No assessment of a stipulated penalty shall be final until the conclusion of dispute resolution procedures related to the assessment of the stipulated penalty.

D. The annual reports required by Section 120(e)(5) of CERCLA shall include, with respect to each final assessment of a stipulated penalty against the Army under this Agreement, each of the following:

1. The facility responsible for the failure;

2. A statement of the facts and circumstances giving rise to the failure;

3. A statement of any administrative or other corrective action taken at the relevant facility, or a statement

of why such measures were determined to be inappropriate;

4. A statement of any additional action taken by or at the facility to prevent recurrence of the same type of failure; and

5. The total dollar amount of the stipulated penalty assessed for the particular failure

E. Stipulated penalties assessed pursuant to this Section shall be payable to the Hazardous Substances Superfund only in the manner and to the extent Congress expressly appropriates and authorizes funds for that purpose.

F. In no event shall this Section give rise to a stipulated penalty in excess of the amount set forth in Section 109 of CERCLA or Section 3008 of RCRA.

G. This Section shall not affect the Army's ability to obtain an extension of a timetable, deadline or schedule pursuant to sections XXIX and XXX of this Agreement.

H. Nothing in this Agreement shall be construed to render any officer or employee of the Army personally liable for the payment of any stipulated penalty assessed pursuant to this Section.

I. In the event that the Army fails to pay any stipulated penalty as provided hereunder based upon the lack of appropriated or authorized funds, the Army shall do the following:

1. Inform EPA and PADER of the specific basis for failure to pay; and

2. Request funding for such stipulated penalties by submitting requests for appropriation and authorization of funds for the payment of the penalties in the first annual budget request following the assessment through the Department of Defense budgetary process, and in all subsequent budget requests until the penalties are paid in full.

XXXIV. Conveyance of Title

No conveyance of title, easement, or other interest in the Army property in which any containment system, treatment system, monitoring system or other response action(s) is installed or implemented pursuant to this Agreement shall be consummated by the Army without provision for continued maintenance of any such system or other response action(s). At least thirty (30) days prior to any such conveyance, the Army shall notify U.S. EPA and PADER of the provisions made for the continued operation and maintenance of any response action(s) or systems installed or implemented pursuant to this Agreement.

XXXV. Public Participation

A. The Parties agree that this Agreement and any subsequent proposed remedial action alternative(s) and subsequent plan(s) for remedial action at the Site arising out of this Agreement shall comply with the administrative record and public participation requirements of CERCLA/SARA, including Section 117 of SARA, the NCP, and U.S. EPA guidances on public participation and administrative records.

B. The Army shall develop and implement a Community Relations Plan (CRP) which responds to the need for an interactive relationship with all interested community elements, both on LEAD and off, regarding activities and elements of work undertaken by the Army. The Army agrees to develop and implement the CRP in a manner consistent with Section 117 of SARA, the NCP, U.S. EPA guidelines set forth in U.S. EPA's Community Relations Handbook, and any modifications thereto.

The CRP is subject to review as a Primary Document as set forth in Section X (Consultation with EPA and PADER) of this Agreement.

C. The public participation requirements of this Agreement shall be implemented so as to meet the public participation requirements applicable to RCRA permits under 25 Pa Code Sections 75.280 - 75.283, 40 C.F.R. Part 124 and Section 7004 of RCRA.

D. To the extent practicable, any Party issuing a formal press release to the media or publishing a notice regarding any of the work required by this Agreement shall advise the other Parties of such press release or notice and the contents thereof at least forty-eight (48) hours before the issuance of such press release or notice and of any subsequent changes prior to release.

E. The Army shall establish and maintain an administrative record at or near LEAD in accordance with Section 113(k) of CERCLA/SARA. The administrative record shall be established and maintained in accordance with current and future U.S. EPA policy and guidelines. A copy of each document placed in the administrative record will be provided to the U.S. EPA and PADER. The administrative record developed by the U.S. Army shall be updated and supplied to U.S. EPA and PADER on at least a quarterly basis. An index of documents in the administrative record will accompany each update of the administrative record.

F. The Army shall follow the public participation requirements of CERCLA/SARA Section 113(k) and comply with any guidance and/or regulations promulgated by U.S. EPA with respect to such Section.

XXXVI. Public Comment

A. Within fifteen (15) days of the date of the execution of this Agreement by all Parties, U.S. EPA shall announce the availability of this Agreement to the public for review and comment. U.S. EPA shall accept comments from the public for a period of forty-five (45) days after such announcement. At the end of the comment period, U.S. EPA shall review all such comments and shall either:

(1) Determine that the Agreement should be made effective in its present form, in which case the Army shall be so notified in writing, and the Agreement shall become effective on the date said notice is issued; or

(2) Determine that modification of the Agreement is necessary, in which case the Army and PADER will be forwarded a revised Agreement which includes all required changes to the Agreement.

B. In the event of significant revision or public comment, notice procedures of Sections 117 and 211 of SARA shall be followed and a responsiveness summary shall be published by the U.S. EPA.

C. In the event that modification of the Agreement is determined by U.S. EPA to be necessary pursuant to Subpart A(2) above, within twenty (20) days of receipt of the revised Agreement the Army and PADER reserve the right to withdraw from the Agreement. If neither the Army or PADER provide U.S. EPA with written notice of withdrawal from the Agreement within such twenty (20) day period, the Agreement, as modified, shall automatically become effective on the twenty-first (21) day, and U.S. EPA shall issue a notice to the Parties to that effect.

D. All plans and activities related to Community Relations and Public Participation undertaken by the Army shall be subject to review as set forth in Section IX (Remedial Action Selection) of this Agreement.

XXXVII. Termination

The provisions of this Agreement shall only be deemed satisfied and terminated upon receipt by the Army of written notice from U.S. EPA and PADER that the Army has demonstrated, to the satisfaction of the U.S. EPA and PADER, that all the terms of this Agreement have been completed.

XXXVIII. Effective Date

This Agreement is effective upon issuance of a notice to the Parties by U.S. EPA following implementation of Section XXXVI (Public Comment) Subparts A through C, of this Agreement.

XXXIX. FUNDING

It is the expectation of the Parties to this Agreement

that all obligations of the Army arising under this Agreement will be fully funded. The Army agrees to seek sufficient funding through the United States Department of Defense budgetary process to fulfill its obligations under this Agreement.

In accordance with Section 120(e)(5)(B) of CERCLA, 42 U.S.C. Section 6920(e)(5)(B), the Army shall include in its annual report to Congress the specific cost estimates and budgetary proposals associated with the implementation of this Agreement.

Any requirement for the payment or obligation of funds, including stipulated penalties and technical assistance/oversight reimbursement, by the Army established by the terms of this Agreement shall be subject to the availability of appropriated funds, and no provision herein shall be interpreted to require obligation or payment of funds in violation of the Anti-Deficiency Act, 31 U.S.C. Section 1341. In cases where payment or obligation of funds would constitute a violation of the Anti-Deficiency Act, the dates established requiring the payment or obligation of such funds shall be appropriately adjusted.

If appropriated funds are not available to fulfill the Army's obligations under this Agreement, U.S. EPA and PADER reserve the right to initiate an action against any other person, or to take any response action, which would be appropriate absent this Agreement.

Funds authorized and appropriated annually by Congress under the "Environmental Restoration, Defense" appropriation in the Department of Defense Appropriation Act and allocated by the Deputy Assistant Secretary of Defense (Environment) to the Army will be the source of funds for activities required by this Agreement consistent with Section 211 of SARA, 10 U.S.C. Chapter 160. However, should the Environmental Restoration, Defense appropriation be inadequate in any year to meet the total Army CERCLA implementation requirements, the DOD shall employ and the Army shall follow a standardized DOD prioritization process which allocates that year's appropriations in a manner which maximizes the protection of human health and the environment. A standardized DOD prioritization model shall be developed and utilized with the assistance of U.S. EPA and PADER.

Attachment 5 is LEAD's current budget planning document for work contemplated under this Agreement. It is recognized that this Attachment is subject to change. Any modifications of this attachment will be made available to PADER and U.S. EPA. To date, LEAD has received and obligated appropriated funds in an amount of 2.8 million dollars for RCRA closure of the IWTP Lagoons.

The Army shall submit copies of all such budget request documents to PADER and EPA by October 1 of each year after the execution of this Agreement, and shall notify PADER and EPA of the actual amounts budgeted by February 1 of each year. The

Budget documents shall clearly establish that LEAD has requested all necessary funds to carry out the Army's obligations under this Agreement for the applicable budget year. The Army shall honor all reasonable requests by PADER and/or EPA to obtain additional documentation or information regarding the budget, and shall respond to such requests within 15 days of the request.

In the event that the Army's obligations under this Agreement are not fulfilled for 12 consecutive months, PADER shall have the option of terminating all provisions in the Agreement affecting PADER's rights and responsibilities, and PADER may thereafter seek any appropriate relief. However, in no case would the State terminate the Agreement without providing ten (10) days notice of the intent to terminate to the other Parties.

XXXX REIMBURSEMENT OF PADER TECHNICAL ASSISTANCE/OTHER COSTS

1.The Army agrees to reimburse PADER for the costs related to the implementation of this Agreement, as provided in this Section, and subject to Section XXXIX (Funding).

2. The Army's agreement to reimburse PADER for its costs is limited as follows:

a. Seventy five-Thousand Dollars ($75,000) Federal Fiscal Year ("FY") 1989, and

b. Seventy Five-Thousand Dollars ($75,000) for the following Federal fiscal year after the effective date of this Agreement (FY 1990).

3. Reimbursement of costs to PADER under this Agreement shall be in accordance with this Section and the procedures in Attachment 6 to this Agreements.

4. The Army and PADER agree that this Section shall not obligate the Army to reimburse PADER for costs incurred after September 30, 1990, unless this Agreement is modified to provide for such reimbursement. The Army and PADER agree to conduct good faith negotiations for the purposes of determining future years oversight costs. In the event that the Army and PADER do not reach agreement on such costs, PADER may withdraw as a party to this Agreement, or this section of the Agreement, by providing written notice to each party. Such withdrawal by PADER will terminate all of the duties and responsibilities of PADER according to the withdrawal.

5. Nothing in this Section shall prevent PADER from seeking any appropriate relief against the Army to (1) recover response costs under CERCLA which are not reimbursed to PADER under this Agreement, (2) recover costs incurred in response to future releases of hazardous substances from the Site, and (3) recover costs incurred due to the Army's noncompliance with this

Agreement.

XXXXI NOTICE OF CITIZEN SUITS

a. Based upon the findings and determinations in this Agreement, and the work to be performed pursuant to this Agreement, including RCRA Closure, Site Investigations, and RI/FS, PADER hereby gives notice, as provided by CERCLA Sections 310(d) and 310(e) and RCRA Section 7002, that it intends to bring an action under CERCLA Section 310(a) or RCRA Section 7002 in the event that EPA or the Army fails to comply with any requirement of this Agreement. Such notice also applies to any failure by EPA or the Army to comply with CERCLA or RCRA, or in the event that EPA or the Army fails to perform any non-discretionary act or duty related to this Agreement.

b. In addition to the above, the Parties agree that any written statement of dispute submitted to the DRC by PADER or other statement or document in response to a written statement of dispute by another Party, as described in Section XI (Resolution of Disputes), or any request submitted by PADER as described in Section XI.H, and any statement of non-concurrence by PADER to a request for extension under the provisions of Section XXX (Extensions), shall be considered a notice of intent to file a citizen suit under CERCLA Section 310 and RCRA Section 7002 if it contains a statement indicating that it is to be considered a notice of intent.

IT IS SO AGREED:

By: Lewis D. Walker — 2/3/89
Date

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Deputy for Environment, Safety
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Col. Stephen L. Etzel, Commander
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U.S. Environmental Protection Agency

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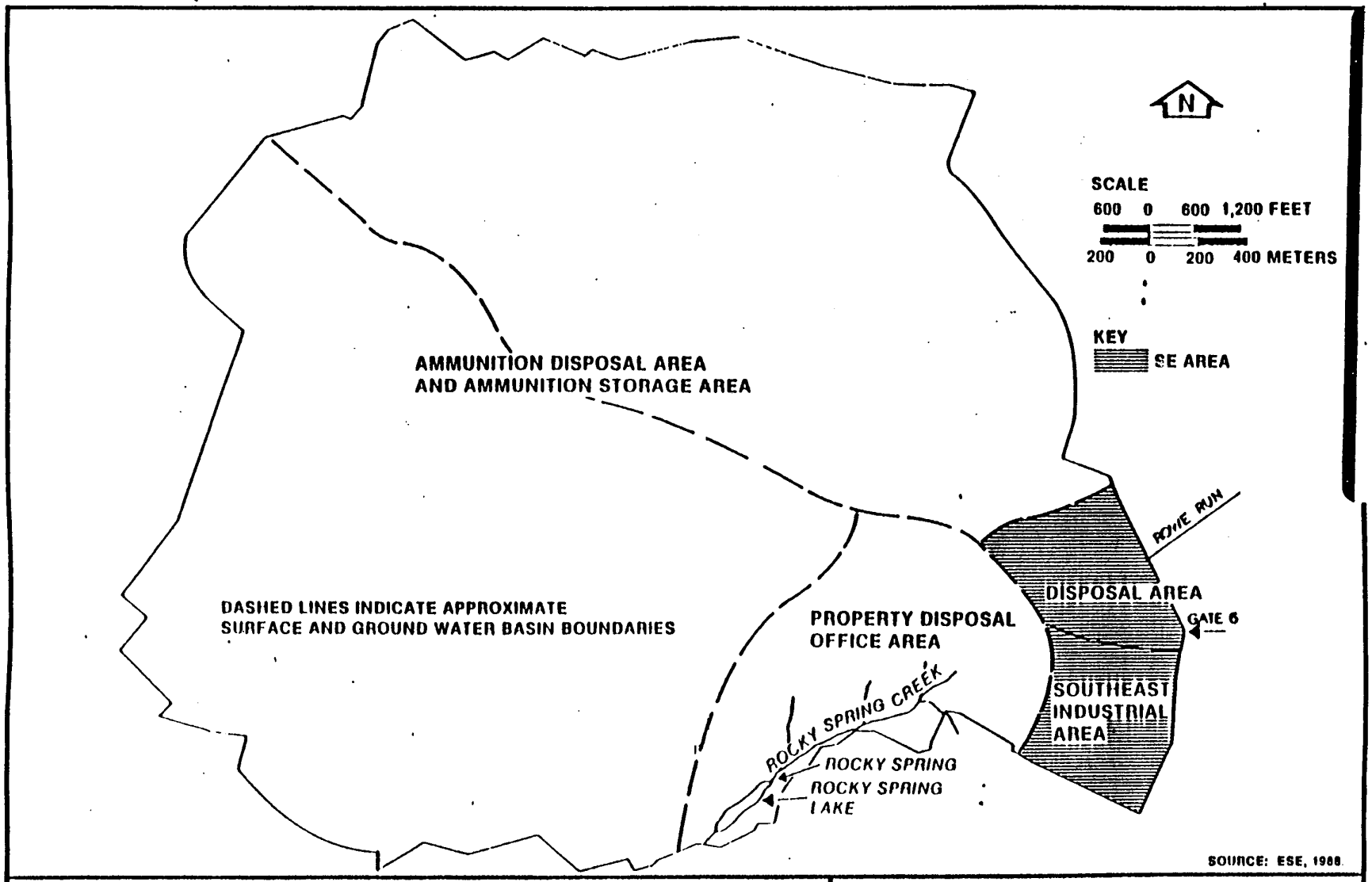
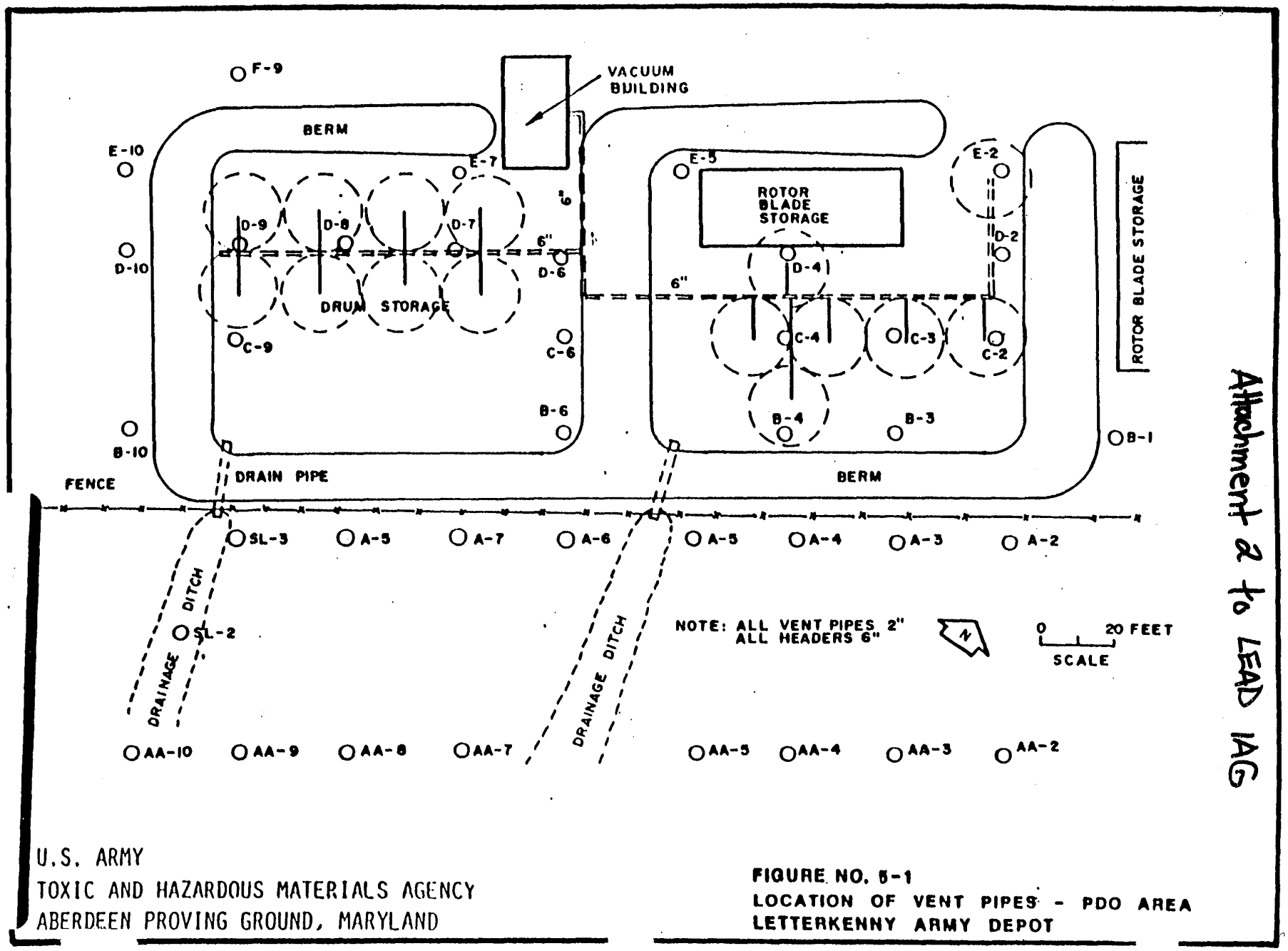


Figure A-2
SURFACE WATER AND GROUNDWATER
BASINS AND SE STUDY AREA AT LEAD

Prepared for:
U.S. Army Toxic and Hazardous Materials Agency
Aberdeen Proving Ground, Maryland

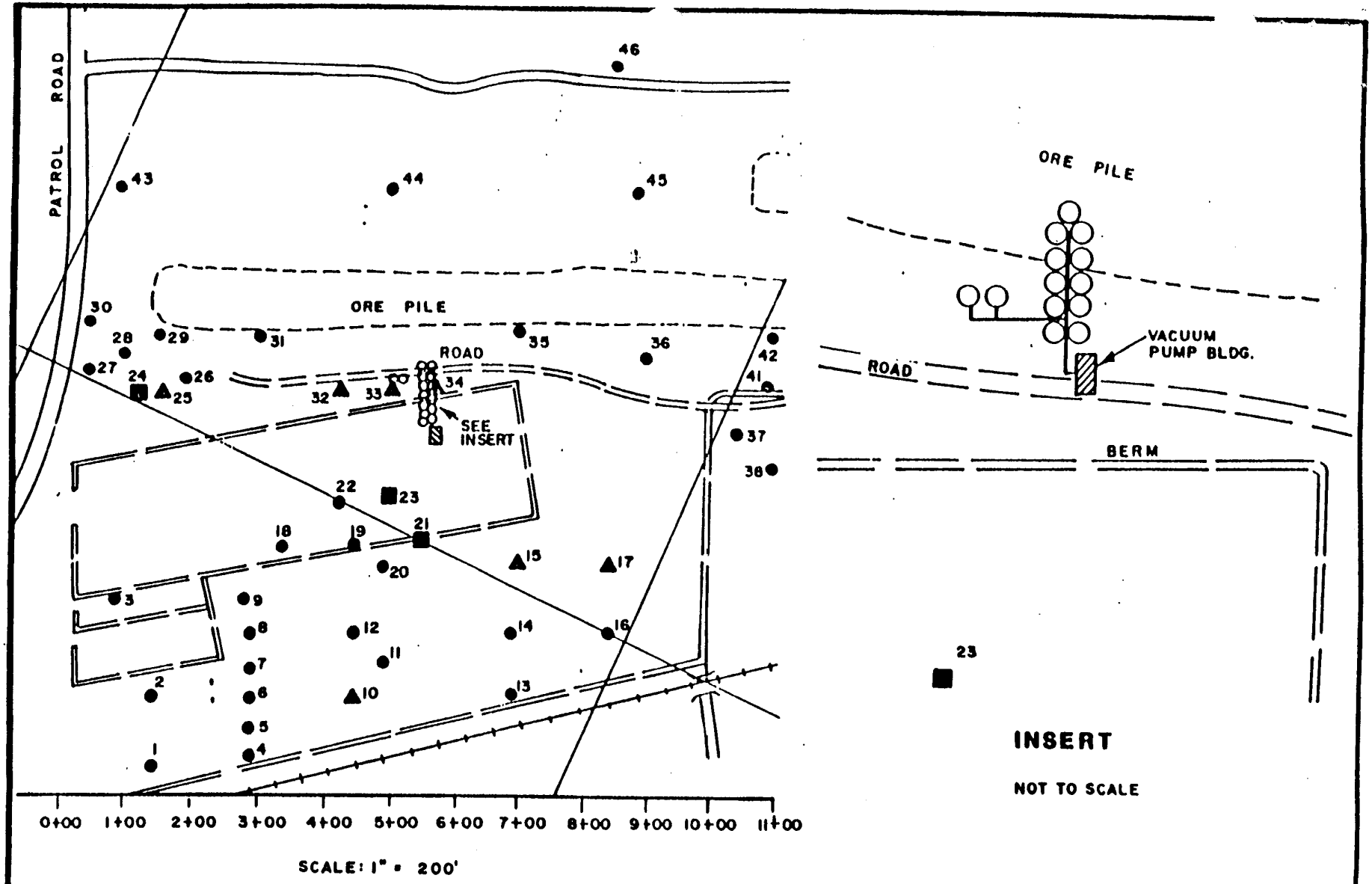


ATTACHMENT 2 to LEAD IAG

Attachment 2 to LEAD IAG

U.S. ARMY
TOXIC AND HAZARDOUS MATERIALS AGENCY
ABERDEEN PROVING GROUND, MARYLAND

FIGURE NO. 5-1
LOCATION OF VENT PIPES - PDO AREA
LETTERKENNY ARMY DEPOT



U.S. ARMY
TOXIC AND HAZARDOUS MATERIALS AGENCY
ABERDEEN PROVING GROUND, MARYLAND

FIGURE NO. 6-3
LOCATION OF VENT PIPES - K AREA
LETTERKENNY ARMY DEPOT

Attachment 3

Solid Waste Management Unit List

1.	Acid Burning Pit Area	(LEAD-54)
2.	Ammunition Box Piles	(LEAD-60)
3.	Residue Burial Site	(LEAD-57)
4.	Open Burning Ground-1	(LEAD-56)
5.	Transformer Pad	(SIA)
6.	Open Burning Ground-2	(LEAD-58)
7.	Burning Site/Neutralization Pit	(LEAD-59)
8.	Demolition Ground-1	(LEAD-62)
9.	Residue Drum Storage Area	(Ammo Area)
10.	Demolition Ground-2	(LEAD-55)
11.	Waste Oil Drum Stor. Autocraft Shop	(LEAD-44)
12.	Classified Paper Incinerator	(SIA)
13.	Waste Storage Pavillion	(LEAD-63)
14.	Building 3700	(LEAD-71)
15.	Lead Pig Storage Area	(SIA)
16.	Ore Pile Locations	(DA)

Attachment 4

RCRA Closure/IWTP Lagoons

1. Groundwater Assessment: The Army shall perform the following obligations to comply with, inter alia, Department requirements for hazardous waste treatment, storage and disposal facilities relating to groundwater assessment under 25 Pa. Code §75.264(n) at the IWTP lagoons:

a. No later than 10 days after execution of the Agreement, the Army shall commence implementation of the Groundwater Assessment and Abatement Plan (hereinafter "GWAAP"), according to the schedule therein, which was submitted by the Army to the Department on or about January 19, 1989, with modifications required by the Department in the GWAAP Addendum (hereinafter collectively referred to as the "Final GWAAP"), attached to this Attachment as Exhibits A-1 and A-2 respectively; and

b. The Army shall respond to comments or requests for additional information submitted by the Department related to the Army's work performed under this paragraph in a timely manner, but no later than 30 days after such comments or requests.

2. Groundwater Monitoring/Assessment Parameters: The Army shall perform the following obligations to comply with, inter alia, Department requirements for monitoring of Appendix VIII/IX constituents under 25 Pa. Code §75.264(n)(20)(ii) and Department policy entitled "Appendix IX, Revised Monitoring Guidance (April 22, 1988)":

a. No later than February 1, 1989, the Army shall have commenced implementation of the Sampling and Analysis Plan submitted by the Army to the Department on or about January 13, 1989, attached to this Attachment as Exhibit B-1, and the January 20, 1989 letter from the Army to the Department attached to this Attachment as Exhibit B-2 (herinafter collectively referred to as the "Final Sampling and Analysis Plan");

b. No later than March 29, 1989, the Army shall submit to the Department a written report on the results of the initial Appendix VIII/IX sampling event performed pursuant to the Final Sampling Analysis Plan as required

by 25 Pa. Code §75.264(n)(20)-(21) and Department policy;

c. No later than April 5, 1989, the Army shall submit to the Department a written report on the results of all groundwater assessment and monitoring conducted prior to March 29, 1989, pursuant to 25 Pa. Code §75.264(n) and subparagraphs (a) and (b) above. The report shall include a statistical analysis necessary to implement the Final GWAAP and other plans required hereunder; and

d. The Army shall respond to comments or requests for additional information submitted by the Department related to the Army's work performed under this paragraph in a timely manner, but no later than 10 days after such comments or requests.

3. Closure: The Army shall perform the following obligations to comply with, inter alia, Department requirements for closure of hazardous waste treatment, storage or disposal facilities under 25 Pa. Code §75.264(o), at the IWTP lagoons:

a. No later than February 5, 1989, the Army shall submit a Closure Plan for the IWTP lagoons to the Department which shall conform to the requirements of 25 Pa. Code §75.264, including §§75.264(o) and 75.264(s);

b. The Army shall respond within 5 days of receipt of any inquiries or comments submitted by the Department on any such Closure Plan;

c. Within 30 days after the Department approves of such Closure Plan, or modifies the Closure Plan in writing, the Army shall commence closure of the IWTP lagoons in accordance with such approved/modified Closure Plan (hereinafter "Final Closure Plan"), and shall complete closure according to the schedule in the Final Closure Plan; and

d. Within 180 days after completion of closure according to the requirements of the Final Closure Plan, the Army shall submit to the Department a complete Post-Closure Permit Application for the IWTP lagoons as required in 25 Pa. Code §§75.264(o)(16) and 75.265, and 40 C.F.R. Parts 264 and §270.

4. Abatement: The Army shall perform the following obligations

to comply with, inter alia, Department requirements for hazardous waste treatment, storage and disposal facilities relating to abatement under 25 Pa. Code §75.264, including §75.264(n)(23):

a. No later than February 28, 1990, the Army shall submit an Abatement Plan for the IWTP Lagoons, as required under 25 Pa. Code §75.264(n)(23);

b. The Army shall respond within 5 days of receipt of any inquiries or comments submitted by the Department on any such Abatement Plan;

c. No later than April 1, 1990, the Army shall commence implementation of the Abatement Plan as approved/modified by the Department (hereinafter "Final Abatement Plan"); and

d. The Army shall complete closure of the IWTP lagoons according to such Final Abatement Plan.

5. Interim Abatement: No later than June 15, 1989, the Army shall take necessary measures to abate the present migration of hazardous waste and hazardous waste constituents from the IWTP lagoons pending review and implementation of the Final Abatement Plan, as follows:

a. Install three production wells, and install pumps, continuous flow meters and other equipment as necessary to be capable of continuous year-round pumping of groundwater from the production wells (identified as the Production Wells in the GWAAP);

b. Operate pumping of the production wells such that groundwater is extracted at a maximum sustained yeild, which shall not be less than five (5) gpm per well;

c. In the event that there is a disruption in the pumping, treatment or other interim abatement activities required under this paragraph five (5), the Army shall notify the Department orally within 24 hours, and in writing within five days;

d. Maintain a daily log of flow of pumped groundwater, which log shall be made available to the Department upon request, and which log shall not be destroyed unless approved by the Department;

e. Notify the Department at least 48 hours prior to any planned disruption in the pumping, treatment or other

interim abatement activities required hereunder, and refrain from any planned disruptions unless approved by the Department.

f. Collect all pumped groundwater and process the groundwater through an approved treatment system such that water quality of the treated effluent meets the requirements of the Department, including the effluent standards determined by the Department;

g. In the event that a treatment system which meets Department requirements is not operational by June 15, 1989, is operational by June 15, 1989 but sebsequently fails to meet Department requirements or is otherwise unavailable at any time, the Army shall remove the pumped groundwater by a licensed transporter to a permitted facility until such time as the treatment system is available;

h. Conduct sampling on a monthly basis of groundwater pumped pursuant to this paragraph. Sampling shall include analysis for parameters determined by the Department and provided in writing to the Army;

i. Beginning July 10, 1989, provide monthly status reports by the 10th of each month on the activities conducted under this paragraph including (1) status of pumping, including total flow for each well, (2) water quality sampling results, (3) disposition of all pumped groundwater and (4) permits applied for and obtained for storage, treatment and disposal, where permits are pending; and

j. Nothing in this paragraph affects the Army's obligations with respect to permits for any treatment system, related to the interim abatement or any other work conducted pursuant to the Agreement.

6. The Army shall not obstruct, impede or otherwise interfere with the entry and conduct of any investigative, monitoring and related work conducted by the Department and its contractors, employees, agents, or representatives related to the Army's obligations under this Attachment.

7. If, after the implementation of the requirements by this Attachment, the Department determines that further steps are needed to achieve the purposes of this Attachment, the Army shall take all additional steps as required at that time by the Department.

Exhibit A-1 to Attachment 4

LETTERKENNY ARMY DEPOT
GROUNDWATER QUALITY ASSESSMENT AND ABATEMENT PLAN

January 13, 1989

Distribution limited to U.S. Government agencies only for protection of privileged information evaluating another command. Requests for this document must be referred to:

Commander
Letterkenny Army Depot
Chambersburg, PA 17201

Prepared by:

U.S. ARMY TOXIC & HAZARDOUS MATERIALS AGENCY
Installation Restoration Division
Aberdeen Proving Ground, MD 21010-5401

GROUNDWATER QUALITY ASSESSMENT
AND ABATEMENT PLAN
LETTERKENNY ARMY DEPOT

1.0 PURPOSE

The Letterkenny Army Depot is the owner/operator of two Industrial Wastewater Treatment Plant (IWTP) Lagoons (Numbers 361 and 362). These lagoons are regulated as Interim Status surface impoundments under the Pennsylvania Solid Waste Regulations (PSWR, Pennsylvania Code, Title 25, Environmental Resources, Chapter 75-Solid Waste Management, Adopted August 2, 1972, Amended through October 4, 1985.

Four groundwater monitoring wells were installed near the IWTP lagoons in October 1985 in compliance with Section 75.264(n) of the PSWR. One monitoring well was installed hydraulically upgradient and three monitoring wells were installed hydraulically downgradient from the perimeter of the impoundments. Once these wells were installed, a groundwater monitoring program was instituted, and these results have indicated that the surface impoundments may be affecting groundwater quality. This indication has triggered Section 75.264(n), paragraph (19) of the regulations which requires the submission of a plan for a groundwater quality assessment and abatement program at the facility to the Pennsylvania Department of Environmental Resources for written approval.

The purpose of this plan is to address the regulatory requirement by presenting specific background information pertaining to the regulated units, the location and construction details of the existing monitoring wells, the analytical results from the sampling of those wells, the current knowledge of the groundwater regime near the lagoons, and details of a recent data collection program and proposed additional groundwater assessment activities. This information will be reviewed and evaluated to assess the rate and extent of migration of the hazardous waste or hazardous waste constituents in the groundwater. In addition, this plan discusses potential abatement methodologies and a schedule to implement the plan.

2.0 BACKGROUND

2.1 FACILITY BACKGROUND

2.1.1 General Installation Introduction

Letterkenny Army Depot (LEAD) is located in Franklin County, Pennsylvania, 5 miles north of the City of Chambersburg, Pennsylvania (Figure 1). The installation covers 19,520 acres situated on the western side of the Cumberland Valley and is characterized by gently rolling terrain underlaid by folded and faulted geologic formations.

The depot was established in 1942 with the primary mission of ammunition storage. Since 1942, the depot's missions have increased to include: (1) overhauling, rebuilding, and testing of wheeled and tracked vehicles; (2) issue and shipment of chemicals and petroleum; and (3) maintenance, demilitarization, and modification of ammunition. Operations conducted at the depot include cleaning and stripping, plating, lubrication, demolition, chemical and petroleum transfer and storage, and washout/deactivation of ammunition. Several of these activities involved the use of trichlorethylene, other solvents, lubricants, corrosives, and various metals.

2.1.2 Facility Industrial Wastewater Treatment

Letterkenny Army Depot generates industrial wastewater from a number of sources, including metal plating, metal cleaning, vehicle washing, and battery acid disposal. These industrial wastewater are collected and conveyed to the Industrial Wastewater Treatment Plant (IWTP) by means of industrial sewers. The IWTP is intended to perform the following treatment functions: pH adjustment; removal of suspended solids, oil and grease; hexavalent chromium reduction; precipitation of metals; and removal of phosphorus, Biochemical Oxygen Demand (BOD_5), and phenols.

The IWTP was constructed in the 1954-57 time frame. Since then, the plant has undergone several modifications consisting of repairs and the addition of an extensive industrial waste collection system. A schematic of the IWTP is

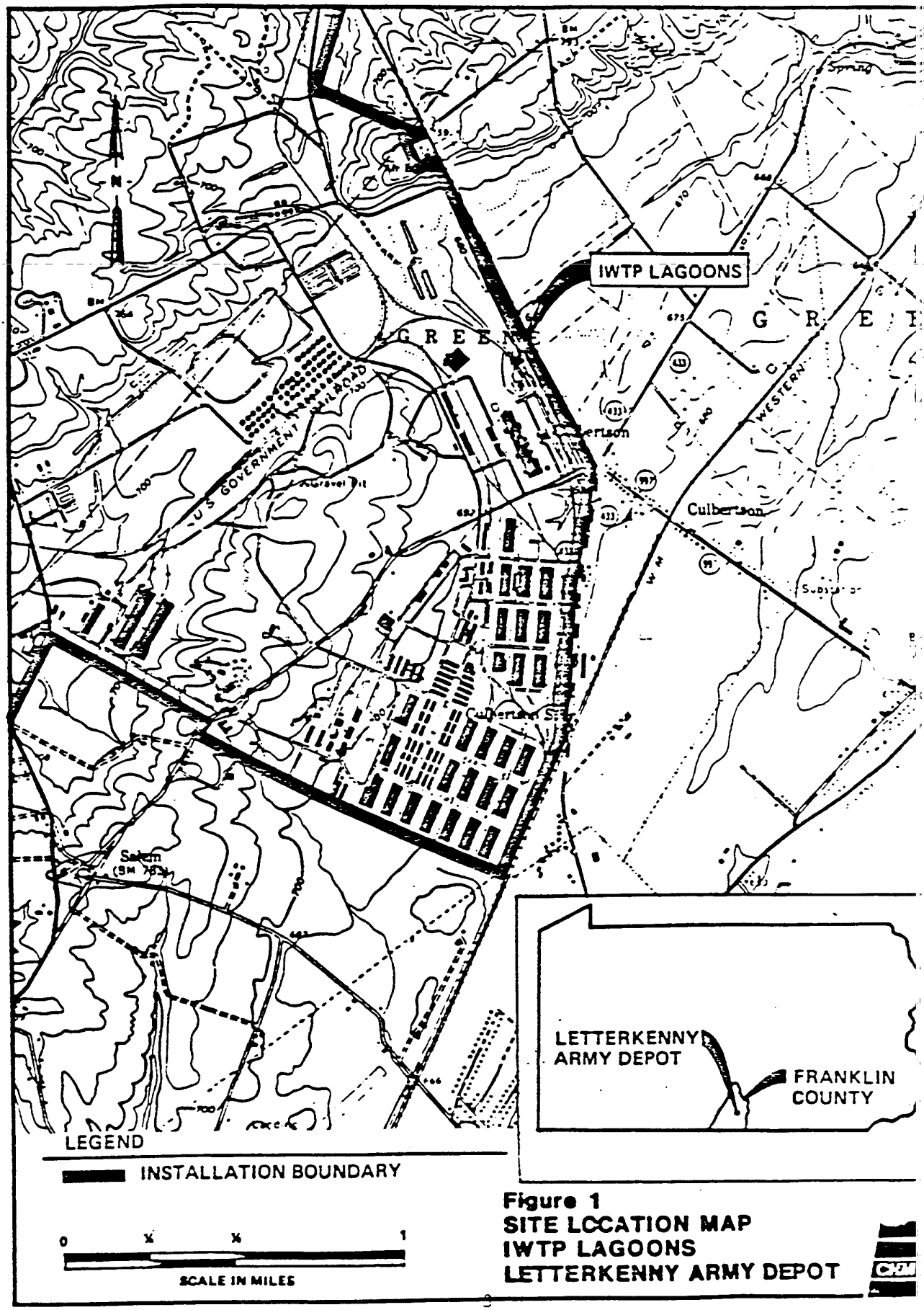


Figure 1
SITE LOCATION MAP
IWTP LAGOONS
LETTERKENNY army DEPOT

included as Figure 2. The IWTP is operated on a three-shifts-per-day basis. The plant provides both physical-chemical and biological treatment. A description of these processes follows in the next several paragraphs.

Under current operating procedures, wastewater entering the IWTP is pumped to the holding and equalization tanks. Wastewater flows from the holding and equalization tanks to the reaction tank where chromium reduction takes place.

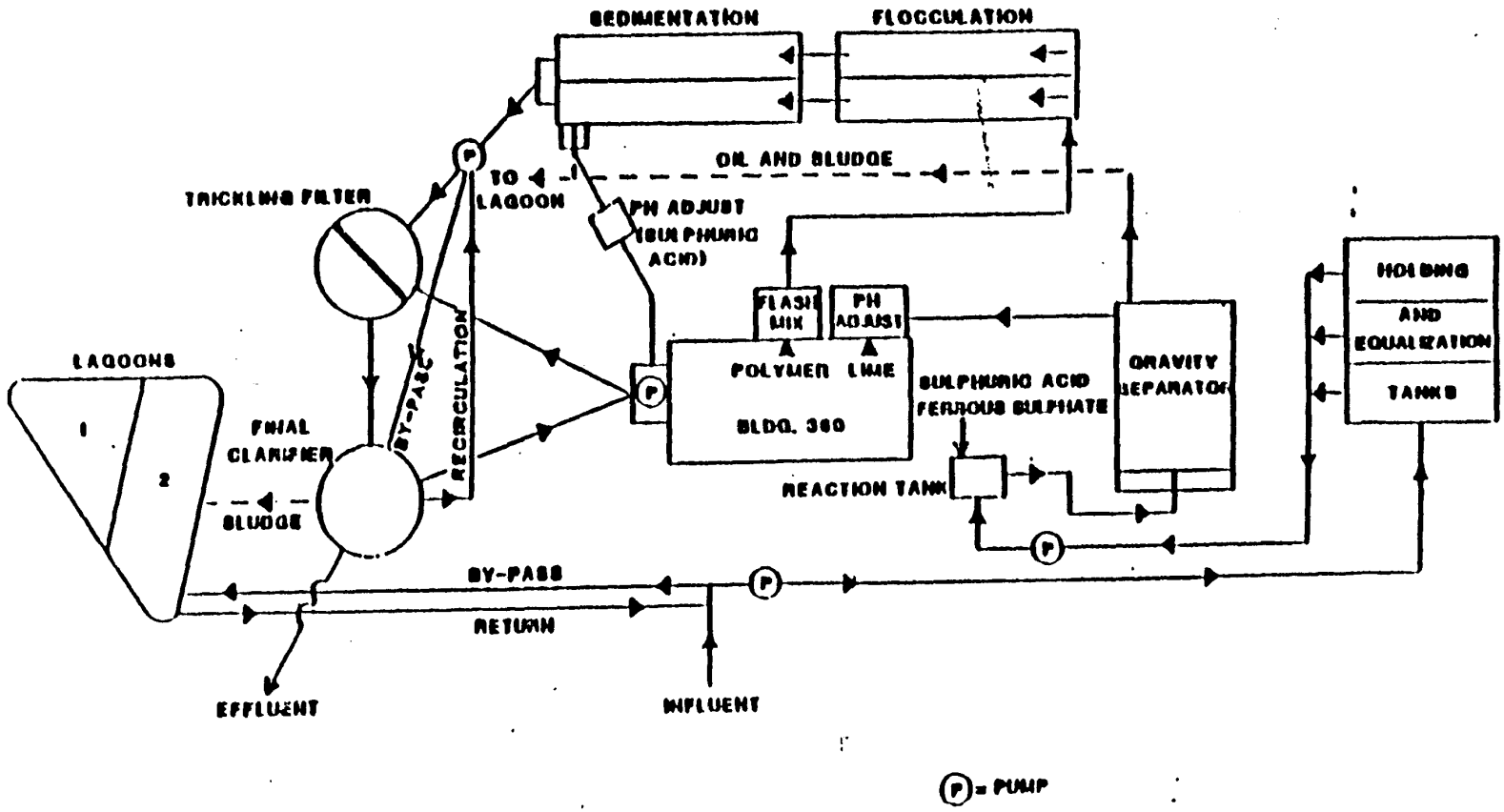
Upon leaving the reaction tank, wastewater flows to a gravity separator to remove oil and grease, and settable solids. Next, flocculation and sedimentation processes remove the metals and phosphorus. After pH adjustment, the wastewater flows to a trickling filter, which removes BOD_5 and phenols. The trickling filter effluent flows to a final clarifier for solids separation, and the clarifier effluent is discharged.

Sludge and scum are separated at three points in the IWTP (the gravity separator, the sedimentation tank, and the final clarifier) and then transferred to the plate-and-frame filter press for volume reduction and storage pending ultimate disposal. Supernatant liquid from the filter press is recycled through the IWTP and discharged.

A 1,000,000 gallon, unlined lagoon was constructed as a portion of the IWTP in the 1954-57 timeframe. This unlined lagoon reportedly contained sludges, oils, and industrial wastes. Reports also indicate that holes developed in the lagoon bottom; the holes were subsequently filled with shale. This situation resulted in the loss of liquids from the lagoon. Losses such as those reported would have increased the likelihood of contamination to the subsurface soils and groundwater.

In 1967, leakage from the lagoon prompted its reconstruction. The two cells of the new lagoon were constructed within the original lagoon perimeter using reinforced concrete. In addition to the lagoon reconstruction, a portion of the original sludge line piping (to the lagoon) was replaced with an extension to the two, newly constructed cells.

2.2 IWTP WASTEWATER AND SLUDGE CHARACTERIZATION



SOURCE: USAEHA, 1985.

Figure 2
LEAD INDUSTRIAL WASTEWATER TREATMENT PLANT

Prepared for:
U.S. Army Toxic and Hazardous Materials Agency
Aberdeen Proving Ground, Maryland

Table 1
1984 IWTP LAGOON SLUDGE SAMPLES

Parameter	Average	Range
pH (standard units)	7.8	7.6-7.9
Conductivity (umhos/cm)	1,737	1,513-2,061
Total Solids (mg/l)	64,190	59,062-73,285
TSS (mg/l)	12,923	11,443-16,536
CN (ug/l)	3.9	1.2-9.3
PO_4/P (ug/l)	36,166	17,329-47,933
F (ug/l)	218	114-300
Phenol (ug/l)	11.9	5.2-25
G&O (percent)	18	9.4-29
TOC (percent)	24	17-45
Parameter (units ug/g)		
Arsenic	<2.0*	<2.0
Barium	285	242-336
Cadmium	328	222-367
Chromium	8,330	3,652-12,820
Copper	374	284-466
Lead	1,523	1,342-1,697
Mercury	0.644	0.403-0.949
Nickel	98	80-114
Selenium	2.48†	<0.40-3.22
Silver	17.8†	<1.0-22.5
Zinc	1,742	1,490-1,836
Parameter (units ug/kg unless stated otherwise)		
Chloroform	135	20-230
1,1-Dichloroethane	1,875	900-5,000
1,1-Dichloroethene	720†	<10-1,700
Ethyl Benzene	335†	<10-1,500
Methylene Chloride	270	100-430
1,1,1-Trichloroethane	1,905	70-9,000
Toluene	289†	<10-1,000
TOX (ug/l)	1,817	391-9,285

*All values were below the detection limit of 2.0 ug/g.

†Averages were calculated only on detectable quantities.

WDR222/006

Table 2
1984 IWTP WASTEWATER (INFLUENT) SAMPLE

Parameter (Units mg/l unless otherwise stated)	Value
Total Solids	1012
Total Phosphate--P	2.7
Lead	0.73
Zinc	0.962
Cadmium	0.347
Chromium	2.71
Copper	0.171
G&O	21
TOX (ug/l)	6646
Methylene Chloride (ug/l)	7000
1,1,1-Trichloroethane (ug/l)	6000
1,1-Dichloroethane (ug/l)	80
Chloroform (ug/l)	75
Toluene (ug/l)	5

WDR222/007

Table 3
1984 IWTP WASTEWATER (EFFLUENT) SAMPLES

Parameter (Units mg/l unless stated otherwise)	21 Feb 84	22 Feb 84	23 Feb 84
Cadmium	0.019	0.030	0.033
Total Chromium	<0.025	0.034	0.068
Copper	0.027	0.044	0.042
Lead	<0.10	<0.10	<0.10
Nickel	<0.10	<0.10	<0.10
Silver	<0.025	<0.025	<0.025
Zinc	0.037	0.052	0.049
pH (standard units)	7.8	7.8	7.6
Total Suspended Solids	11	11	12
Total Cyanide	0.05	0.04	0.21
Amenable Cyanide	0.03	--	<0.01
Oil and Grease	<1.0	<1.0	1.11
Flow (gallons/day)	141,914	145,560	128,000
Total Toxic Organics	0.131	1.665	1.355
Organic Constituents[1]			
Chloroform (ug/l)	<10	15	15
Methylene Chloride (ug/l)	70	1,500	1,200
1,1,1-Trichloroethane (ug/l)	61	150	140

[1] These samples were analyzed for volatile organics, extractable organics, and pesticides/polychlorinated biphenyls. Only the constituents that were detected at measurable levels are presented here.

WDR222/008

construction details of the existing monitoring wells, and the current knowledge of the groundwater regime (geohydrology) near the lagoons. In addition, analytical results from samples obtained from residential wells are presented to aid in the evaluation of the extent of groundwater contamination. Finally, details of an ongoing program designed to collect additional data necessary to further aid in assessing the rate and extent of migration of the hazardous waste or hazardous waste constituents in the groundwater will be discussed.

3.1 GROUNDWATER MONITORING

3.1.1 Monitor Well Documentation

As a result of the Pennsylvania Department of Environmental Resources (PADER) determination that the IWTP lagoons are hazardous waste surface impoundments, and in accordance with PSWR Section 75.264(n) regarding groundwater monitoring, four monitoring wells were installed hydraulically downgradient, and one well was installed hydraulically upgradient at the perimeter of the waste management area. Construction and development logs for these four IWTP monitoring wells (TW-1 through TW-4) are presented in Appendix A. Locations of these wells are shown on Figure 3.

Groundwater investigations to evaluate suspected contamination from past source areas located at LEAD have been conducted by the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA) since 1981. These investigations have included groundwater monitoring well installation, groundwater sampling and analysis, and aquifer characterization. Figure 3 highlights the locations of suspected contamination source areas and monitoring wells near the IWTP lagoons. As shown on this figure, two monitoring wells (81-10 and 82-2) that were installed during these past investigations are situated by Source Area D (Source Area D refers to the former unlined lagoon where the current concrete-lined lagoons are now located). TW-4 will serve as the background well for lagoon groundwater quality assessments. Since these wells have been sampled by USATHAMA and most recently by the Depot, construction logs for these wells have also been provided in Appendix A.

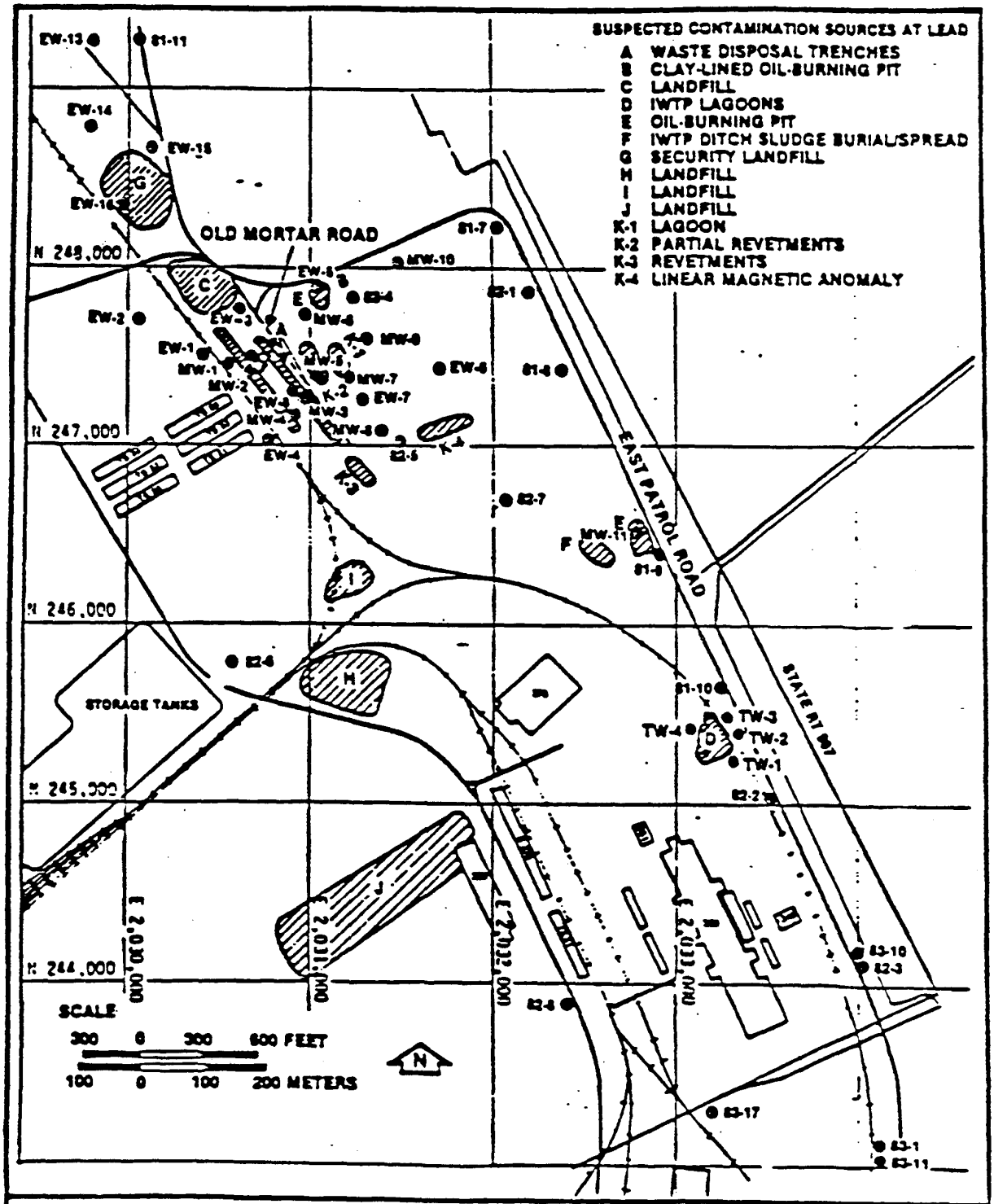


Figure 3
MONITOR WELL LOCATIONS
SOURCES: Battelle, 1983b
Weston, 1984
ESE, 1985b

Prepared for:
U.S. Army Toxic and Hazardous Materials Agency
Aberdeen Proving Ground, Maryland

3.1.2 Analytical Results

The USAEHA has collected and analyzed three rounds of groundwater samples from the four monitoring wells (TW-1 through TW-4) during October 1985, January and April 1986. Subsequent groundwater samples have been collected by LEAD for six monitor wells (TW-1 through TW-4; 81-10 and 82-2). These samples were analyzed for parameters identified in Section 75.264(n), paragraph (11) of the PSWR. In addition, the samples were analyzed for purgeable priority pollutant organic compounds. The analytical data developed from these analyses are presented in Appendix B. Highlighted in these tables are the results of sampling and analyses of the inorganic parameters and detectable purgeable priority pollutant organic compounds. None of the pesticides, herbicides, or polycholorinated biphenyls (PCBs) were detected above the detection limits.

Samples collected during the second and third rounds (January and April 1986) were analyzed for purgeable priority pollutant organic compounds more than 45 days after the 14-day maximum holding time for these compounds. Therefore, these results may not be truly representative. However, as indicated in this table, the concentrations ofcertain purgeable organic compounds were consistently high in the downgradient wells (TW-1 through TW-3) during all three sampling events conducted by the USAEHA.

Also included in Appendix B are analytical data developed for monitoring wells 81-10 and 82-2.

3.2 GEOLOGY

LEAD is located in the Great Valley section of the Valley and Ridge physiographic province. This area, known locally as the Cumberland Valley, extends in a northeast-to-southwest direction across the central part of Pennsylvania.

LEAD straddles two major structural features: the South Mountain anticlinorium to the east and the Massaneutten synclinorium to the west. These structures resulted form folding that occurred during the close of the Paleozoic Era.

High-angle reverse faulting accompanied the folding of rocks in the eastern part of LEAD. Several major faults, which strike to the northeast and dip to the southeast at fairly steep angles, cross through the part of the facility where the lagoons are located (Weston, 1984).

The limestones and shales in the vicinity of the lagoons are distorted by structural deformations that formed the Great Valley. The predominant faults include the Pinola and Letterkenny Faults (see Figure 4). The Pinola Fault is reportedly located immediately north of the lagoons and represents the structural boundary between the Martinsburg Formation and the St. Paul Group. This fault has a reported strike of approximately N55^{o}E (Becher and Taylor, 1982) and a reported dip of approximately 35^{o}SE (Battelle, 1984). The Letterkenny Fault is also located north of the lagoon area and represents a major structural feature between the northern boundary of the Chambersburg Formation and the St. Paul Group. The Letterkenny Fault reportedly has a strike of N40^{o}E (Becher and Taylor, 1982) and a dip of approximately 50^{o}NW (Battelle, 1984). One additional unnamed fault is reportedly located near the lagoons. This fault has a reported strike of approximately N30^{o}E (Becher and Taylor, 1982) and a reported dip of approximately 35^{o}SE (Battelle, 1984).

The area depicted in Figure 4 is underlain by five geologic units: the Chambersburg Formation, the St. Paul Group, the Pinesburg Station, Rockdale Run, and Martinsburg Formations. The lagoons are situated on the St. Paul limestone close to the contact with the Pinesburg Station dolomites. The locations of the Pinesburg Station dolomites shown on Figure 4 have been placed there based upon the photogeologic analysis (which included fracture trace analysis and groundtruthing) performed in 1986 by the U.S. EPA Environmental Photographic Interpretation Center/USATHAMA (EPIC/USATHAMA, 1986). The St. Paul Group limestones have a pinnacled rock surface and exhibit numerous healed fractures and solution openings. Many of the solution openings are partially filled with wet, runny clay (Battelle, 1984).

The limestones of the Chambersburg Formation (which lies immediately north of the IWTP lagoons) and the St. Paul Group are predominantly a dark gray color with redeposited calcite showing as white bands. The Martinsburg Formation (approximately 900 feet west of the IWTP lagoons) is characterized by black

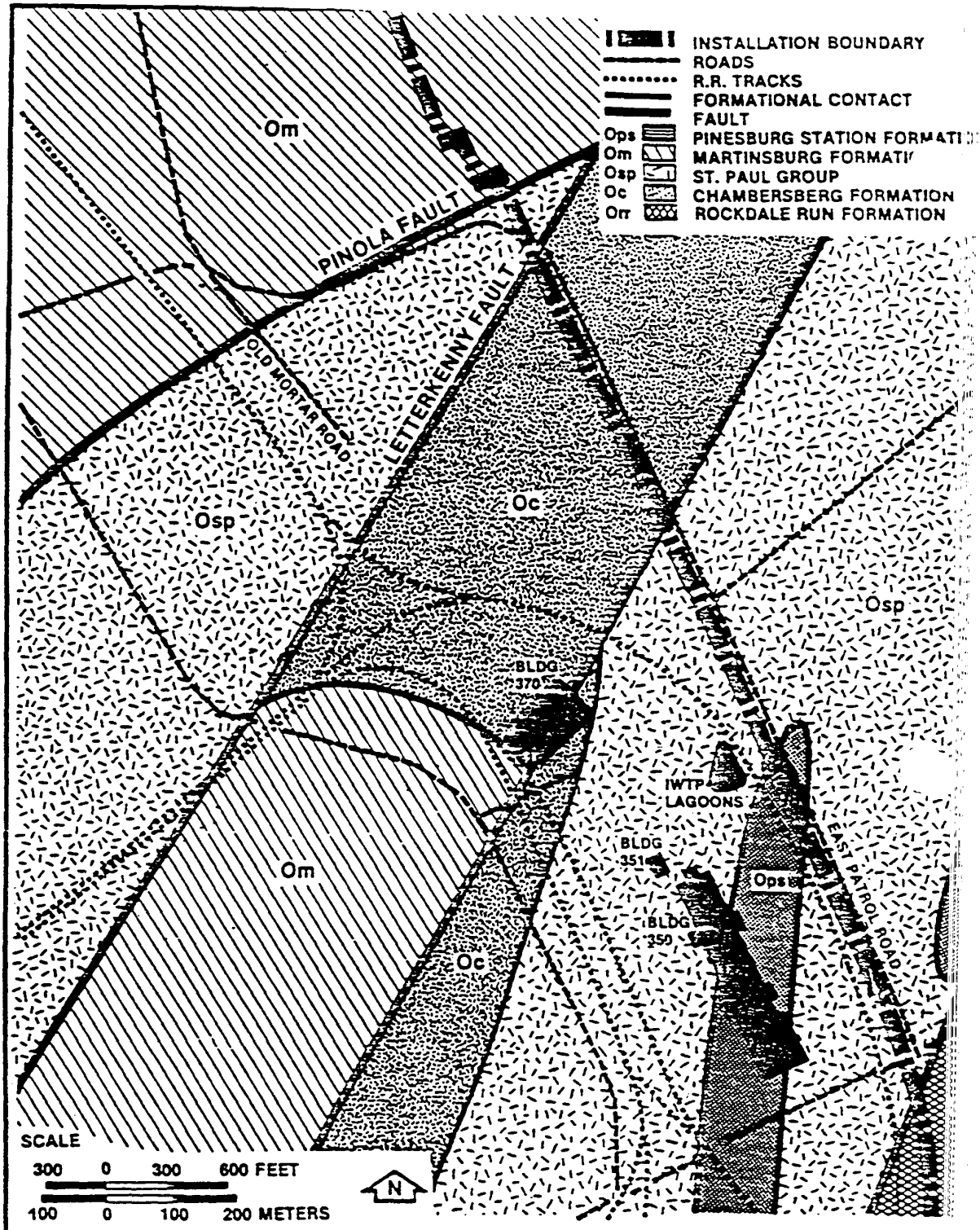


Figure 4
GEOLOGIC MAP SHOWING APPROXIMATE FORMATIONAL CONTACTS AND FAULTS

SOURCES: Becher and Taylor, 1962.
EPIC/USATHAMA, 1986, REVISED BY ESE, 1987.

Prepared for:
U.S. Army Toxic and Hazard
Materials Agency
Aberdeen Proving Ground, M

carbonaceous shales, which are generally fissile and highly fractured. The Pinesburg Station Formation is characterized by buff-colored dolomites.

3.3 GEOHYDROLOGY

Groundwater flow at LEAD is controlled by the structural orientation of the geologic units, elevation of the water surface, and geomorphology.

Within the limestones of the Chambersburg Formation and of the St. Paul Group, groundwater flow is predominantly through solution channels and enlarged fractures typical of karst terrain. Fractures are predominantly aligned with the regional north-northeast strike of the formations and are irregularly and widely spaced. Based on the groundwater levels obtained during previous USATHAMA studies for the depot, it appears that in some areas groundwater must flow across the tighter zones normal to the alignment of most of the fractures. This condition appears to be a regional phenomenon; the exact locations where this occurs cannot be identified. Large solution cavities are also found in the limestone; groundwater flow in these cavities is more closely related to open channel flow than to fracture flow. Flow within the overburden deposits is primarily typified by porous media flow, unlike the underlying limestones.

This generalized description of the geohydrology in the area can be further explained because erosion plays a role in controlling the direction and rate of groundwater movement. The shales of Martinsburg Formation form gently rolling hills. The limestones of the St. Paul Group and of the Chambersburg Formation weather quicker than the shale and tend to mirror ground surface with minor local relief. Where groundwater and surface-water gradients are high, erosion has produced pinnacled limestone bedrock surfaces. Infiltrating groundwater is directed into the low places between bedrock pinnacles, further accelerating erosional processes. Water is then directed into the joints in the bedrock and flows downgradient, preferentially along the bedding and fracture planes. The dolomites of the Pinesburg Station Formation are more resistant to weathering and fracturing than the surrounding limestones. Typically, this could create the potential for a "groundwater barrier" with increased groundwater flow along

Table 4
IWTP LAGOON MONITORING WELL WATER LEVEL DATA

Date	Well	Ground Surface Elevation (ft)	Stickup (ft)	Depth Top of Casing (ft)	Water Table Elevation (ft)
Oct 85	TW-1	682.26	2.77	33.38	651.65
Oct 85	TW-2	683.45	2.04	35.54	649.95
Oct 85	TW-3	681.75	2.06	33.21	650.6
Oct 85	TW-4	680.59	1.46	31.17	650.88
Jan 86	TW-1	682.26	2.77	29.21	655.82
Jan 86	TW-2	683.45	2.04	30.63	654.86
Jan 86	TW-3	681.75	2.06	28.71	655.1
Jan 86	TW-4	680.59	1.46	25.21	656.84
June 86	TW-1	682.26	2.77	33.46	651.57
June 86	TW-2	683.45	2.04	35	650.49
June 86	TW-3	681.75	2.06	33.79	650.02
June 86	TW-4	680.59	1.46	31.46	650.59
June 86	81-10	679.87	2.96	32.92	649.91
June 86	82-2	685.41	2.4	38.04	649.77
Apr 86	TW-1	682.26	2.77	27.08	657.95
Apr 86	TW-2	683.45	2.04	27.83	657.66
Apr 86	TW-3	681.75	2.06	26.08	657.73
Apr 86	TW-4	680.59	1.46	23.83	658.22
Aug 86	TW-1	682.26	2.77	33.44	651.59
Aug 86	TW-2	683.45	2.04	35.29	650.2
Aug 86	TW-3	681.75	2.06	33.81	650
Aug 86	TW-4	680.59	1.46	30.87	651.18
Aug 86	81-10	679.87	2.96	33	649.83
Aug 86	82-2	685.41	2.4	39.29	648.52
Apr 87	TW-1	682.26	2.77	25.65	659.38
Apr 87	TW-2	683.45	2.04	26.50	658.99
Apr 87	TW-3	681.75	2.06	24.70	659.11
Apr 87	TW-4	680.59	1.46	22.00	660.05
Apr 87	81-10	679.87	2.96	24.00	658.83
87	82-2	685.41	2.4	30.00	657.8

the contact between the dolomites and the limestones and little or no groundwater flow through the dolomites.

Regional groundwater movement is primarily in a northeasterly direction along the regional strike of the underlying geologic units, except where influenced by the less permeable Pinesburg Station dolomites. Table 4 summarizes the groundwater elevations obtained from six monitoring wells (TW-1 through TW-4, 81-10 and 82-2). In general, the discharge area for groundwater from the lagoon area is Rowe Run, which is aligned with the strike. However, the contact between St. Paul limestones and the Pinesburg Station dolomites plays a role in controlling groundwater flow from the lagoon area to the east. There is an increased occurrence of solution channels locally with this contact that would provide preferred pathways for short distances.

Predicting contaminant migration in this geologic setting is difficult due to the complexity of flow paths. The flow paths themselves may be difficult to define. Depending on whether a particular monitoring well is located within, immediately adjacent to, or at some distance from these available pathways, observed contaminant levels may vary considerably from those predicted by a strict linear flow model (Battelle, 1983b).

To assist in further defining the groundwater regime in the lagoon area, a fracture trace analysis of the area around the lagoon was completed in September 1986 (EPIC/USATHAMA, 1986). The results of the fracture trace efforts have been used to focus a geophysical investigation to confirm or identify the locations of fractures (that influence groundwater flow) near the IWTP lagoons. A more detailed discussion of the accomplished geophysical investigation is provided in Section 3.4.1.

3.4 SUMMARY OF RECENT INVESTIGATIONS

Additional data has been generated by USATHAMA during the Remedial Investigation/Feasibility Study (Comprehensive, Environmental Response Compensation and Liability Act response effort) for LEAD. A portion of data generated from this effort will be coupled with the existing groundwater quality information and used to accomplish the PSWR 75.264(n), paragraph (20)

objectives. Those objectives simply stated are to determine the rate and extent of migration and the concentrations of hazardous waste or hazardous waste constituents in the groundwater originating from the RCRA unit.

3.4.1 Geophysical Investigation

The geophysical investigation built on the information derived from the fracture trace analysis completed by EPIC/USATHAMA. Aerial photographs were studied to identify fracture trace features and differing rock types. Groundtruthing was also conducted to supplement the aerial interpretation. The result of this effort was the identification of specific locations for geophysical testing.

Two geophysical techniques, ground-penetrating radar and seismic refraction, were used in the area of the IWTP lagoons to verify the existence of faults and fractures in the subsurface and to locate these features. Two additional geophysical techniques, electromagnetic conductivity surveying and downhole induction well logging, were used to verify and further locate not only fracture patterns but contaminant flow patterns. These efforts were completed in mid-December 1986 (ESE and Technos, Inc., 1987).

The geophysical investigations provided additional information on the hydrogeologic characteristics below the IWTP lagoons. The studies confirmed the presence of groundwater mounding in the IWTP area. The relief of the groundwater mound is not quantifiable given the number of groundwater monitoring wells in the IWTP area. The mounding might be due to possible infiltration from the IWTP lagoons or from nearby, losing streams, the North Fork and Rowe Run. It was determined that the Pinesburg Station Formation was fractured whereas previously it had been characterized as a dense, unfractured dolomite. Based on geophysical logs obtained from the IWTP monitoring wells, there is considerable vertical and lateral variation in the condition of the soil and weathered rock. Three distinct layers were identified below the IWTP area as a result of these studies:

- Surface soils made up of silt and clay

- Shallow highly weathered rock within the upper 10 to 30 feet
- Unweathered limestone deeper than 30 feet

An additional geophysical investigation was conducted this past summer (Technos, Inc., 1987). The investigation focused on obtaining geophysical logs from on-post groundwater monitoring wells using the following methods:

- Induction
- Natural Gamma
- Gamma-Gamma (density)
- Neutron-Neutron (porosity)

Based on these studies, there are indications that the deeper rock (below 40 to 60 feet or so) may be less fractured than the overlying rock. Therefore, the deeper rock, as a whole, may play a lesser role in groundwater movement than does the intermediate rock.

3.4.2 Aquifer Testing

Single-well aquifer tests (slug tests) were performed in wells TW-1, TW-2, TW-3, TW-4, and 81-10, as well as in other wells that are not located near the IWTP lagoons. A digital data logger, capable of recording the instantaneous water level at frequencies up to five times per second, was used for the testing. The water level sensor consisted of a quartz pressure probe with accuracy to 0.01 ft. PVC slugs were constructed of sufficient size to displace at least 2 feet of water when placed in the wells. Wells were allowed to recover to at least 75 percent of the original static level before terminating the test. Data obtained from the tests were reduced by computer using the Bouwer and Rice (1976) method.

For the slug-in portion of most of the tests, the water level was observed to oscillate wildly, no matter how gently the slug was introduced. Therefore,

most of the slug-in tests could not be reduced by the computer program. In several of the wells, the water level either returned to equilibrium too quickly to be observed or never changed form the static value. These conditions could be the result of improper well construction or could represent the true aquifer response. If groundwater in the vicinity of these wells moves by open channel or major fracture flow, it is possible that the volume of water displaced by the slug was distributed throughout the fracture network without causing an easily observable water level change.

The calculated hydraulic conductivities for wells TW-1, TW-2, TW-3, TW-4, and 81-10 were 4×10^{-4} ft/min, 2.6×10^{-4} ft/min, 2.6×10^{-2} ft/min, 3.3×10^{-1} ft/min, and 2.5×10^{-4} ft/min, respectively.

As was previously discussed, there are zones of weathered and unweathered rock below the lagoons. The thickness of the weathered rock is approximately 25 feet and the weathered rock is present at depths of roughly 15 to 40 feet below the lagoon. The unweathered rock has a thickness of about 110 feet below the weathered rock to a depth of approximately 150 feet. Although the water level in the monitoring wells is such that there is water in the zone of weathered rock, wells that have been screened strictly in the weathered rock zone have not had good water yields and are often dry. It is therefore assumed that the majority of water drawn in the aquifer tests comes form the unweathered rock zone. The amounts of screened area in the unweathered rock zone for TW-1, TW-2, TW-3, TW-4, and 81-10 are measured as approximately 27, 35, 9 11, and 3 feet, respectively. The transmissivity can be estimated for these wells using the estimated hydraulic conductivities and assumed saturated thicknesses. Based on this information, the estimated transmissivities for wells TW-1, TW-2, TW-3, TW-4, and 81-10 are 0.011, 0.009, 0.234, 3.63, and 0.00075 ft^2/min. Calculating transmissivity as the product of hydraulic conductivity and saturated thickness is strictly applicable only to continuous porous media, such as unconsolidated granular deposits; in a fractured porous medium, such as that underlying the IWTP lagoons, this transmissivity calculation can only be used as a rough approximation.

3.4.3. Downhole Geophysical Studies in Residential Wells

LEAD performed downhole geophysical studies on 10 residential wells downgradient and off post from the lagoon area in early 1988 (Technos, 1988). The geophysical procedures used were the same as those used on the existing depot monitoring wells. The procedures used included: induction logging, natural gamma logging, spontaneous potential (SP) composite profiling, and resistance composite profiling. In addition, caliper logs and TV logs (both axial and radial lens) were performed in the uncased residential wells. Information on the residential wells logged and their locations can be found in Table 5 and Figure 5. Approximately 2000 feet of hole was logged in those 10 wells. No major open fracture system were detected, however many minor fractures (both open and calcite filled), cavities, and bedding planes were identified as zones of apparent increased porosity and water flow. However outside these zones, the composite logs showed very little significant lateral and vertical variation of the rock below the water table. Of addition interest is that the logs showed no significant hydrogeological difference between the differing limestone rock units in the area (Chambersburg, St. Paul, and Rockdale Run). However the dolomite unit (Pinesburg Station) showed less permeability outside of the fracture features than the limestone units. More detailed discussion of these studies as well as other assessment activities will be included in the Groundwater Quality Assessment Report.

3.5 PROPOSED ADDITIONAL GROUNDWATER ASSESSMENT ACTIVITIES

The Letterkenny Army Depot intends to perform additional groundwater assessment activities. These activities and the rationale for conducting these activities are discussed below. A proposed schedule of implementation is presented in Section 5.

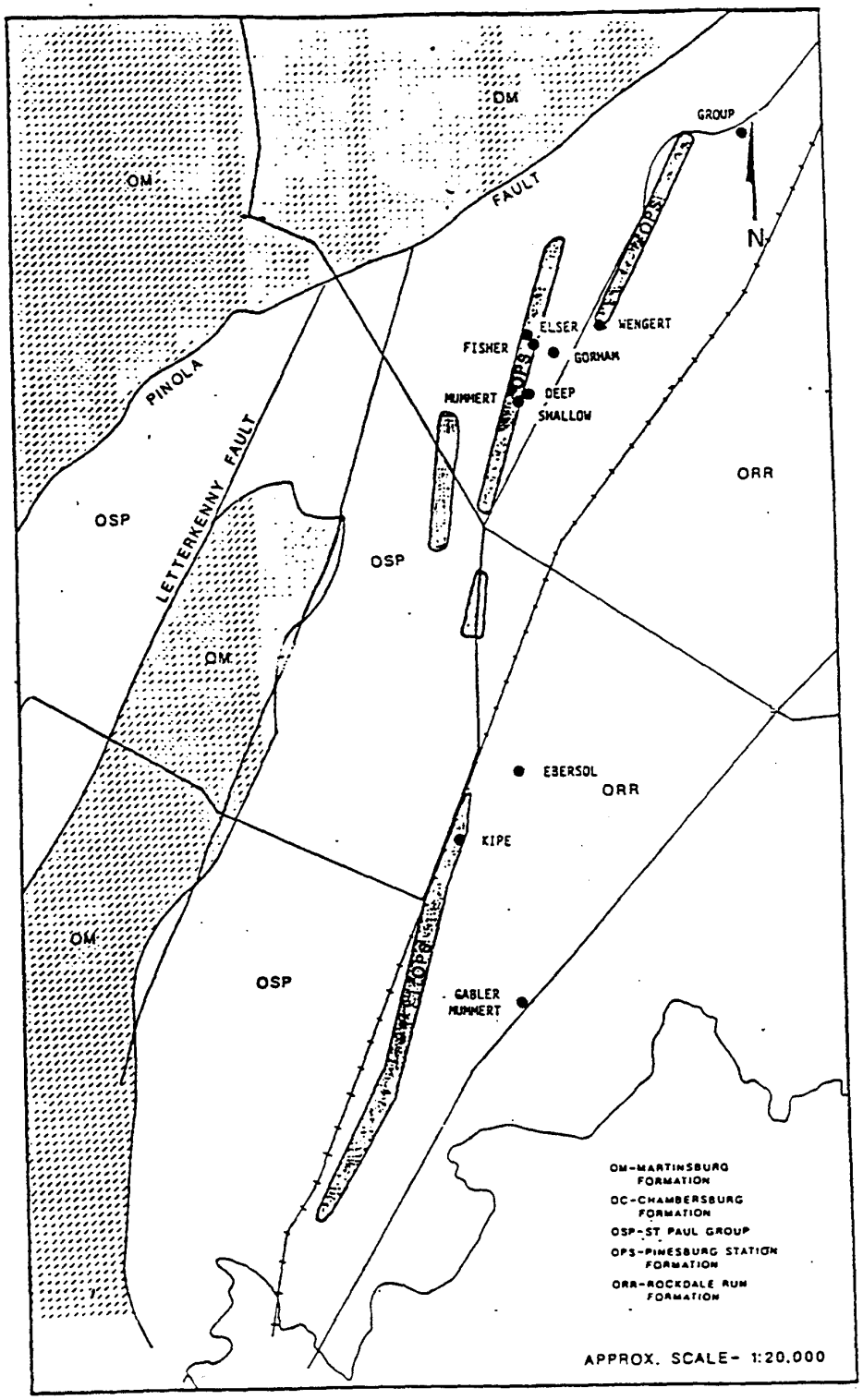
3.5.1. Sampling and Analysis Plan

LEAD will implement the revised Sampling and Analysis Plan (Appendix C) for the PADER list constituents. The first activity to be performed under the assessment program is to obtain samples from wells TW-1, TW-2, TW-3, TW-4 and analyze these samples for the PADER Appendix IX Optional Analytical Approach constituents. During the implementation of the Groundwater Assessment and Abatement Program, samples from the groundwater assessment monitoring wells

TABLE 5
WELL INFORMATION

Hole Name	Depth of Hole (Feet)	Water Level	Pump Setting (Feet)	Lengtn Steel Casing (Feet)	Hole Diameter (Inches)	Geologic Formation
Group	208.6	14' 8"	200	20	5.9	Rockdale Run
Wengert	252.0	27' 3"	240	7.5	6.25	Rockdale Run
Elser	298.3	16' 5"	280	41	6.25	Pinesburg Station
Fisher, S	499.4	18' 8"	280	41	6	Pinesburg Station
Gorham	113.0	27' 3"	100	20	6.25	Rockdale Run
Mummert (deep)	172.8	28' 10"	147	22	5.8	Rockdale Run
Mummert (shallow)	86.6	27' 7"	80	40	6 average	Rockdale Run
Ebersol	90.7	21' 8"	75	3 steel 17 PVC	6	Rockdale Run
Kipe	221.1	38' 8"	160	32	6.25	Pinesburg Station
Gabler	142.4	8' 6"	no pump	17	6.25	Rockdale Run

Note: The depth of hole, water level, length of casting and hole diameter information was determined by the geophysical and/or TV logs. The geologic formation each well was located in is taken from Figure 4 and field or TV log observations.



Source: Mata, 1986.

Figure 5 Site Map Showing Well Locations

TECHNOS

(and production wells) will be analyzed for those constituents identified from the Appendix IX sampling, indicator parameters, in replicate, and any statistically elevated parameters. The sampling events will be performed under the USATHAMA QA Plan (Appendix D). Sampling will be performed quarterly for the first year.

3.5.2. Dye - Tracing Studies

A dye tracing study is proposed for the lagoon area and the downgradient offpost areas to help determine the rate and extent of the contamination from the lagoon area. The use of dye tracing is a standard methodology for characterizing hydrogeologic characteristics in karst terranes (Quinlain and Ewers, 1985). These dye tracing techniques have been developed to deal with the inability of conventional monitor well networks to adequately assess ground water flow patterns in discrete fracture and channel flows, as seen in karst terranes. Dye tracing techniques assist the characterization efforts by (1) locating all springs, streams in sinkhole bottoms, and major streams in cave systems, (2) establishing hydrologic connection between source(s) of contamination and springs, streams, and existing monitoring wells, (3) delineating boundaries of groundwater basins, and (4) assessing the rate of ground water movement through the aquifer materials.

The dye will be injected into TW-3 well to assess movement from the lagoon area. Dye will also be injected into the sinkhole south of the installation to assess movement of water in a defined open channel system leading to the Conococheague Creek. The movement of the dye will be monitored at Rowe Spring, Pinola Spring and a series of wells and unnamed springs south and east of the installation boundary. The monitoring points will include 25 springs and 50 wells. An outline of the proposed dye tracing studies is at Appendix E.

The dye tracing program is planned to include three separate dye injections. These injections will be timed to coincide with periods of average flow, high flow and low flow through the aquifer system. If feasible dye will be injected directly into any visible fractures underneath the lagoon discovered during the closure of the lagoon itself.

3.5.3. Installation of Additional Groundwater Monitoring Wells

LEAD proposes to install additional wells to supplement the existing facility and residential wells to evaluate contaminant migration and better characterize site geology. Figure 6 presents the proposed locations of the wells. The proposed wells locations are based on the results of the studies completed to date (fracture trace analysis, geophysical studies, etc.) and will attempt to optimally supplement existing wells and provide an useful groundwater treatment program.

Three (3) wells will be drilled on post near the lagoon area and will act both as monitoring points and as production wells for the groundwater treatment program. These wells will be open 6 inch diameter holes drilled to approximately 200 feet depth. The holes will be packer tested (at least 4 tests per well) to determine the zones of highest yield and the zones of highest contamination. The pumps in each well will be sized and placed at the depth to produce the maximum water yield and maximum contaminate capture. Before implacement of the pumps the same geophysical techniques that have been performed on existing wells will be run on the new production wells.

Four (4) monitoring wells will be drilled offpost to further define the contamination profile between the lagoon and Rowe Spring. These wells will be drilled as 6 inch diameter open hole to the first significant (defined as 5 gallons a minute or better) water bearing zone below 150 feet. The wells will be drilled no deeper than approximately 250 feet.
These wells will be packer tested at all zones of water flow (here defined as at least one gallon a minute) (again at least 4 tests per hole) to determine the zones of highest contamination. The wells will be completed with 20 foot screens in the zones of highest contamination and will be completed as standard USATHAMA monitoring wells with 4 inch I.D. PVC casing.The well construction will conform to the procedures found in USATHAMA's publication Geotechnical Requirements for Drilling, Monitoring Wells, Data Acquisition, and Reports attached as Appendix F. At least two wells of the four wells will have significant flow in the deeper zones (approximately 150 -250 feet) so that data from packer tests in deeper zones will be accumulated.

3.5.4. Groundwater Quality Assessment Report

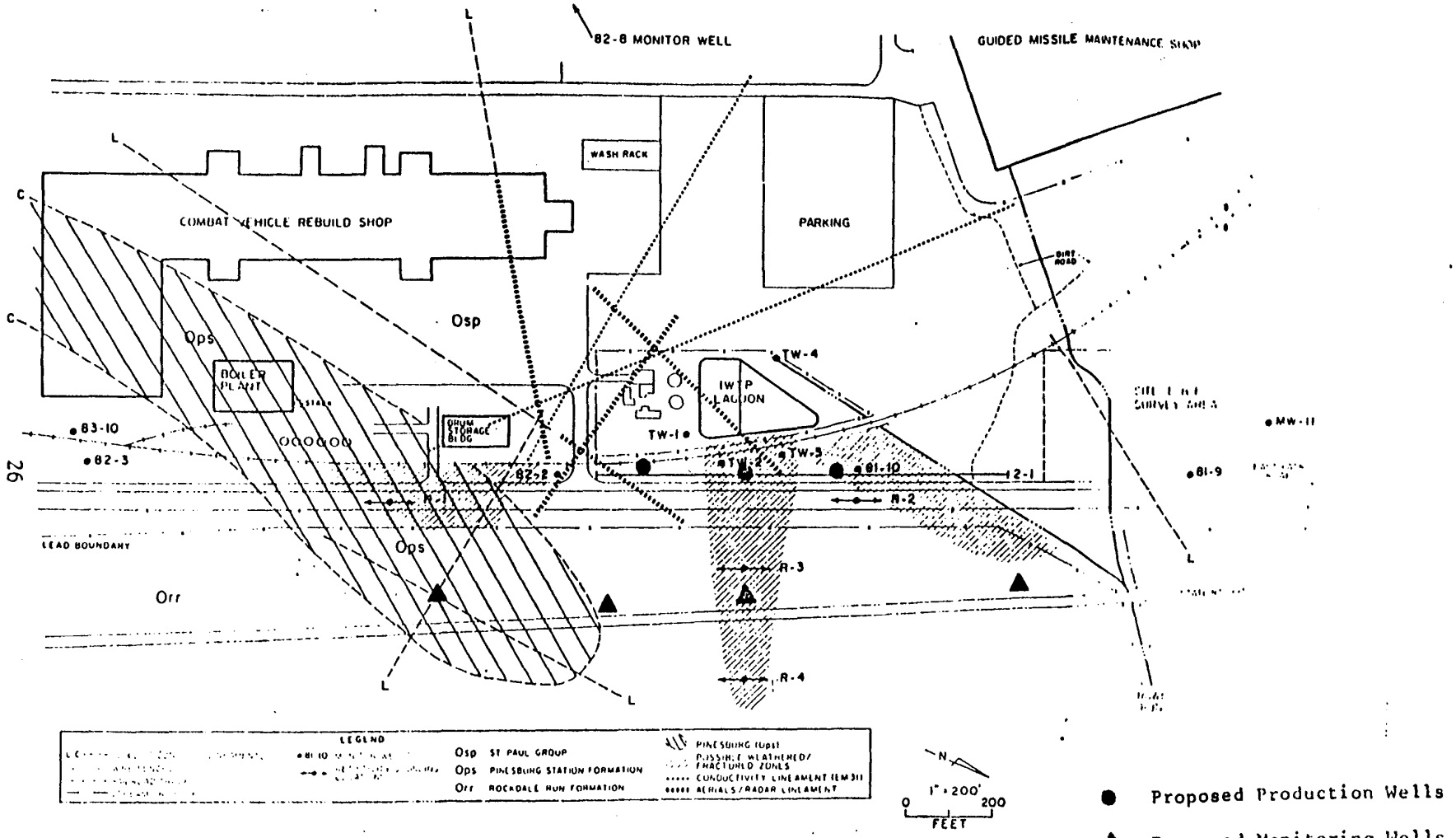


Figure 6. Proposed Locatio Additional Groundwater Wells

Source: Technos, 1987

A groundwater quality assessment report will be submitted, presenting the findings of the investigation and all previously gathered ground water data. Water table contour maps, vertical cross-sections of hydraulic heads, and graphical analysis of contaminant concentrations based on well and sampling data will be provided in the assessment report. If the report findings indicate that significant contamination is due to the IWTP lagoon area, then the assessment report will provide that a final abatement plan will be submitted within thirty days of submission of the assessment report. If the planned studies indicate that other assessment activities are needed such as the installation of additional groundwater monitoring wells, the locations and screening intervals of the wells will be provided.

4.0 GROUNDWATER CONTAMINATION ABATEMENT

4.1 OVERVIEW

The Letterkenny Army Depot ceased usage of the hazardous waste surface impoundments prior to November 1988. At that time, the surface impoundments will be closed according to the facility closure plan. The closure plan is anticipated to be submitted to PADER in the spring of 1989. The closure plan will address the removal of the lagoon sludge, liner, and contaminated soil. To the extent possible, all contaminated material will be removed from the lagoon area.

With regard to the groundwater below the surface impoundments, several activities are planned to assess the groundwater quality. Section 5 contains a proposed schedule of implementation for these activities. Several abatement methodologies (discussed below) may be applicable to the site. Section 75.264(n), paragraph (23) of the PSWR requires abatement of groundwater contamination. Abatement is defined in Section 75.260 of the PSWR as "the restoration, reclamation, recovery, and the like of a natural resource adversely affected by the activity of a person, permittee, or municipality."

As has been noted in the installation's letter dated August 25, 1987, responding to PADER's comments on the Draft Groundwater Quality Assessment and Abatement Program Plan, the Letterkenny Army Depot intends to treat the

TABLE 6.

LETTERKENNY ARMY DEPOT
GROUNDWATER QUALITY ASSESSMENT AND ABATEMENT PLAN
PROGRAM SCHEDULE

	START	COMPLETION
GWQAAP Submittal	13 Jan 89	13 Jan 89
GWQAAP PADER Review & Approval	16 Jan 89	31 Jan 89
GWQAAP Property Easements	17 Jan 89	28 Mar 89
GWQAAP Appendix IX Sampling & Analysis	1 Feb 89	29 Mar 89
GWQAAP Analytical List Submittal	30 Mar 89	5 Apr 89
GWQAAP Production Well/Off-post Borings	6 Apr 89	1 Jun 89
GWQAAP Packer Tests/Sampling & Analysis	2 Jun 89	4 Aug 89
GWQAAP Preliminary Assessment Report	2 Jun 89	14 Aug 89
GWQAAP Army/PADER Meeting	18 Aug 89	18 Aug 89
GWQAAP Quarterly Monitoring	2 Feb 89	21 Mar 90
GWQAAP Abatement Plan Submittal	31 Jan 90	28 Feb 90
GWQAAP Abatement Plan PADER Review	1 Mar 90	31 Mar 90
GWQAAP Abatement Plan Implementation	1 Apr 90	1 Apr 90
Dye Trace Plan Submittal	13 Jan 89	13 Jan 89
Dye Trace (#1)	15 Mar 89	9 May 89
Dye Trace (#2)	15 Jun 89	10 Aug 89
Dye Trace (#3) (Optional)	16 Oct 89	12 Dec 89
GW Treatment Design Submittal	20 Jan 89	20 Jan 89
GW Treatment - NPDES Permit Modification	23 Jan 89	24 Apr 89
GW Treatment Construction	10 Apr 89	15 Jun 89
GW Treatment Operations	15 Jun 89	

groundwater below the IWTP lagoons. Extracted groundwater is intended to be treated by the existing IWTP.

There is an on-going contract for the design of a large-capacity (carbon adsorption) unit to remove any volatiles which might appear in the IWTP effluent. The water will be treated so that the contaminants in the effluent do not exceed maximum contaminant levels (MCLs). The effluent polishing system will be installed following acceptance of the final design by LEAD/PADER. LEAD will obtain the necessary permits and approvals from the appropriate State agencies for the discharges.

4.2 IWTP LAGOON GROUNDWATER TREATMENT SYSTEM

The three (3) new production wells will be used as extraction wells for the removal of groundwater below the IWTP lagoons. Pumps will be installed in each of the wells at the highest level of contamination found during the packer tests, and the extracted groundwater will be discharged to a header pipe connected to each of the extraction wells. Groundwater will be pumped form each of the wells at a rate that can be sustained over a long period of time as determined by the packer tests.

Based on the results of the groundwater assessment, a final abatement plan will be generated. It is possible that additional extraction wells will be necessary. Also, treatment of the groundwater at Rowe Spring is another possible abatement alternative.

5.0 PROPOSED SCHEDULE OF IMPLEMENTATION

The activities that will be performed as part of the groundwater quality assessment and abatement program at Letterkenny are presented in Table 6. These activities are essential to this program because of the karst terrain at LEAD and the multiple sources of contamination at other LEAD locations. This program will complement the activities outlined in the closure plan for the hazardous waste surface impoundments.

6.0 CERTIFICATION

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 fine and imprisonment for knowing violations.

Signature: Ira P. May

Typed Name: Ira P. May

Date: January 11, 1989

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Exhibit A-2 to Attachment 4

GWAAP Addendum

1. The Department and the Army agree to the modifications to the GWAAP described herein. In the event that there is a conflict between this GWAAP Addendum and the GWAAP, the terms of the GWAAP Addendum shall prevail.

2. Installation of Additional Groundwater Monitoring Wells. The four monitoring wells drilled offpost, and any additional wells described herein shall be for the purpose of defining the contaminant plume related to the IWTP Lagoons, and shall be constructed to allow for use as production/abatement wells.

Two of the four monitoring wells drilled offpost shall be drilled according to the following schedule:

a. borings drilled no later than June 15, 1989, and final locations to be approved by the Department not less than 15 days prior to drilling;

b. sampling analysis according to Sampling Analysis Plan/GWAAP completed no later than June 15, 1989; and

c. screens installed no later than August 14, 1989, according to screen locations approved by the Department.

3. Groundwater Quality Assessment Report

No later than August 14, 1989, the Army shall submit a preliminary report which meets the following (hereinafter "GWAAP Preliminary Assessment Report"):

a. Contains data, analysis and recommendations for the location of at least two additional monitoring wells to meet the purposes of the GWAAP, including defining the contaminant plume related to the IWTP Lagoons;

b. Contains a schedule for installation of the additional monitoring wells, which schedule shall not affect the schedule in the GWAAP unless otherwise agreed to by the Department;

c. Contains data, analysis and recommendations, and schedule for installation, as to the use of first two monitoring wells for the purpose of interim abatement.

Interim abatement is appropriate when the concentration of contaminants in the downgradient monitoring wells exceeds the background concentration.

4. Additional monitoring wells shall be drilled by the Army within 30 days of notice by the Department, and according to the following:

a. The Army shall execute a requirements contract with a certified well drilling contractor who is capable of performing well drilling as required in the GWAAP and this GWAAP Addendum. Such contract shall be effective in sufficient time to meet the requirements of the GWAAP, including modifications made following the GWAAP Preliminary Assessment Report to be submitted to the Department on August 14, 1989;

b. the Army shall drill additional monitoring wells as required by the Department to further define the vertical and horizontal distribution of the contaminant plume from the IWTP lagoons. The number and location of the additional wells shall be based upon the GWAAP Preliminary Assessment Report, and may further be based upon the Final GWAAP Report to be submitted to the Department on February 20, 1990, and any other information, including the results of the dye tracer study if timely results are available;

c. the additional monitoring wells shall be constructed in a manner similar to the first two monitoring wells.

Exhibit B-1 to Attachment 4

Letterkenny Army Depot RCRA Sampling and Analysis Plan

1. The following sampling plan will be implemented under the direction of the Environmental Management Division at Letterkenny Army Depot (LEAD). This manual will be employed in conjunction with LEAD's groundwater monitoring program for the depot's six RCRA-approved point of compliance monitoring wells located in the vicinity of the Industrial Waste Treatment Plant (IWTP). These compliance monitoring wells are TW-1, TW-2, TW-3, TW-4, 81-10 and 82-2. See Enclosure 1 for the location of these wells. The plan will include information on the apparatus required, sample collection, sample preservation and handling, chain-of-custody control, analytical procedures used, and field and laboratory quality assurance/quality control. Sampling of these wells will occur on a quarterly basis, with the approximate months of sampling being March, June, September and December of each year.

2. See Enclosure 2 for a complete list of equipment that is needed for this groundwater monitoring program. Also included is the location on depot of each piece of equipment. This list was compiled site-specifically for LEAD in order to utilize the best possible methods for the purging and sampling of the monitoring wells.

3. All equipment from Enclosure 2 should be collected prior to when the sampling is to take place. All equipment will be housed either in the Environmental Management Division's white trailer, which is located in the parking lot adjacent to Building 663 or the Industrial Waste Treatment Plant, Building 360, except for the sample containers, labels, seals, coolers, sonic interface probe, the nitric acid, and the distilled water. The containers, seals, labels, coolers and interface probe will be supplied by Wright Lab Services of Middletown, Pennsylvania or whichever laboratory performs the analysis. A courier can be dispatched to Wright Labs a day or two before the sampling to collect the labels and containers, or the laboratory can be responsible for transporting the containers to LEAD. The laboratory should be contacted by telephone a week prior to this to give them sufficient time for preparation. The acid can be obtained from the chemical quality laboratory on depot, Building 102 and the supply store carries distilled water.

4. The trailer and the monitoring wells are locked at all times to ensure the integrity of the equipment and the wells. The keys to the wells will be needed the day of monitoring. A set of keys are located in the Environmental Office in Building 663.

5. A field data record is to be completed for every well sampled. Enclosure 3 is an example of the field data record to be filled out. These records should be signed or initialed by the sampler.

6. The hydrogeological well logs for the six point of compliance wells have been included as Enclosures 13, 14 and 15. Using an electronic water tape, each well can be sounded out to ensure that each well depth has not been altered from the previous quarter of sampling. The bailers should remain in the wells during this measurement. These determined values should correspond to the well depths listed on the well logs and should be recorded in feet on Enclosures 3 and 16.

7. With the bailers still remaining in the wells and using an electronic water tape, determine each well's static water level. This static water level should be determined to 0.01 feet. The water tape is marked off in feet so a tape measure is also needed for this level measurement. Every monitoring well has a notch chiseled into the top of its casing. This notch serves as a standardized reference point so that the static water level is always measured from the same point during each quarter of monitoring. The water tape is nondedicated; therefore, it will need to be decontaminated after each well. Proper cleaning procedures will be described in detail later. The static water level measurements for the wells should also be recorded on Enclosures 3 and 16.

8. A Sonic Interface Probe will either be purchased by the depot, rented on a quarterly basis from the Contracting Laboratory or visual inspection of the transparent check valve bailers will be used. This probe or the bailers will be used to determine the existence of any immiscible layers in each well. If a floater and/or sinker does exist, the thickness of each layer will be verified and these immiscible layers will be collected in accordance with the RCRA Ground-Water Monitoring Technical Enforcement Guidance (TGED). The immiscible layers, if detected, will be collected prior to any sampling.

9. Calculate the volume of water to be pumped in order to purge the well of three times its own well volume. Purging is required to remove all stagnant water in the well and to allow fresh water to recharge into the well, yielding a more representative sample. To calculate the volume to be purged, an example for well TW-4 has been done.

TD = Total depth of well = 67.40 ft (known)
HC = Height of well casing above ground level = 1.46 ft (known)
SWL = Static water level = 32.00 ft (measured)
Amount of water in well = ((TD + HC) - SWL)
= ((67.40 + 1.46) - 32.00) ft
= 36.86 ft
One well volume = (amount of water in well) * well constant
= 36.86 ft * 0.65 gal/ft
= 23.96 gal
Amount to purge = 3 well volumes
= 3 * 23.96 gal
= 71.88 gal

When doing calculations, carry all figures out to two significant digits. See Enclosure 4 for well data and Enclosure 5 for a table of well constants. Wells TW-1, TW-2, TW-3, and TW-4 are 4-inch diameter monitoring wells while 81-10 and 82-2 are 2-inch diameter wells. All calculations should be recorded on the field data record sheets.

10. A Fultz groundwater sampling pump will be used to evacuate the wells for purging. An instruction manual for this portable pump can be obtained in the Environmental Office. This pump is nondedicated and will require cleaning between each well. Proper cleaning procedures will be described later. When purging a well, the pump should be slowly and gently lowered into the well to eliminate any unnecessary aeration of the water. The bottom of the pump should not hit the bottom of the well screen while purging. At the same time, the pump intake should be approximately 5 feet below the surface of the well water. Well water collected while purging should be containerized in a 5 gallon bucket and disposed of on the ground approximately 50 feet away from the well. To determine the pumping rate of the well, record the time it takes to pump out 5 gallons of water using the stopwatch.

11. Shallow-depth wells or an extremely dry period of weather may have the effect of not producing three well volumes to be purged. If this is the case, pump the well dry, let it recover, and if possible, pump again to dryness. When the well recovers a second time, begin sampling.

12. Once three well volumes have been evacuated or a well has been pumped to dryness, quadruplicate measurements of temperature, pH and specific conductivity should be taken before any sampling takes place. These values should recorded on Enclosure 3.

13. The upgradient well, TW-4, should be sampled first. Thereafter, the wells should be sampled in increasing order of contamination so that the less contaminated wells are sampled first. This ensures a smaller degree of cross-contamination between wells. According to data collected thus far, the order of sampling wells is:

First - TW-4
Second - 82-2
Third - 81-10
Fourth - TW-1
Fifth - TW-3
Sixth - TW-2

14. Once the initial measurements of temperature, pH and specific conductivity have been taken, sampling should begin immediately. Dedicated teflon bailers will be used for each well. These bailers can remain inside the well casing between sampling events, using the teflon-coated wire to hang the bailer in the well. Teflon is being used because of its low absorption rate of contaminants. When raising and lowering the bailers, care should be taken not to aerate the well water. Do not drop the bailers into the wells. Plastic sheeting may, if desired, be used to rest all equipment on. New sheeting, if used, should be used for each well and all sheeting should be disposed of properly at the end of the sampling events in a 55 gallon, labeled drum. Measures, such as the plastic sheeting, may be taken to prevent soils from coming in contact with any of the equipment. If sheeting is not used, care should be taken not to place the bailers on the ground while sampling. Rubber gloves are to be worn while handling all containers during sampling. The gloves will be cleaned after each well sampling occurs.

15. The following parameters are to be analyzed for the six point of compliance well based on contaminants already known to be present in the wells:

a. <u>Indicators</u> (quadruplicate measurements)

- pH
- Total Organic Halogen (TOX)
- Total Organic Carbon (TOC)
- Specific Conductivity

b. Water Quality Parameters:

- Manganese
- Sulfate
- Total Iron
- Chloride
- Phenols
- Sodium

c. Bacteriological:

- Total Coliform

d. Inorganic Metals(Total and Dissolved):

- Fluoride
- Lead
- Nitrate - N
- Arsenic
- Selenium
- Barium
- Cadmium
- Chromium
- Silver

e. Radiological:

- Gross Alpha
- Gross Beta
- Radium 226, Radium 228, Strontium 90 (if warranted)

f. Pesticides/Herbicides:

- Endrin
- Lindane
- Toxaphene
- Methoxychlor
- 2,4-D
- 2,4,5-TP Silvex

g. Volatile Organics (Method 624):

- Benzene
- Bromoform
- Carbon Tetrachloride
- Chlorobenzene
- Chlorodibromomethane
- Chloroethane
- 2-Chloroethylvinyl Ether
- Chloroform

- Dichlorobromomethane
- 1,1-Dichloroethane
- 1,2-Dichloroethane
- 1,1-Dichloroethylene
- 1,2-Dichloropropane
- 1,3-Dichloropropene
- Ethylbenzene
- Methyl Bromide
- Methyl Chloride
- Methylene Chloride
- 1,1,2,2-Tetrachloroethane
- Tetrachloroethylene
- Toluene
- trans-1,2-Dichloroethylene
- 1,1,1-Trichloroethane
- 1,1,2-Trichloroethane
- Trichloroethylene
- Vinyl Chloride

16. Parameters are to be collected in order of decreasing volatilization sensitivity. They are listed below in the preferred collection order:

a. In-field parameters: pH, specific conductivity, temperature

b. Volatile organics (VOA)

c. Total organic halogens (TOX)

d. Total organic carbon (TOC)

e. Pesticides

f. Herbicides

g. Total metal

h. Dissolved metal

i. Phenols

j. Anions

k. Total coliform

l. Radionuclides

m. In-field parameters: pH, specific conductivity, temperature

17. Once all samples have been collected for an individual well, final quadruplicate measurements of the indicators; pH, temperature and specific conductivity should be taken again and recorded on the field data sheets. If there is a significant shift between these the initial and final sets of measurements, this is a good indication that not enough well water has been purged from the well. Purging would have to take place again and the samples would have to be retaken once the indicator measurements had stabilized. If there is no significant shift between both sets of measurements, then enough well water has been purged and the samples collected will suffice for analysis. Stabilization criteria for the indicator parameters is $\pm$10 % of the average for the quadruplicate measurements.

18. Temperature, pH, and specific conductivity measurements are made in the field due to their instability. The field meters, the pH meter and C-S-T meter, should be calibrated prior to each well measurement to ensure reliable and accurate measurements. The pH meter will be calibrated using two different pH buffer solutions. A solution with pH of 4.0 and one with a pH of 7.0 are to be used because our samples are in the lower pH range. The C-S-T meter will be calibrated by "red-lining" the instrument. Temperature readings are required to correct the specific conductivity values, which are temperature dependent. These meters are nondedicated and will need to be cleaned between each well. Proper cleaning procedures will follow later.

19. Temperature will be measured in C, pH in standard units, and specific conductivity in umhos/cm. Quadruplicate measurements of temperature, pH, specific conductivity, total organic carbon, and total organic halogens will be taken for all six point of compliance wells, to provide a statistical background. Single measurements will suffice for the rest of the parameters for all six wells.

20. All sample containers should be filled in a manner which does not agitate or aerate the sample. This is necessary to prevent the loss of volatile contaminants or any chemistry changes occurring. The samples collected for volatile organics, total organic halogens, and total organic carbon should have no headspace or bubbles in their containers. Forming a convex miniscus on the top of the vial helps eliminate any headspace.

contaminants. Do not tighten the cap too much or the teflon septum will bulge out. Turn the vial upside down and tap it against your wrist. If a headspace exists, empty the vial and refill it. When filling the containers to be used for the temperature, pH, and specific conductivity measurements, the containers should be rinsed out with well water prior to filling.

21. One sample will be collected for total metals analysis and one sample collected for dissolved metals analysis. The samples for dissolved metals analysis must be filtered as soon as it is collected. Filtering is necessary because the initial sample is almost always turbid. This turbidity is a result of the well casing and is not representative of in-site well water. To obtain a more representative sample, this turbidity should be filtered out. The waste filtration system listed on Enclosure 2 should be used. Instructions for the waste filtration system can be obtained in the Environmental Office. The containers used to collect the dissolved metals samples and the barrel of the filtration system, where the well water is filtered, should be rinsed out with well water prior to filtration.

22. The 0.45 um filter will be used; and, if the well water is extremely turbid, a prefilter may be necessary. The filtered solution can then go directly into the sample container, an amber glass jar. The barrel of the waste filtration system is a nondedicated piece of equipment and will need to be cleaned between wells. The proper cleaning procedures will be discussed later.

23. When sampling, the bailers should be lowered 5 feet or more below the surface of the water level to ensure that representative samples are taken. At the same time, the bailers should not scrape the well screen and dredge up any sediment.

24. The teflon bailers are dedicated equipment and will remain in their respective wells. No cleaning will be required for these bailers other than the initial cleaning. All other equipment; the sampling pump, the barrel of the waste filtration system, the water tape, the pH meter and the C-S-T meter, will need to be cleaned between the sampling of each well. The water tape and the two meters, pH and C-S-T, can be rinsed with distilled water. This measure should suffice. The sampling pump should be rinsed with distilled water, and tap water should then be run through the pump to clean it. To collect an equipment blank after each well, distilled water will then be run through the pump and the equipment blank collected at the discharge tube. The two 20-gallon drums listed on Enclosure 2 will be used to hold the tap water and the distilled water respectively. Duplicate samples for Volatile Organic

Analysis (VOA) will constitute the equipment blank instead of conducting an analysis for all 12 parameters listed previously. An equipment blank will be collected after every well, so there will be a total of six equipment blanks for the entire day of sampling. The equipment blanks determine that cross-contamination does not occur between wells. To provide a background with which to compare this blank to for VOA analysis, one sample of tap water will be analysed for VOA during each year of sampling. The barrel of the filtration system must be cleaned with distilled water, followed by a dilute solution of nitric acid (NHO3), approximately 20% HNO3, and then rinsed again with distilled water. The nitric acid solution pulls out any metals remaining in the barrel. Because LEAD is primarily concerned with analysis of organics and not metals, the sampling pump will be cleaned using a combination of tap water and distilled water and not nitric acid.

25. Using the proper container for each parameter is important to ensure the integrity of the sample. See Enclosure 6 for a list of containers that are to be used for each parameter being analyzed. The necessary containers will be supplied by Wright Labs, or whichever laboratory is performing the analysis. All containers will be clean upon arrival.

26. In conjunction with the correct containers, sample preservation is also an important step in ensuring the samples' integrity. Phenols are to be preserved with sulfuric acid (H2SO4). Total organic carbon is to be preserved with phosphoric acid (H3PO4) or the choice of preservative will be dependent upon the instrumentation used by the Contracting Laboratory. The use of HCl or H2SO4 would also constitute acceptable preservatives for TOC. Sodium thiosulfate (Na2 S2 O3) is used to preserve the total coliform samples and nitric acid (HNO3) is used to preserve metals and radionuclides. The preservative are needed to adjust the samples to the proper pH. Approximately 10-20 drops of each concentrated solution is needed. See Enclosure 7 for a list of containers and preservatives that are being proposed in the Federal Register and the TGED. All sample containers are then to be stored in the insulated coolers with the ice to keep the containers chilled for further preservation.

27. All containers, as they are filled, should be sealed with the labelled seals to further ensure the integrity of the samples and also to guard against any accidental opening or leaks. These seals should then be labelled with an individual serial number (see 28.h.). Enclosure 8 shows an example of the labelled seals which will be used.

28. All containers must also be properly labeled as they are filled. The following information should be listed on each and every bottle:

a. Sample location.

b. Sample collector(s).

c. Sample description.

d. Date/time of sample being taken.

e. Method of acquiring sample.

f. Preservation needed.

g. Analysis required.

h. Individual serial number

See Enclosure 8 for an example of a proper label. All labels and seals will be supplied in conjunction with the containers by the laboratory performing the analysis. Once sample containers are labeled and sealed, all containers should then be stored in the insulated coolers. Once filled with containers, these coolers should be sealed also with duct tape so that no tampering can occur with the enclosed contents.

29. A trip blank consisting of one of each type of sample bottle filled with Type II reagent grade water will be supplied by the Contracting Laboratory. This trip blank will accompany the sampler during the entire day of sampling and will be analysed for all necessary parameters. This trip blank assures that there is no interference with the sample containers during the day of sampling.

30. Sampling six wells will take approximately 7-9 hours, about an hour per well, depending on the amount and extent of complications which may occur. The samples will either be picked up by a representative from the Contracted Laboratory or will be transported by depot courier to the laboratory immediately following cessation of sampling so that analysis can begin without delay. At no time will the samples be left unattended.

31. A chain-of-custody control program needs to be implemented in order to keep an accurate account of the number of sample containers, where they are, who is responsible for the containers, where their destination is, etc. The chain-of-custody control program should include:

a. Sample Labels.

b. Sample Seals .

c. Field Data Record Sheet.

d. Chain-of-Custody Form.

e. Analysis Request Form (DD 1222).

Enclosure 9 is a set of the chain-of-custody records which will be used at LEAD, dependant on whichever performs the analysis, and Enclosure 10 is a copy of DD Form 1222. There should be a chain-of-custody record for each insulated cooler that is used. These records can be taped to the top of each cooler. The chain-of-custody forms will be completed at the time of sampling by the field crew. The original forms will accompany the samples at all times after collection. Copies of these forms will be retained by the field crew and filed in the Environmental Office. Everyone handling the containers, the field crew, the courier, and the receiving laboratory, will sign, date, and note the time on the forms upon receiving and/or relinquishing the sample containers.

32. Enclosure 11 is a set of lists of EPA-approved test methods that the laboratories use for analysis of various parameters. The list of methods may vary with the laboratories.

33. A quality control/quality assurance (QC/QA) plan will be strictly followed by Wright Lab Services, or whichever laboratory performs the analysis. Quality control/quality assurance is required to ensure the validity of all test results. Copies of Wright Lab Services plan and Kellogg Environmental Services plan are included as Enclosure 12. If at some point in time a different laboratory is employed for analysis, the new laboratory's QC/QA plan will be substituted.

34. Enclosures 13, 14 and 15 are drawings of the six point of compliance wells, detailing depth and the layers of soil encountered.

35. Enclosure 16 is a copy of the PADER form which is to be completed for each well being sampled.

36. Once the results are received from the laboratory, a copy of the analytical results and copies of Enclosures 3 (Field Data Record) and 16 (PADER Form) for each well should be submitted to the Bureau of Waste Management of the Pennsylvania Department of Environmental Resources.

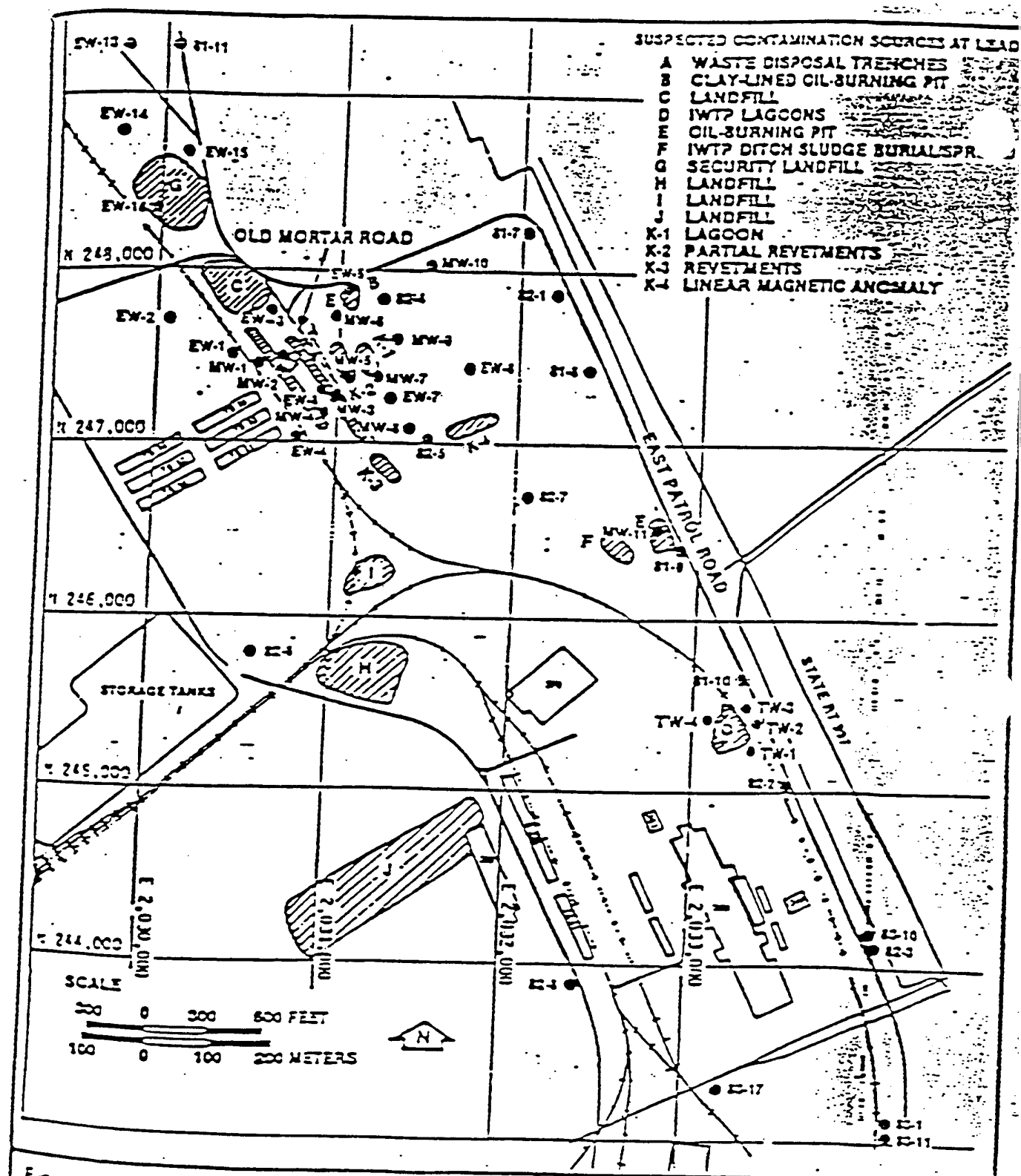


Figure 3
MONITOR WELL LOCATIONS
SOURCES: Battelle, 1983b
Weston, 1984
ESE, 1985b

Prepared for:
U.S. Army Toxic and Hazardous Materials Agency
Aberdeen Proving Ground, Maryland

Encl.

Equipment List for Groundwater Monitoring

Description	Location
Fultz Groundwater Sampling Pump Model (SP-201-4) pump head - 2.5 inch diameter 24 volt DC battery power supply battery charger 100 feet of vinyl discharge hose hose storage reel and control panel aluminum backpack frame	360
Millipore Hazardous Waste Filtration System 0.45 um membrane prefilter cellulose acetate	360
Water Tape	360
Calculator	663
Digital PH Meter	Trailer
Conductivity-Salinity-Temperature Meter (C-S-T)	Trailer
Teflon Bailers (6) (once used will remain in wells)	Trailer
Teflon-coated Wire	Trailer
Deionized Water	360
Stopwatch	663
5-gallon Bucket	Trailer
Sprayer	Trailer
20-gallon Drums (2)	360
Coolers (4)	Contracted Laboratory
Ice	663
Garbage Bag	Officer's Club
Tool Kit	360
Tape Measure	360

Field Data Record

INITIAL DATA

DATE_____ SAMPLE SERIAL NUMBER_____

TIME_____ FIELD CREW_____

WELL NUMBER_____ LOCATION_____

WEATHER_____ TEMPERATURE (C)_____

WELL DATA

A. Sounding depth of well (ft)_____

B. Total depth of well (ft)_____

C. Height of well casing above ground level (ft)_____

D. Static water level (ft)_____

E. Amount of water in well (ft)=((B+C)-D)_____

F. Inside diameter of well (in)_____

G. Well constant (gal/ft)_____

H. One well volume (gal)=(E*G)_____

I. Amount of water to be purged (gal)=(3*H)_____

J. Time to pump out 5 gallon (sec)_____

K. Rate of pumping (gal/sec)_____

FIELD DATA

Temperature (C)_____ _____ _____ _____

Specific conductivity (umhos/cm)____ ___ ____ ____

pH_____ _____ _____ _____

END DATA

Number of samples collected_____

Approximate time to sample_____

Cleaning materials used for equipment_____

Encl 3

Duct Tape	360
Sample Containers	Contracted Laboratory
(12) 1 liter amber glass jars, narrow-neck, specially preserved	
(12) 40 mil glass vials with teflon-lined caps	
(12) 1 quart plastic jugs	
(12) 1 liter amber glass jars, wide-neck	
(6) 125 mil amber glass jars	
(12) 1 liter amber glass jars, narrow-neck	
(6) 125 mil plastic bags, specially preserved	
Labels	Contracted Laboratory
Rubber Gloves	Trailer
Field Data Recording Sheets (6)	663
Chain-of-Custody Records (4)	663
20% Nitric Acid (HNO3)	102
Key to the wells (6)	663
Seals	Contracted Laboratory
Sonic Interface Probe	Contracted Laboratory

Well Measurements

Well Number	Total Depth of Well (ft)	Inside Diameter (in)	Height of Well Casing Above Ground (ft)
TW-1	67.40	4	2.77
TW-2	75.00	4	2.04
TW-3	51.20	4	2.06
TW-4	48.70	4	1.46
81-10	43.01	2	2.96
82-2	37.99	2	2.40

Encl 4

Well Constants

Inside Well Diameter (in)	Gallons/Foot
3/4	0.02
1	0.04
1 1/4	0.06
1 1/2	0.09
2	0.16
2 1/2	0.25
3	0.37
4	0.65
5	1.00
6	1.50
8	2.60

Exc 5

Sample Containers Used for Groundwater Sampling

Parameter	Container
Pesticides	1-liter amber glass jar, narrow-mouth
Herbicides	1-liter amber glass jar, narrow-mouth
Volatile Organics	2 40-ml glass vials with teflon lined caps
Anions	1-quart plastic jug
Phenols	1-liter amber glass jar, wide-mouth, specially preserved
Radionuclides	1 quart plastic jug, specially preserved
Total Organic Carbon	125-ml amber glass jar, specially preserved
Total Organic Halogens	1-liter amber glass jar, narrow-mouth
Total Metals	1-liter amber glass jar, specially preserved
Dissolved Metals	1-liter amber glass jar, specially preserved
Total Coliform	125-ml polypropylene bag, specially preserved
pH, Temperature, Specific Conductivity	1-liter amber glass jar, wide-mouth

Encl 6

Table 1.—Containers, Preservation, and Holding Times

Measurement	Container	Preservation	Maximum holding time
1 Acidity	P,G	Cool, 4°C	14 days
2 Alkalinity	P,G	Cool, 4°C	14 days
3 Ammonia	P,G	Cool, 4°C, H_2SO_4 to pH < 2	28 days
BACTERIA			
4–7 Coliform, fecal and total	P,G	Cool, 4°C, 0.008% $Na_2S_2O_3$	6 hours
8 Fecal streptococci	P,G	Cool, 4°C, 0.008% $Na_2S_2O_3$	6 hours
9 Biochemical oxygen demand	P,G	Cool, 4°C	48 hours
10 Biochemical oxygen demand carbonaceous	P,G	Cool, 4°C	48 hours
11 Bromide	P,G	None required	28 days
12 Chemical oxygen demand	P,G	Cool, 4°C, H_2SO_4 to pH < 2	28 days
13 Chloride	P,G	None required	28 days
14 Chlorinated organic compounds	G, teflon-lined cap	Cool, 4°C, 0.008% $Na_2S_2O_3$	7 days (until extraction). 30 days (after extraction).
15 Chlorine, total residual	P,G	Determined on-site	2 hours
16 Color	P,G	Cool, 4°C	48 hours
17–18 Cyanide, total and amenable to chlorination	P,G	Cool, 4°C. NaOH to pH > 12. 0.008% $Na_2S_2O_3$	14 days
19 Dissolved oxygen			
Probe	G bottle and top	Determine on site	1 hour
Winkler	G bottle and top	Fix on site	8 hours
20 Fluoride	P	None required	28 days
21 Hardness	P,G	HNO_3 to pH < 2	6 months
22 Hydrogen ion (pH)	P,G	Determine on site	2 hours
23 and 24 Kjeldahl and organic nitrogen	P,G	Cool, 4°C, H_2SO_4 to pH < 2	28 days
METALS			
40–41 Chromium VI	P,G	Cool, 4°C	48 hours
56–53 Mercury	P,G	HNO_3 to pH < 2, 0.05% $K_2Cr_2O_7$	28 days
54–55, 58–70 Metals except above	P,G	HNO_3 to pH < 2	6 months
88 Nitrate	P,G	Cool, 4°C	48 hours
89,90 Nitrate-Nitrite	P,G	Cool, 4°C, H_2SO_4 to pH < 2	28 days
89 Nitrite	P,G	Cool, 4°C	48 hours
90 Oil and Grease	G	Cool, 4°C, H_2SO_4 to pH < 2	28 days
91 Organic Carbon	P,G	Cool, 4°C, H_2SO_4 to pH < 2	28 days
ORGANIC COMPOUNDS			
93–108 Extractables (including phthalates, nitrosamines organochlorine pesticides, PCB's nitroaromatics, isophorone, polynuclear aromatic hydrocarbons, haloether, chlorinated hydrocarbons and TCDD)	G, teflon-lined cap	Cool, 4°C. 0.008% $Na_2S_2O_3$	7 days (until extraction). 30 days (after extraction).
Extractables (phenols)	G, teflon-lined cap	Cool, 4°C. H_2SO_4 to pH < 2. 0.008% $Na_2S_2O_3$	7 days (until extraction). 30 days (after extraction).
Purgeables (halocarbons and aromatics)	G, teflon-lined septum	Cool, 4°C, 0.008% $Na_2S_2O_3$	14 days
Purgeables (acrolein and acrylonitrile)	G, teflon-lined septum	Cool, 4°C, 0.008% $Na_2S_2O_3$	3 days
207 Orthophosphate	P,G	Filter on site, cool, 4°C	48 hours
208 Pesticides	G, teflon-lined cap	Cool, 4°C. 0.008% $Na_2S_2O_3$	7 days (until extraction). 30 days (after extraction).
209 Phenols	P,G	Cool, 4°C, H_2SO_4 to pH < 2	28 days
210 Phosphorus (elemental)	G	Cool, 4°C	48 hours
211 Phosphorus, total	P,G	Cool, 4°C, H_2SO_4 to pH < 2	28 days
RADIOLOGICAL			
212–215 Alpha, Beta and radium	P,G	HNO_3 to pH < 2	6 months
217 Residue, total	P,G	Cool, 4°C	14 days
218 Residue, filterable	P,G	Cool, 4°C	14 days
219 Residue, nonfilterable	P,G	Cool, 4°C	7 days
220 Residue, settleable	P,G	Cool, 4°C	7 days
221 Residue, volatile	P,G	Cool, 4°C	7 days
73 Silica	P	Cool, 4°C	28 days
222 Specific conductance	P,G	Cool, 4°C	28 days

Enc. 7

CUSTODY SEAL

DATE _____

SIGNATURE _____

CHEM
Hayward, CA 94545
New Castle, DE 19720
(800) 443-1689
(800) 553-3696
Specialty Cleaned Containers

Client Name	Project No.
Sample Location	Date/Time
Sample Collector	Method
Sample Description	
Preservation	
Analyses Requested	

Wright Lab Services, Inc.
Phone: 717-944-5541

Client Name	Project No.
Sample Location	Date/Time
Sample Collector	Method
Sample Description	
Preservation	
Analyses Requested	

Wright Lab Services, Inc.
Phone: 717-944-5541

Encl. 8

MPLERS: *(Signature)*

NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS							REMARKS

nquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
nquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
nquished by: *(Signature)*	Date / Time	Received for Laboratory by: *(Signature)*	Date / Time	Remarks	

DATE ORDERED: / /

DATE REQUESTED: / /

208 NORTH STREET • HARRISBURG, PA 17101 • Phone (717) 238-7124

REPORT TO:	CONTACT	PHONE NO.	SALESMAN
	PROJECT NAME	PROJECT NO.	P.O. NO.
	DATE SAMPLED	SAMPLER(S)	

BILL TO:

SAMPLE DESCRIPTION/LOCATION	TIME OF SAMPLING	TOTAL NO. OF CONTAINERS	ANALYSES TO BE PERFORMED												REMARKS
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															

REMARKS:

RELINQUISHED BY:	DATE	TIME	RECEIVED BY:	DATE	TIME
	/ /			/ /	
RELINQUISHED BY:	DATE	TIME	RECEIVED BY:	DATE	TIME
	/ /			/ /	

REQUEST FOR AND RESULTS OF TESTS

PAGE NO. | NO. OF

SECTION A - REQUEST FOR TEST

1. TO: *(Include ZIP Code)*	2. FROM: *(Include ZIP Code)*

3. PRIME CONTRACTOR AND ADDRESS *(Include ZIP Code)*	4. MANUFACTURING PLANT NAME AND ADDRESS *(Include ZIP Code)*
CONTRACT NUMBER	P. O. NUMBER

5. END ITEM AND/OR PROJECT	6. SAMPLE NUMBER	7. LOT NO.	8. REASON FOR SUBMITTAL	9. DATE SUBMI

10. MATERIAL TO BE TESTED	10a. QUANTITY SUBMITTED	11. QUANTITY REPRESENTED	12. SPEC. & AMEND AND/OR DRAWING NO. & REV. FOR SAMPLE & DATE

13. PURCHASED FROM OR SOURCE	14. SHIPMENT METHOD	15. DATE SAMPLED AND SUBMITTED BY

16. REMARKS AND/OR SPECIAL INSTRUCTIONS AND/OR WAIVERS

17. SEND REPORT OF TEST TO

SECTION B - RESULTS OF TEST *(Continue on plain white paper if more space is required)*

1. DATE SAMPLE RECEIVED	2. DATE RESULTS REPORTED	3. LAB REPORT NUMBER

4 TEST PERFORMED	RESULTS OF TEST	SAMPLE RESULT	REQUIREMENTS

DATE	TYPED NAME AND TITLE OF PERSON CONDUCTING TEST	SIGNATURE

DD FORM 1 FEB 62 1222 REPLACES DD FORM 1222, 1 JUL 58, WHICH IS OBSOLETE.

EPA APPROVED TEST METHODS

FOR

MODULE NO. 8

ANALYSIS	TEST METEOD
Volatile Organic Analysis	EPA 624
Gross Alpha	Std. Method 16 ED, Method 703
Gross Beta	Std. Method 16 ED, Method 703
Phenolics	EPA 600/4-79-020, Method 420.1
Specific Conductance	EPA 600/4-79-020, Method 120.1
pH	EPA 600/4-79-020, Method 150.1
Total Organic Carbon	EPA 600/4-79-020, Method 415.1
Total Organic Halogen	Std. Method 16 ED, Method 506
Herbicides	EPA Method for Organochlorine Pesticides and Chlorophenoxy Acid Herbicides in DW
Pesticides	Std. Method 14 ED, Method 509A
Total Coliform	Std. Method 15 ED, Method 909A
Chloride	EPA 600/4-79-020, Method 325.3
Sulfate	EPA 600/4-79-020, Method 375.4
Fluoride	EPA 600/4-79-020, Method 340.2
Nitrate-Nitrogen	Std. Method 15 ED, Method 418B
Total Iron	EPA 600/4-79-020, Method 236.1
Manganese	EPA 600/4-79-020, Method 243.1
Sodium	EPA 600/4-79-020, Method 273.1
Arsenic	EPA, SW-846, Method 8.51
Barium	EPA, SW-846, Method 8.52
Cadmium	EPA, SW-846, Method 8.53
Chromium	EPA, SW-846, Method 8.54
Lead	EPA, SW-846, Method 8.56
Mercury	EPA, SW-846, Method 8.57
Selenium	EPA, SW-846, Method 8.59
Silver	EPA, SW-846, Method 8.60

Kellogg Environmental Services, Inc.

Ms. Peggy Gobrecht
Attn: SDSLE - EN
LETTERKENNY ARMY DEPOT
Chambersburg, Pa. 17201 - 4150

Subject: Procedures for groundwater samples

November 30, 1988

Dear Ms. Gobrecht,

In response to your request for procedures/methods, please note the following list. These are approved EPA procedures used for your groundwater samples.

METALS: Atomic absorption with hydride generation, cold vapor nitrous oxide direct aspiration following digestion/concentration (21 CFR 103.35).

HERBICIDES & PESTICIDES: EPA # 600/4-81-053 Federal Reg. (40 CFR 141-143). Solid phase extraction followed by concentration GC-ECD. Pesticides are derivitized.

TOX: Standard Methods 506.

TOC: EPA 415.2.

GROSS ALPHA: 600/4-80-032 (900.0).

GROSS BETA: 600/4-80-032 (900.1).

TOTAL COLIFORM: EPA Membrane Filtration Method

VOCs: EPA Method 624 GC/MS.

Respectfully submitted,

Ed V. Kellogg

Ed V. Kellogg
KELLOGG ENVIRONMENTAL SERVICES, INC.

EVK/mk
cc: D. Eddy
File

816 Anthony Drive Mechanicsburg, PA 17055 (717) 732-3364

QUALITY CONTROL/QUALITY ASSURANCE PLAN

FOR

WRIGHT LAB SERVICES, INC.

INTRODUCTION

Purpose

The purpose of this manual is to serve as a source of instructive material for Wright Lab Services, Inc. (WLSI) in the establishment and maintenance of laboratory quality control as it is applicable to its structure and operations.

This manual describes administrative systems and statistical techniques. Laboratory analytical methods and procedures, and analytical instrument operating instructions are covered in other manuals.

The basis for use of statistical techniques may be summarized as follows: Statistical quality control involves application of the laws of probability to systems where chance causes operate. The technique is employed to detect and separate assignable (determinate) from the random (generally indeterminate without more sophisticated analytical techniques) causes of variations. Statistics is the science of uncertainty; therefore, any conclusions based on statistical inference contain varying degrees of uncertainty expressed in terms of probability. Uncertainty can be quantified in terms of a well-defined statistical probability distribution theory which can be applied directly to quality control. The application of statistical quality control can most efficiently indicate when a given procedure is under control. A continuing program that covers sampling, instrumentation and overall analysis of quality will assure the validity of the analytical program.

Quality Objectives

The objective of the Analytical Laboratory Control Program is to assure the scientific reliability of laboratory data. Management, administrative, statistical, investigative,

preventive and corrective techniques will be employed to maximize reliability of the data.

Specific objectives should be:

1. To develop and/or put into service rugged methods capable of meeting the user's need for precision, accuracy, sensitivity, and completeness.

2. To establish the level of quality in the laboratory's routine performance.

3. To make any changes in the routine methodology found necessary to make it compatible with performance needs.

4. To monitor the routine operational performance of the laboratory through an appropriate intra-laboratory program and to provide for corrective actions as necessary.

5. To participate in quality evaluation programs with peer laboratories to achieve and maintain consistent uniform levels of quality.

6. To improve and validate laboratory methodologies by participation in method validation collaborative tests.

Quality Control Policies

The policies of WLSI include:

1. Publication, distribution and maintenance of current and complete laboratory analytical methods and procedures, sampling data sheets, calibration data sheets and analytical instrument operating instructions.

2. Promulgation, distribution and retention of laboratory reports with provision for administrative/technical review.

3. Periodic calibration of instruments and equipment both in the laboratory and on the field. Quality control checks on analytical instruments to ensure proper function at all times and a preventive maintenance program.

4. Assurance of appropriate fresh reagents and chemicals, and appropriate calibrated glassware.

5. Establishment and maintenance of total analytical quality control systems to assure continued precision and accuracy of laboratory results including, as appropriate, policies that:

   a. Each test shall be checked on each day of use.

   b. At least one standard (may be an instrument standard) and one control sample (working value established) should be included with each run of unknown samples. Where the control sample is not

subject to the interferences, etc., of the unknown samples, a previously run unknown should be included as a blind check sample. ~~A blank sample (no added amount of the constituent being determined) should also be tested to aid in detecting reagent contamination and other problems important near the lower limit of operation of the method.~~

c. If the results on the standard, control, blank or recycle samples are not within acceptable limits as established by management, the entire batch of analyses should be repeated and control verified before reports are issued. Serious consideration should be given to the nonacceptance of samples where there is only enough material for a single analysis. In such situations, this policy may be waived. Consideration of the consequences in reporting results when the analytical system is apparently "out-of-control" should minimize such waivers.

6. Requirements for participation in inter-laboratory quality evaluation programs.

7. Requirements for training and qualifying personnel in quality control techniques and prior to running new tests. This qualification test is to be statistically valid and include evaluation of precision and accuracy. The qualification standard should be the established level of quality in the laboratory.

JOB DESCRIPTION

Quality Control Coordinator

Basic Function

The Quality Control Coordinator is responsible for the conduct of the Analytical Laboratory Quality Control Program and for taking or recommending measures to ensure the fulfillment of the quality objectives of management and the carrying out of quality control policies in the most efficient and economical manner commensurate with ensuring continuing accuracy and precision of data produced.

Responsibilities and Authority

1. Develops and carries out quality control programs including statistical procedures and techniques, which will help laboratories to meet authorized quality standards at minimum cost; and advises and assists management in the installation, staffing and supervision of such programs.

2. Monitors quality control activities of the laboratory to determine conformance to authorized policies and procedures with sound practice; and makes appropriate recommendations for correction and improvement as may be necessary.

3. Seeks out and evaluates new ideas and current developments in the field of quality control and recommends means for their application wherever advisable.

4. Advises management in reviewing technology, methods and equipment with respect to quality aspects.

5. Advises the purchasing section regarding quality of purchased materials, reagents and chemicals.

6. Recommends packaging materials and procedures.

7. Performs related duties as assigned.

Quality Control Planning

Purpose and Scope

Advance planning of the sequence of actions to accomplish a proposed objective and communicating to the person or persons expected to execute these actions will help maintain a level of control. The quality planning described in this section is designed toward delivering acceptable quality data at a reasonable cost. Acceptable quality is defined in terms of accuracy, precision and completeness.

Specifications for Data Quality

The data quality which is considered acceptable must be defined as quantitatively as possible. The three basic measures of data quality are accuracy, precision and completeness. Acceptance limits should be established for the completeness, precision and accuracy of data recorded in the data bank, thus yielding acceptable estimate levels of validity for all reportable data. Acceptance limits for accuracy and precision of data are measurement method specific.

Identification of Critical Characteristics

In the application of quality assurance measures, the total measurement system may be viewed as a complex system consisting of the sample collection, sample analyses, data processing and the associated test equipment or analyzers and the users, namely the operators and analysts. The critical characteristics of this complex system are identified by functional analysis of which ruggedness testing is one form.

Development of a QA Plan

The next step in the quality planning sequence is to determine which quality assurance elements should be included as part of a quality assurance plan (QA plan). This is done by analyzing answers to questions posed to gain an understanding of the situation and needs by selecting the most productive steps reaching toward the objectives defined in terms of accuracy, precision and completeness of data. Such questions might be:

- What characteristics should be considered?
- Which of these characteristics are most critical?
- What acceptance limits should be assigned to the characteristics, particularly the most critical ones?
- How often should these acceptance limits be checked?
- What methods of measurement should be used to check the characteristics?
- What action should be taken if the acceptance limits for characteristics are not met?

These elements should include:

- Sample collection.
- Sample analysis.
- Data reduction, validation, and reporting.
- Calibration.
- Preventive maintenance.
- Procurement of apparatus and supplies.
- Auditing procedures.

The product of quality planning should be a written document including the most important information which the planner (normally the Quality Control Coordinator) feels should be communicated to the person or persons to execute the plan. This is called the QA plan.

Standard Operating Procedures

Work Instructions (Standard Operating Procedures) (Methods)

The quality program should assure that all work affecting quality (including such things as purchasing, handling, storage, analyzing, testing, facilities, standards of equipment and any other treatment of samples) be prescribed in clear and complete written instruction of the type appropriate to the circumstances. Work instructions should provide the criteria for performing the work, particularly the analytical and testing functions, and should prescribe the chain-of-custody procedures which are necessary to assure that analytical results can be used as evidence. The preparation, maintenance, and compliance to the work instructions should be monitored by the Quality Control Coordinator.

Sample Collection

The quality of a sampling program has a direct bearing on the legal, physical and chemical integrity of the samples. If the representativeness of the samples cannot be verified due to inadequate attention to sample procedures, then the usefulness of the analytical data will be limited. It is imperative, therefore, that no analytical program be conducted with an adequate sampling plan which does or will document the degree of representativeness of the parameters of interest.

Regardless of the intent, all numbers generated by a water quality laboratory are ultimately represented as the concentration levels in the sample matrix at the time of collection. Such numbers automatically tend to endorse the sample collection, preservation, and shipment procedures. Thus, quality assurance programs limited to the care of the sampling, beginning with its receipt by the laboratory, are inadequate. The laboratory must share responsibility for the preservation and shipment of all samples that it will accredit with concentration values.

Two approaches are available that will generally protect the laboratory from generating numbers that may not reflect actual conditions of the sample at the time of collection. The best solution, but usually the least practical, is for the laboratory personnel to collect all samples. The alternative is for the laboratory to adopt a policy of sampling rejection based on minimum standards of sample identification and age.

It is the responsibility of the project director to:

A. Coordinate the sampling, preservation and shipment with the laboratory,

B. Obtain clean sample bottles from the laboratory,

C. Provide adequate sample identification and complete instructions, and

D. Provide duplicates and blanks as required by the laboratory.

To ensure the integrity of the samples, steps must be taken to minimize contamination from the containers they are stored in. If the analytes to be determined are organic in nature, the containers should preferably be made of amber glass. If the analytes are inorganic, then the containers should preferably be plastic. When both organic and inorganic substances are expected to be present, duplicate samples, if at all possible, should be taken. Procedures for cleaning the glass and plastic containers and their caps are as follows:

A. Amber Bottles

1. Soak bottles in detergents for one day.
2. Scrub to remove deposits of foreign materials.
3. Rinse with copious amounts of distilled water.
4. Rinse with acetone.
5. Rinse with hexane.
6. Air dry.
7. Heat to 200°.

8. Allow to cool.
9. Cap using clean caps with teflon liners.

B. Plastic Bottles

1. Rinse bottles and lids with 5% sodium hydroxide.
2. Rinse with deionized water.
3. Rinse with 5% nitric acid.
4. Rinse with deionized water.
5. Drain and air dry.

C. Bottle caps

1. Remove paper liners from caps.
2. Wash with detergent.
3. Rinse with distilled water.
4. Dry at 40° centigrade.

D. Teflon liners (avoid contact with fingers)

1. Wash with detergent.
2. Rinse with distilled water.
3. Rinse with acetone.
4. Rinse with hexane.
5. Air dry.
6. Place the liners in clean caps.
7. Heat to 40° centigrade for two hours.
8. Let cool and then cap on bottles until used.

Sampling for purgable organics require special consideration and equipment. The sample container should consist of a 40ml screw cap vial fitted with a teflon face silicone septa. The vials, septa and caps should be washed in hot detergent water and

thoroughly rinsed with tap water and organic-free water then dried at 105° centigrade for one hour. The vials should then be cooled to room temperature in a contaminant-free zone. When cooled, the vials should be sealed with the septa, teflon side down, screw cap and maintain in this sealed condition until filled with sample.

~~Multiple samples are usually required for purgable organics analysis because of leakage and the measurement process is destructive to the sample.~~ All vials should be identified with waterproof labels. The water sample vials are filled to overflowing from a bubble-free source so that the convexed meniscus is formed at the top. They are sealed by carefully placing the septa, teflon side down, on the opening of the vial and screwing the cap firmly in place. Any samples that are provided to Wright Lab Services, Inc. containing large head spaces for volatile organic analysis will be rejected.

The project director will be responsible for delivering samples to the laboratory representative. A representative sampling plan includes provisions for the following:

1. Selecting appropriate sampling locations, depths, etc.
2. Providing a statistically sufficient number of sampling sites.
3. Measuring all necessary ancillary data.
4. Determining climatic flow or other conditions under which sampling should be conducted.
5. Determining which media ought to be sampled (e.g. waste-water, sediment, effluent soil).
6. Determining which parameters ought to be measured.
7. Selecting appropriate sample containers.

8. Selecting the frequency of sampling and length of sampling period.
9. Selecting the types of samples (e.g. composite versus grab) to be collected.
10. Sample preservation.
11. A valid chain-of-custody.

Sample Collection, Handling and Identification

It is important that a minimum number of persons be involved in the sample collection and handling. Guidelines established by the EPA manuals for sample collections, preservations and handling will be followed. Field records will be completed at the time the sample is collected and will be signed or initialed including the date and time by the sampler or collector. Field records will contain the following:

1. A unique sample or log number.
2. The date and time the sample was collected.
3. The source of the sample including name, location and sample type.
4. The preservative used.
5. The analyses required.
6. The name of the collector(s).
7. Pertinent field data, (e.g., pH, dissolved oxygen, chlorine residual, etc.).
8. Serial numbers on seals and transportation cases.

Each sample will be identified by affixing a pressure sensitive gummed label or standardized tag on the container(s). This label

will contain the sample number, source of sample, preservative used, collector's initials and the time of collection. The analysis required will be identified. Where a label is not available, the sample information will be written on the sample container with an indelible marking pen. The sampler will also be responsible for providing a valid chain-of-custody with the samples. This chain-of-custody will show the following information:

1. The sample location(s).
2. The date and time sampled.
3. The sample collector.
4. The sample type (i.e composite or grab).
5. The number of containers.
6. The type of analysis.
7. The date and time of a trip and field blank.
8. The job number and name.

The collector will also indicate the rapidity of the results required by marking the appropriate box "normal," "hold" or "rush" which will be analyzed at a 50% markup. When delivering samples to the laboratory, the sample collector and the laboratory sample receiver will both sign, date and time the chain-of-custody. This chain-of-custody allows transfer of custody of a group of samples to the central laboratory. If the samples are delivered to the laboratory when appropriate personnel are not there to receive them, the samples must be locked in the cooler so that no one can tamper with them or they must be placed in a secure area. The sampler must return to the laboratory, unlock the samples and deliver custody to the appropriate laboratory personnel at the earliest convenience.

Laboratory Custody Procedures

The laboratory shall designate a sample receiver and an alternate receiver to act in his or her absence. Incoming samples will be received by the laboratory receptionist who will indicate receipt by signing the accompanying custody control forms and will retain the signed forms as a permanent record. The receiver will retain a permanent log book to record the receipt of each sample, the person delivering the sample, the person receiving the sample, the date and time received, the source of the sample, the date and time the sample was collected, the condition of the sample, and the preservative used, if any. The receiver will assign a unique sample number.

In addition, as much information pertaining to the sample will be collected. The reason for its analysis must be indicated (i.e. for a specific element, is the element present in the sample, is there more than a specified amount of the element in the sample or what is the level of the element in the sample?). The sample receiver will ensure that heat sensitive samples, light sensitive, or other sample materials having unusual physical or chemical characteristics or requiring special handling are properly stored and maintained prior to analysis. The sample receiver will ensure that samples requiring preservation are preserved in the recommended fashion. The samples will be stored in a refrigerator designated for a particular group of analyses.

Laboratory personnel will be responsible for the care and custody of the sample once it is received by them and must be prepared to testify that the sample was in their possession and view or secured in the laboratory at all times from the moment it was received from the laboratory manager until the time that the analyses were completed. The analyst will record in his/her

laboratory notebook or analytical worksheet identifying information describing the sample, the procedures performed and the results of the testing. The notes shall be dated and shall indicate in red any abnormalities that occur during the testing procedure. The notes shall be retained as a permanent record in the laboratory.

Once the sample analyses are completed, the unused portion of the sample together with all identifying labels and other documentation will be returned to the refrigerator. The returned tagged sample will be retained in the refrigerator until permission to destroy the sample is received from the laboratory manager. Samples will be destroyed when it is certain that the information is no longer required or the samples have deteriorated. Samples will usually be kept for a maximum period of one month; however, samples such as bacteria will be destroyed within 48 hours. The logbook should show when each sample was disgarded.

Sample Preparation

A sample is represented most accurately immediately after it has been taken. Delays in delivery of the samples to the laboratory or storage by the laboratory can effect the quality of the relationship unless appropriate precautions are taken to prevent changes in the sample (e.g., decomposition, loss or gain of moisture, oxidation).

Care must be taken by the analyst to assure that the portion of the sample taken for analysis is representative of the entire sample. For liquids and semi-solids, the products can usually be shaken, mixed or blended to homogeneity. For solid samples, the distribution of particle sizes and the shape and adhesiveness are

also factors. Solid samples will be taken from the bottle, the top of the bottle, the middle of the bottle and the bottom of the bottle to ensure that the sample obtained from the bottle is homogeneous. After a portion of the sample has been taken for analysis, the remainder of the sample should be held in a manner that will preserve its integrity at least until after the analysis is completed.

Environment

Environmental contamination can be minimized by good laboratory design and good housekeeping and laboratory practices by the staff. Constant awareness must be maintained because dust, air, water, and reagents are all potential carriers of contaminants. For example, hands can contribute skin flakes, cuticle dirt, perspiration and skin oils. Watches, rings and other jewelry can contribute dirt and traces of iron, copper, silver, platinum and chromium. Cosmetics can also contribute contaminants. Clothing can carry outside dust into the laboratory. The laboratory area must be kept clean of waste and spills; they must be disposed of quickly and properly. The analyst must be constantly aware of the potential for environmental contaminants.

Apparatus

Glassware comprises the majority of laboratory operators and is in such common use that it tends to be taken for granted. Laboratory glassware serves three major functions:

1. Storage and transfer,
2. Measurement of volume, and
3. Confinement of reactions.

Errors in analysis due to glassware can be realized in several ways. Contaminated or dirty glassware can lead to serious errors especially in trace analysis. The method of cleaning must be appropriate to both the contaminants that are to be removed and the determination to be performed. It is sometimes necessary to reserve a set of glassware for a specific type of analysis.

An automatic glass washer using a low resident detergent is recommended. Final rinsing will be done with deionized water. Substances more difficult to remove may require the use of an organic solvent, no-chrome mix cleaning solution, nitric acid, or aqua regia. It is good laboratory practice to rinse glassware with tap water or suitable organic solvents and again with water as soon as possible after use. Material allowed to dry on glassware is much more difficult to remove. For certain determinations, the glassware requires special treatment in addition to normal washing: in trace element analysis, a rinse with 1 plus 1 nitric acid/water mixture is necessary; in pesticide residue analysis, the glassware is either organic solvent rinsed or heated in a oven at 285°C before use. For volumetric analysis, class A volumetric glassware will be used. Proper techniques in handling volumetric glassware must be used. Measurement of solutions must be made at a constant temperature.

Reagents

Purified water is the most important reagent in the laboratory since it has many uses (e.g., preparation of reagents, dilution of solutions and final rinsing of glassware). All water used in WLSI will be obtained from a Barnstead Nano-pure unit.

Chemical reagents, solvents, and gases are available in a variety of grades or purity from technical grade to various ultrapure grades. The purity of these materials varies with the type of analysis. The parameter being measured and the sensitivity and specificity of detection system are important factors in determining the purity of the reagents required. Wright Lab Services, Inc. will use analytical grade reagents or reagents of a higher quality. Analyses such as trace organic residues frequently require special ultrapure reagents and solvents. The purity of the reagents should be checked to determine if the reagent meets the requirements of the particular method involved. For trace metal analysis the reagents and solvents should be of spectroquality although analytical reagent grade is sometimes satisfactory. Analytical reagent grade acids are required to be distilled in borosilicate glass or alternatively special high purity acids may be used. Wright Lab Services, Inc. will use Baker Instra-analyzed acids for their analyses. In trace organic detectors used, much greater purity than analytical reagent grades are frequently required. WLSI will use J. T. Baker's distilled in glass solvents for all trace organic work. However, each new lot of solvents obtained from the distributor must be checked to assure its suitability for the analysis.

Instruments and Equipment

Instruments and equipment must be handled and maintained properly so that they will operate with accuracy required for assured quality of results. The deterioration of electrical, mechanical and optical instrument components is usually slow and difficult to detect. This is particularly true since most instruments operate by comparing the response of a known standard to that of the sample thereby masking changes in the instrument itself. Performance checks will be scheduled and carried out on each

instrument. The performance checks, calibrations and/or adjustments must be made in consultation with the instrument manual. The laboratory must also have a system in place to assure that maintenance performance checks and repairs are performed, and a permanent record of the instrument's and equipment's history is maintained and available.

Standards

A reference standard must be used in all determinations requiring comparison to a chemical substance. The reference standard specified in a method or by regulation must be used. All tests on a reference standard specified in a method must be followed. Reference standards must be stored, handled, and labeled to ensure the integrity of these standards. When a substance is not certified and tests are not specified, the analyst must perform appropriate validating tests to assure that the reference standard is suitable for the test and assays intended. Records including the following must be maintained for each reference standard: identity, purity, date received, lot number, source, storage and handling procedures. Standards not meeting quality criteria must not be used. Procedures for preparing, handling, and storing working standards must be developed and followed. These procedures should include standardizing volumetric titrated solutions, labeling containers, recording all information, handling and storing unused portion, and restandardizing working standards after appropriate time intervals.

Validation of Results

Wright Lab Services, Inc. will validate its results through recovery studies. A known amount of a compound of interest is added to a blank sample of the matrix. The recovery of the known amount of compound will be used to determine if the results of that group of tests are valid. Quality control charts will be developed for each test to determine if the analysis is valid. The recovery of the internal standard used in the test will be plotted. The mean of the recovery is used as the midpoint of the mean chart. Warning limits will be at plus and minus; two standard deviations and rejection limit will be marked at plus and three standard deviations at minus. Thus based on a normal distribution 95.5% of the means for a set of determinations should fall between plus or minus two standard deviations and 99.7% of the means within plus or minus three standard deviations. The following rules are to be used to interpret the charts:

1. One or more points outside three standard deviations requires rejection of the entire batch of samples.

2. Two or more consecutive points outside two standard deviations require rejection of the batch of analyses.

3. A run of four points outside one standard deviation will require rejection of the batch of analyses and;

4. A run of seven or more points above or below the mean or seven consecutive points increasing or decreasing will require rejection of the results.

Periodic use of check samples will also be used as a means of validation. These samples will be obtained from the EPA's Repository of Quality Assurance check samples.

Reporting

The assurance of quality throughout an analysis is of little practical value if the results are not permanently recorded in meaningful exact terms. Permanent records will be retained in bound numbered notebooks which establish the sequence of insertion of the data. The use of scraps of paper or scratch pads to record the data is not acceptable. All results obtained by an analyst will be checked for calculating errors and data transpositions made in reporting the results of analysis. This will be done either by a senior analyst or by the laboratory manager. No data will be released by the laboratory until th laboratory manager is certain that the data produced is correct.

Laboratory Personnel

Before an analyst is allowed to run a determination, on-the-job training must be initiated. Training must also be considered when new methods, procedures, and techniques are introduced into a laboratory. The analyst will show proficiency by analyzing unknown check samples. The analyst must be aware of the difficulties and the problems involved with an analysis. An analyst must be aware of the construction and maintenance of control charts, and be able to interpret them. Until the analyst has demonstrated competency in a particular analysis, the analyst will not be allowed to perform the test.

QUALITY ASSURANCE

MANUAL

Revision I September 6, 1988

816 Anthony Drive Mechanicsburg, PA 17055 (717) 732-3364

SPECTRA LABORATORIES, INC.

QA/QC PROGRAM

Where possible, approved EPA methodology is followed.

The ability to generate acceptable accuracy and precision is initially demonstrated for all analytes of interest prior to the analysis of these analytes in actual samples.

An initial determination of method detection limits for all analytes is performed in accordance with "Appendix A: A Definition and Procedure for the Determination of the Method Detection Limit." On a weekly basis, the ability to detect analytes at the MDL is demonstrated by analyzing low level spike samples.

Each day, a reagent water blank is analyzed to demonstrate that 1. interferences from the analytical system are under control and 2. blank water utilized for standards preparation and sample dilution is not contaminated. A reagent water blank analysis shall follow any sample containing high levels of analyte(s).

The analytical system is calibrated at the beginning of each day, and a multipoint calibration curve is plotted for each analyte. Thereafter, quality control check standards are periodically analyzed at a frequency equivalent to 10% of all samples. Data obtained from check standards shall be used to determine if the operation of the measurement system is in control.

All samples, blanks and calibration standards are spiked with surrogate compounds. Percent recovery of the surrogates shall be within +/- three standard deviations for the analysis to be considered valid. A minimum of one surrogate per detector shall be utilized.

Analytical precision is determined by the analysis of duplicates at a frequency of 10% of all "positive" samples.

Quality control charts for surrogates, duplicates and check standards are maintained.

Samples shall be collected, preserved and stored in accordance with appropriate EPA methodology. Strict chain-of-custody procedures are followed. All samples must be accompanied by a chain-of-custody form. Samples, when received into the laboratory, are assigned a discrete sample number.

Analytical data is interpretted by a trained analyst and reviewed by the laboratory manager. To guard against transcription errors, analytical reports are cross checked with the raw data prior to signature and submittal.

SPECTRA LABORATORIES

FIELD SAMPLING

Field sampling will be performed by, or under the supervision of Ed Kellogg. Spectra Laboratories, Inc. has experience in sampling drinking water, hazardous waste, soil and air samples.

Emphasis is put on the proper sampling of monitoring wells and drinking water sources to assure accurate and representative samples are maintained. Sample containers, holding times and transportation precautions are maintained in accordance with EPA protocals.

RESUME OF EDWARD V. KELLOGG

SPECTRA LABORATORIES, INC.

Harrisburg, Pa.

President

More than 17 years of experience with companies such as Wright Lab Services, General Public Utilities, Battelle Memorial Institute, Crouse Nuclear Energy Services, Metropolitan Edison and Westinghouse (Bettis).

EDUCATION

M.B.A.; Ohio State University; Columbus, Ohio, 1982.

B.A. Biology, Chemistry; Olivet College; Olivet, Michigan, 1971.

Masters Teaching Assistantship; Chemistry; Ball State University Muncie, Indiana, 1972.

Engineer-In-Training Certificate

ASQC Membership and Certificate

In addition to completing coursework in a Masters program in Chemistry at Michigan State University and Ball State University, I have participated in a number of industrial courses related to the nuclear field.

RESUME OF RICHARD J. EDDY

SPECTRA LABORATORIES, INC.

Harrisburg, Pa.

Chief Analytical Chemist

Laboratory Manager

QA/QC Director

EXPERIENCE RECORD

Wright Lab Services: Middletown, Pa.: 9-86 to Present

GC/MS Section Leader.

Initiated and instituted procedures for the analysis of volatile organics (EPA methods 624 & 524.2) and semivolatile organics (EPA method 625) by capillary GC/MS. Established standard operating procedures in accordance with EPA methodologies and developed QA/QC protocols parallel to those established by the contract lab program.

Other responsibilities include: Methods development and analysis of non-routine samples, spectral interpretation and instrument maintanence.

Gollob Analytical Service: Berkelev Heights, N. J.: 2-84 to 9-86

Analytical Chemist.

Solely responsible for the analysis of volatile organics in water, soil and air. Set up instrumentation and instituted analytical procedures to meet criteria for EPA methods 601, 602, 503.1 (volatile organics by gas chromatography) and method 624 (volatile organics by GC/MS).

Other responsibilities include: Analysis of semivolatiles, mass spectral intrepretation, head space analysis, industrial hygiene, ambient air analysis, cylinder gas analysis and instrument maintenance.

MG Scientific Gases; Branchburg, N. J.; 11-81 to 2-84

Analytical Chemist, Lab Supervisor (Promoted 1-83).

Analyzed a myriad of multicomponent gas mixtures including: permanent gases, hydrocarbons, halocarbons, rare gases, sulfur gases and corrosive gases. Analyzed trace contaminants in high purity gases.

Responsibilities as Lab Supervisor include: Planning and oversight of daily laboratory operations, quality assurance, development of methods for non-routine analyses.

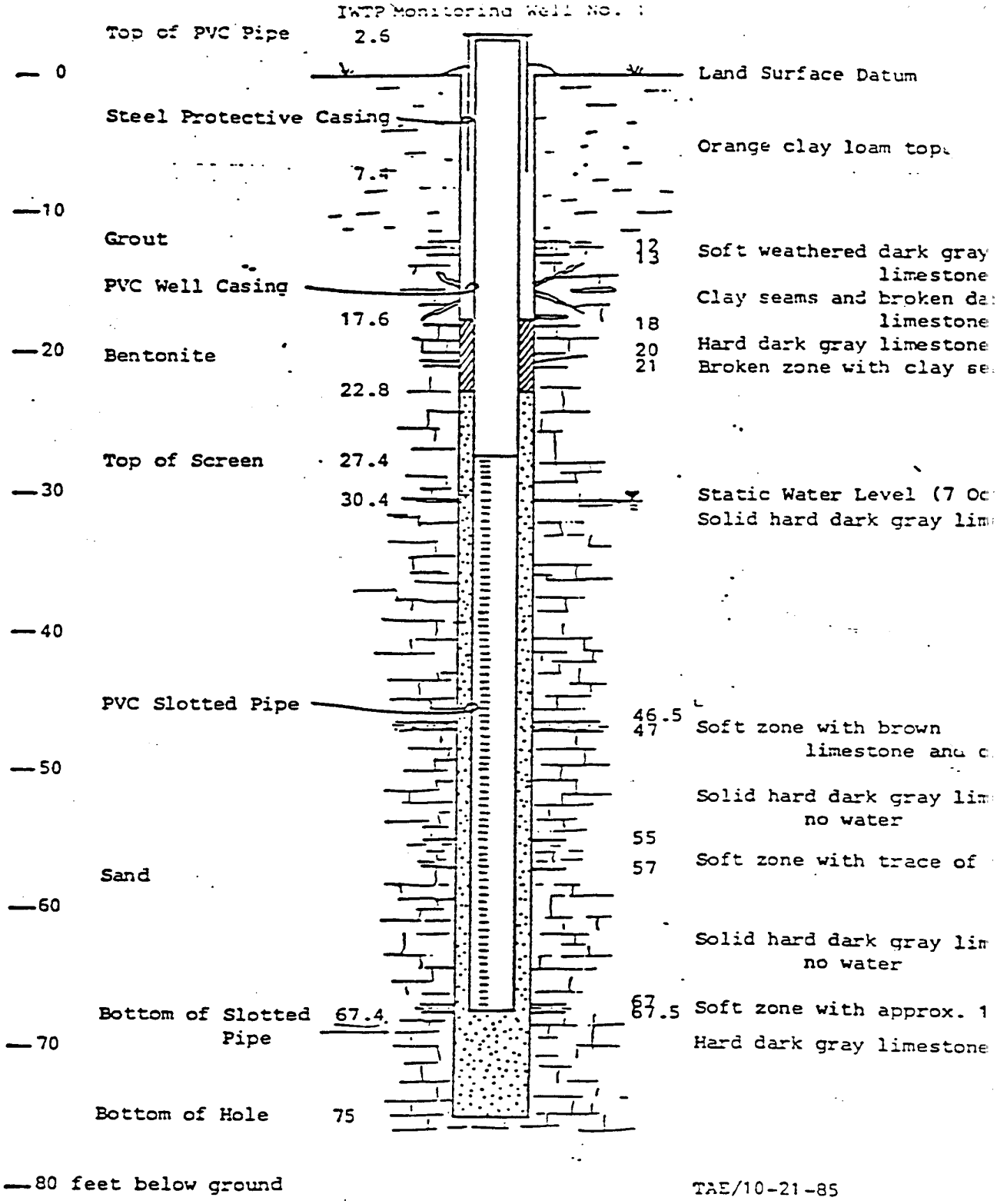
EDUCATION

Bachelor of Science Degree, May 1980.

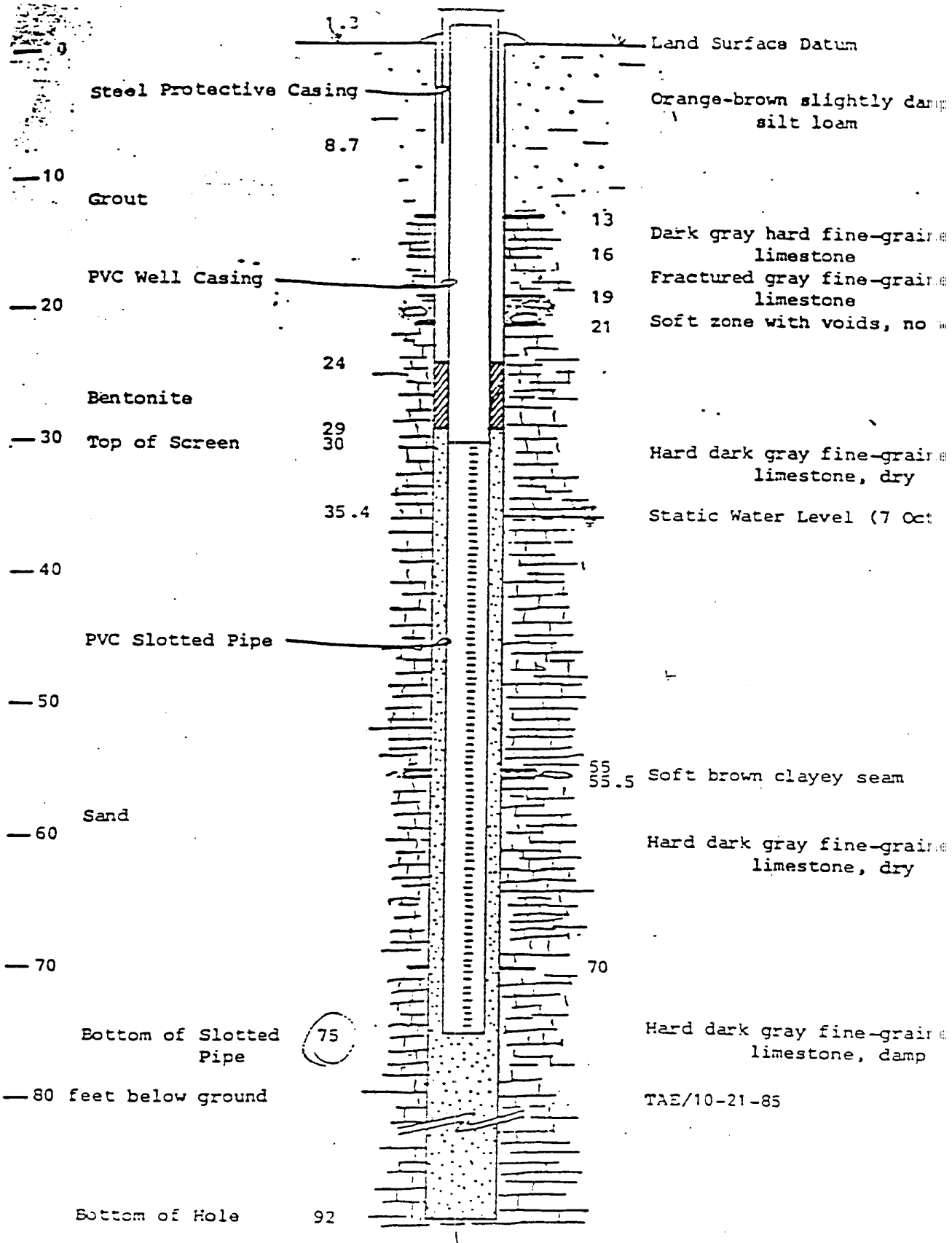
State University of New York at Brockport.

Mass Spectrometry Techniques and Interpretation.

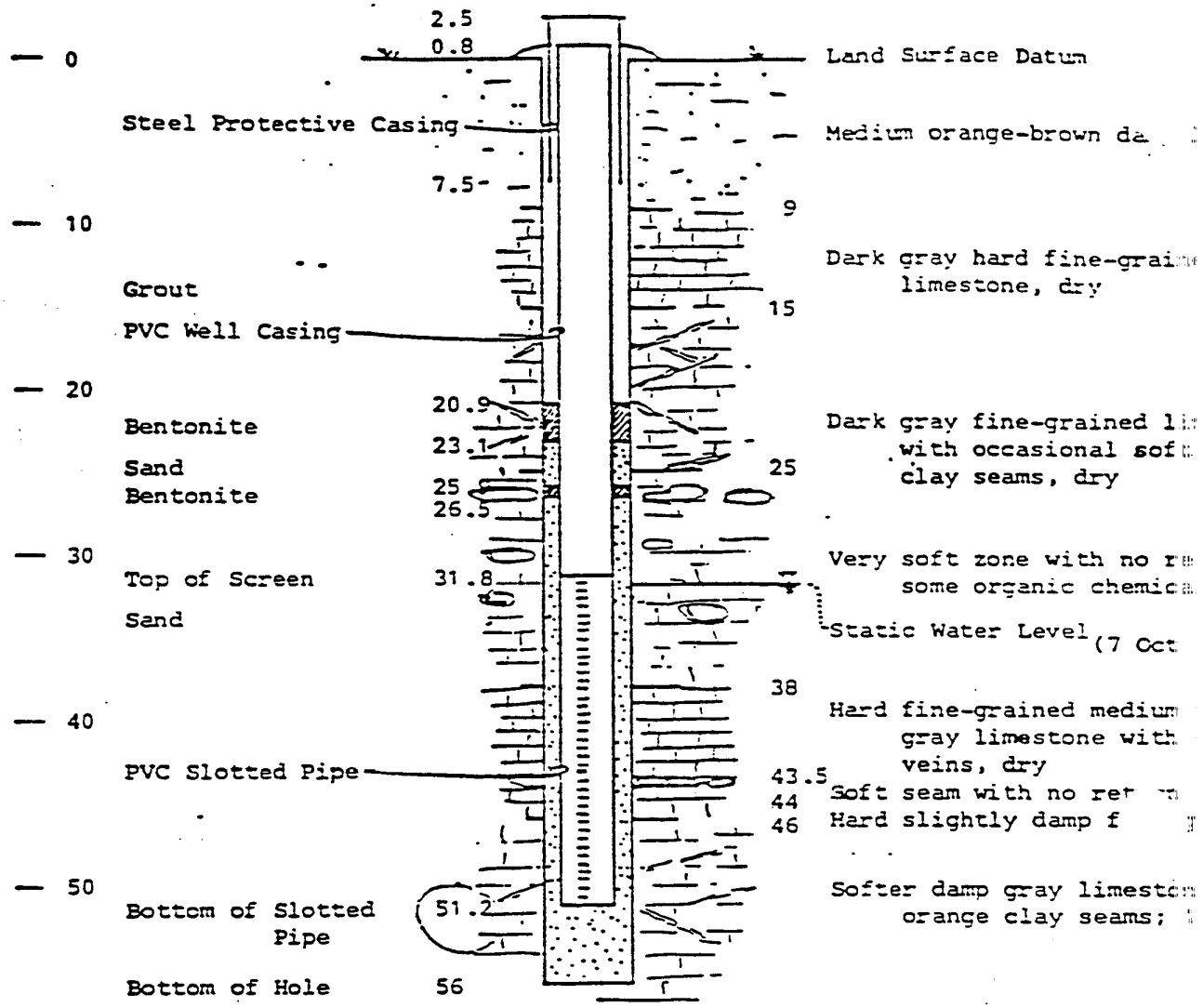
Dr. Jack Henion, Cornell University.



MEISER & EARL hydrogeologists
1512 W COLLEGE AVENUE STATE COLLEGE PENNSYLVANIA 16801 814 234-0813


1.3
Land Surface Datum
Steel Protective Casing
Orange-brown slightly damp silt loam
8.7
Grout
13
Dark gray hard fine-grained limestone
16
PVC Well Casing
Fractured gray fine-grained limestone
19
21
Soft zone with voids, no
24
Bentonite
29
Top of Screen
30
Hard dark gray fine-grained limestone, dry
35.4
Static Water Level (7 Oct
PVC Slotted Pipe
55
55.5
Soft brown clayey seam
Sand
70
Hard dark gray fine-grained limestone, dry
Bottom of Slotted Pipe
75
Hard dark gray fine-grained limestone, damp
feet below ground
TAE/10-21-85
Bottom of Hole
92
MEISER & EARL
hydrogeologists
1612 W COLLEGE AVENUE, STATE COLLEGE PENNSYLVANIA 16801 814 234-0813

IWTP Monitoring Well No. 3

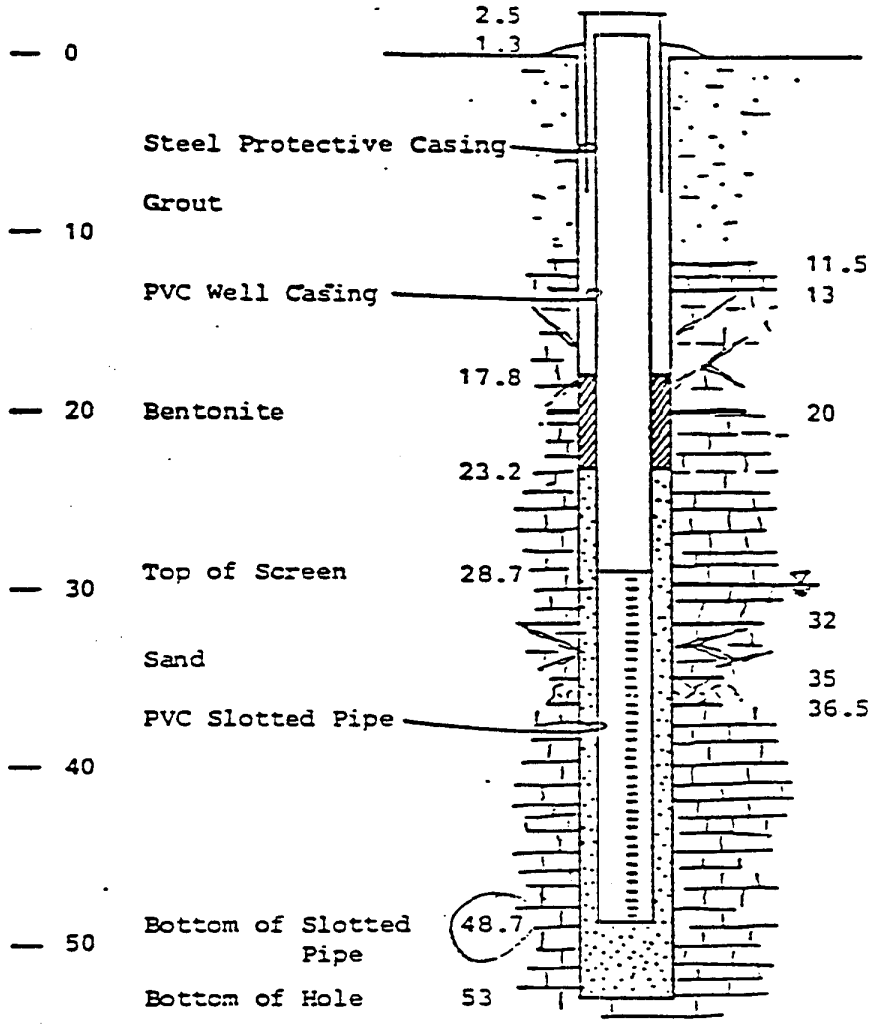


TAE/10-21-85

APPROVED
FACILITY

MEISER & EARL hydrogeologists

1512 W COLLEGE AVENUE, STATE COLLEGE PENNSYLVANIA 16801 814 234-0813



TAE/10-21-85

APPROVE
FACILITIES ENG

MEISER & EARL hydrogeologists

1512 W COLLEGE AVENUE STATE COLLEGE, PENNSYLVANIA 16801 814 234-0813

GEOTECHNICAL FIELD LOG (SUCCESSIVE SHEET)

INS	FA	I	FIL	SITE TYPE	SITE ID BORE	ELEVATION	DATE FD	BORE HOLE	ORG FD	INIT
	SA	G	FD	BORE	31-10		81338	31-10	EM	DJA

SHEET 1 OF 8

DATE 12-4-81

GEOLOGIST DAVE ALLISON

(GPA)
SAMPLES COLLECTED FOR PHYSICAL TESTING

(GFD)

SAMPLE NO	DEPTH FD	INTERVAL THICKNESS	TEST NAME PA	MTH PA	DEPTH (CM)	COMPLETION	SCREEN AND CA	LITHOL. SYMB.	VERBAL DESCRIPTION	DEPTH FD INT CM	INTERVAL THICKNESS	ACTION MEAS	MTH FD	VALUE	UNITS MEAS	ENTRY FD	RHS	C
					50							SHIFT				JNL		
												ADVANC	0.					
												SAMPL	0.2					
					100				TOP 6" STEEL - 91 cm.									
									TOP PVC - 76 cm.									
					50													
1001	0	13			00				CLAY, 5% SILT, LITTLE	0		USCS	CL			SL		
									MOISTURE, STIFF,			LITHO				CLAY		
									STRONG BROWN 7.5YR5/6			MOIST				LM		
												CONSIS				ST		
					50							MODIF				WIL		
												VAR.LA			12			
												COLOR				7.5YR56		
					100													
					150													

REMARKS SET UP ON 31-10 AT 10:15 12-4-81. SPLIT SPOONS AT 5' INTERVALS TO ROCK, TOOK 3 SAMPLES. ROCK AT 15' -

GE(;HNICAL FIELD LOG (SUCCESSIVE SHEET)

INS	FA	I	FIL	SITE TYPE	SITE ID BORE	ELEVATION	DATE FD	BORE HOLE	ORG FD	INIT
	S A	G	F D	B O R E	81-10		81 336	81-10	BM	DJA

SHEET 2 OF 8
DATE 12-4-81
GEOLOGIST Dave Allison

(GPA) SAMPLES COLLECTED FOR PHYSICAL TESTING

SAMPLE NO	DEPTH FD	INTERVAL THICKNESS	TEST NAME PA	MTH PA
1002	152	11		
1003	305	16		

DEPTH (CM) / COMPLETION / SCREEN AND CA / LITHOL. SYMB.

150, 200, 250, 300, 350, 400, 450

VERBAL DESCRIPTION

CLAY, SAME AS ABOVE ~~BUT STIFF~~ STIFFER

higher blow counts

Tire Jnil 213 cm.

CLAY, SAME AS ABOVE [illegible]

(GFD)

DEPTH FD INT CM	INTERVAL THICKNESS	ACTION MEAS	MTH FD	VALUE	UNITS MEAS	ENTRY FD	BHS
152		Z					
305							

REMARKS

GEOTECHNICAL FIELD LOG (SUCCESSIVE SHEET)

1 INS	6 PA	7 I	8 FIL	8 SITE TYPE	12 SITE ID NUMB	22 ELEVATION	29 DATE ED	34 DONE HOLE	39 ORG ED	41 INIT
	S,A	G	F,D	B,O,M,E	91-1P		91,3,28	91-1P	SM	DJA

SHEET 3 of 8
DATE 12-1-91
GEOLOGIST Dirk Allison

(GPA)
SAMPLES COLLECTED FOR PHYSICAL TESTING

SAMPLE NO	DEPTH FD	INTERVAL THICKNESS	TEST NAME PA	METH PA

DEPTH (CM) | COMPLETION | SCREEN AND CA | LITHOL SYMB.

VERBAL DESCRIPTION

450
500
550
600
650
700
750

LIMESTONE
TOP OF SANDPIPE 535cm
PIPE JOINT 510cm
Void clay-filled?
LIMESTONE

(GFD)

44 DEPTH FD INT CM	50 INTERVAL THICKNESS	55 ACTION MEAS	60 METH FD	62 VALUE	68 UNITS MEAS	71 ENTRY FD	77 INIS	80

REMARKS

GEOTE NICAL FIELD LOG (SUCCESSIVE SHEET)

INS	FA	T	FIL	SITE TYPE	SITE ID BORE	ELEVATION	DATE FD	BORE HOLE	ORG FD	INIT
1		8		8	12	22	29	34	39	41
	S A	G	F D	B O R E	81-10		91338	81-10	511	DTA

SHEET 4 of 8

DATE 12-4-81

GEOLOGIST Dave Acconiw

(GPA)

SAMPLES COLLECTED FOR PHYSICAL TESTING

SAMPLE NO	DEPTH FD	INTERVAL THICKNESS	TEST NAME PA	MTH PA

DEPTH (CM)	COMPLETION	SCREEN AND CA	LITHOL. SYMB.	VERBAL DESCRIPTION
750				
				TOP OF SAND - 762cm.
800				
850				TOP OF SCREEN 853cm
900				
950				
				Screen Joint - 970cm.
1000				
1050				

(GFD)

DEPTH FD INT CM	INTERVAL THICKNESS	ACTION MEAS	MTH FD	VALUE	UNITS MEAS	ENTRY FD	OBS	C
44	50	55	60	62	68	71	77	80

REMARKS

GEOTECHNICAL FIELD LOG (SUCCESSIVE SHEET)

INS	FA	I	FIL	SITE TYPE	SITE ID BORE	ELEVATION	DATE FD	BORE HOLE	ORG FD	INIT
	SA	G	FO	BORE	81-10		81338	81-10	BM	DJ

SHEET 5 of 8

DATE 12-4-81

GEOLOGIST Dave Allison

(GPA)
SAMPLES COLLECTED FOR PHYSICAL TESTING

SAMPLE NO	DEPTH FD	INTERVAL THICKNESS	TEST NAME PA	MTH PA

DEPTH (CM)	COMPLETION	SCREEN AND CA	LITHOL. SYMB.	VERBAL DESCRIPTION
1050				
1100				
				Screen Joint 1138 cm
1150				
1200				
				Screen Joint . 1205 cm
1250				
1300				
				Bottom of Screen [illegible] 1310 cm
1350				

(GFD)

DEPTH FD INT CM	INTERVAL THICKNESS	ACTION MEAS	MTH FD	VALUE	UNITS MEAS	ENTRY FD	OBS	C M

REMARKS

GE CHNICAL FIELD LOG (SUCCESSIVE SHEET)

INS (1)	FA (5)	I	FIL (8)	SITE TYPE	SITE ID NUM (12)		ELEVATION (22)	DATE FD (29)	BORE HOLE (34)	ORG FD (39)	INIT (41)
	S,A	G	F,D	n,o,n,e	81-10			0133 8	81-10	EC	07A

SHEET 6 of 8
DATE 12-4-81
GEOLOGIST Dave Allison

(GPA)
SAMPLES COLLECTED
FOR PHYSICAL TESTING

SAMPLE NO	DEPTH FD	INTERVAL THICKNESS	TEST NAME PA	MTH PA

DEPTH (CM)	COMPLETION	SCREEN AND CA	LITHOL. SYMB.	VERBAL DESCRIPTION
1350				
	?		↓	
1400				
	?			
1450				
	?			Bottom of Hole - 1480 cm
1500				
50				
00				
50				

(GFD)

DEPTH FD INT CM (44)	INTERVAL THICKNESS (50)	ACTION MEAS (55)	MTH FD (60)	VALUE (62)	UNITS MEAS (68)	ENTRY FD (71)	NUS (77)	(80)

REMARKS

6-1

GEOTECHNICAL FIELD LOG (SUCCESSIVE SHEET)

INS	FA	1	FIL	SITE TYPE	SITE ID BORE	ELEVATION	DATE FD	BORE HOLE	ORG FD	INIT
[illegible] LK	S A	G	F D	B O R E	82002		072182	12002	PT	PA

SHEET 1

DATE 7/8/82

GEOLOGIST Thomas

(GPA) SAMPLES COLLECTED FOR PHYSICAL TESTING

SAMPLE NO	DEPTH FD	INTERVAL THICKNESS	TEST NAME PA	MTH PA

DEPTH (CM) / COMPLETION / SCREEN AND CA / LITHOL. SYMB.

Depth scale: 150, 100, 50, 00, 50, 100 (joint 114), 150

VERBAL DESCRIPTION

Top PVC at +63 cm

joint at +33 cm

Top soil
Silt with clay. little moist.

(CL)
Clay with med plasticity. soft and moist. Yellowish red 5YR 4/6. Hit limestone after driving

(GFD)

DEPTH FD INT CM	INTERVAL THICKNESS	ACTION MEAS	MTH FD	VALUE	UNITS MEAS	ENTRY FD	ABS	C
0	10	USCS	[illegible]			[illegible]	[illegible]	
10	170	USCS	CL			SL	OL	

REMARKS Began drilling at 10:00 AM on 7/8/82.

GEOT' 'NICAL FIELD LOG (SUCCESSIVE SHEET)

IRS	FA	T	FIL	SITE TYPE	SITE ID BORE	ELEVATION	DATE FD	BORE HOLE	ORG FD	INIT
CA	SA	G	FD	BORE	82002		7/8/82	82002	PT	TPT

SHEET 2

DATE 7/8/82

GEOLOGIST T Gerue

(GPA) SAMPLES COLLECTED FOR PHYSICAL TESTING

SAMPLE NO	DEPTH FD	INTERVAL THICKNESS	TEST NAME PA	MTH PA
201	170	15		
[illegible]	[illegible]			
		Core		

DEPTH (CM): 150, 200, 250, 300, 350, 400, 450

COMPLETION / SCREEN AND CA / LITHOL. SYMB.

VERBAL DESCRIPTION

sampler 3"
blow counts were
10 over first 6"
and 100 over
next 3"

Limestone
Fairly solid
and medium
hard. 4 fracture
over 5' section
from 6-11' Wet
very dark gray
2.5 YN/3 with
streaks of dark gray. Few
veins of calcite
they are very thin

97% recovery

joint at
413 cm

(GFD)

DEPTH FD INT CM	INTERVAL THICKNESS	ACTION MEAS	MTH FD	VALUE	UNITS MEAS	ENTRY FD	RHS
170	15	ALLCUT	01			CLAY	OE
		SPLIT	↓			[illegible]	↓
		CONSI	↓			SOFT	↓
		COLOR	↓			10YR5/1	↓
		COLCF	↓			5Y7/4	↓
		HARDC	↓	1.0	IG		↓
180	05	USCS	01			SHAL	OE
↓	↓	LITHO	↓			LMSN	↓
↓	↓	MOBIL	↓			FRACT	↓
↓	↓	CONSI	↓			MED	↓
↓	↓	MOISE	↓			WET	↓
↓	↓	SOLCR	↓			2.5YR3	↓

REMARKS

GEOTECHNICAL FIELD LOG (SUCCESSIVE SHEET)

INS	FA	I	FIL	SITE TYPE	SITE ID BORE	ELEVATION	DATE FD	BORE HOLE	ORG FD	INIT
PM/LR	SA	G	FD	BORE	52002		82/189	52002	PT	RN

SHEET 3

DATE 7/8/82

GEOLOGIST Thorne

(GPA) SAMPLES COLLECTED FOR PHYSICAL TESTING

SAMPLE NO	DEPTH FD	INTERVAL THICKNESS	TEST NAME PA	MTH PA
Continuous				
CORE				

Log

DEPTH (CM): 450, 500, 550, 600, 650, 700, 750

COMPLETION / SCREEN AND CA / LITHOL. SYMB.

VERBAL DESCRIPTION:

Void at 485 - 495 cm. about 3" wide
Lost drilling water return
75% recovery

Small void about 1".

Like above very much like above quite solid except at voids 100% recovery.

Top screen at 712 cm

(GFD)

DEPTH FD INT CM	INTERVAL THICKNESS	ACTION MEAS	MTH FD	VALUE	UNITS MEAS	ENTRY FD	RHS
485	1.0	4SCS	01			SS	OF
485	1.0	5LTHL	01			CLAY	OF
495	29.5	4SSS	01			CMS/L	OF
↓	↓	1ORLE	↓			LEAST	↓
↓	↓	SDYSS	↓			HR	↓
↓	↓	1BLSC	↓			45	↓
↓	↓	SOLAR	↓			SYLL	↓

REMARKS

I-16

GEOTECHNICAL FIELD LOG (SUCCESSIVE SHEET)

INS	FA	T	FIL	SITE TYPE	SITE ID BORE	ELEVATION	DATE FD	BORE HOLE	ORG FD	INIT
LN	SA	G	FO	BORE	82 992		82 1 89	82 90 7	PJ	PO7

SHEET 4

DATE 7/8/82

GEOLOGIST Thorne

(GPA) SAMPLES COLLECTED FOR PHYSICAL TESTING

SAMPLE NO	DEPTH FD	INTERVAL THICKNESS	TEST NAME FA	MTH FA
	(Ok	Hike	Ok	
	Cont			

DEPTH (CM)	VERBAL DESCRIPTION
750	joint at 759
	70% recovery
800	35' void from 770-960 cm.
850	Joint at 853 cm
900	
950	Limestone, medium hard, about one fracture per foot. More calcite filled veins than above. Very dark gray with 40% dark gray streaks.
1000 (joint at 1006)	100% recovery
1050	

(GFD)

DEPTH FD INT CM	INTERVAL THICKNESS	ACTION MEAS	MTH FD	VALUE	UNITS MEAS	ENTRY FD	SHI
780	110	USGS	01			SS	0C
780	110	[illegible]	01			GSAY	2E
900	345	USGS	01			[illegible]	0E
↓	↓	[illegible]	↓			[illegible]	↓
		[illegible]				[illegible]	
		[illegible]				[illegible]	
		[illegible]				[illegible]	
		[illegible]				[illegible]	

REMARKS

GEOTECHNICAL FIELD LOG (SUCCESSIVE SHEET)

INS (1)	FA (5)	T	FIL (8)	SITE TYPE	SITE ID BORE (12)	ELEVATION (22)	DATE FD (29)	BORE HOLE (34)	ORG FD (39)	INIT (41)
Z1	S A	G	F D	B O R E	82001		52187	F5001	PT	FJB

SHEET 5

DATE 7/8/82

GEOLOGIST Thorne

(GPA)

SAMPLES COLLECTED FOR PHYSICAL TESTING

SAMPLE NO	DEPTH FD	INTERVAL THICKNESS	TEST NAME PA	MTH PA
Continuous core				

DEPTH (CM) / COMPLETION / SCREEN AND CA / LITHOL. SYMB.

1050

1100

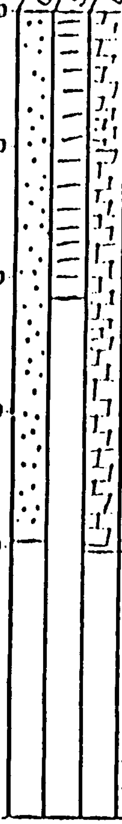
1150

1200

1250

1300

60



VERBAL DESCRIPTION

Same as above.

Bottom of screen at 1155

90% recovery

(GFD)

DEPTH FD INT CM (44)	INTERVAL THICKNESS (50)	ACTION MEAS (56)	MTH FD (60)	VALUE (62)	UNITS MEAS (68)	ENTRY FD (71)	RHS (77)	C (80)

REMARKS Stopped drilling at 5:30PM on 7/8/82 with 5 ft. left to ream. // Finished reaming at 9:00AM on 7/9/82 and began completion.

DATE PREPARED

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
BUREAU OF SOLID WASTE MANAGEMENT

I. D. NUMBER

HAZARDOUS WASTE MONITORING
INITIAL BACKGROUND REPORT

(To be submitted quarterly for one year for all monitoring wells)

Facility Name _____ Facility Permit Number _____

Location: County _____ Municipality _____

Monitoring Well Number _____ Check one: up____ down____ gradient

Depth to Water Level _____ feet. Measured from: land surface____ top of casing____

Sampling Depth _____ feet. Elevation of land surface _____ feet or top of casing _____

Type of Sampling (check one) pump____ bailer____. Was the well purged? Yes____ No____

Monitoring Well Location: Latitude ____° ____' ____"N Longitude ____° ____' ____"W

Date Sample Collected _____ Time of Sampling _____

Sample Collectors Name _____

encl.

January 4, 1989

Environmental Management Division

Bureau of Waste Management
ATTN: Mr. John Stephenson
One Ararat Boulevard
Harrisburg, PA 17110

Dear Mr. Stephenson,

Please find enclosed a revised Sampling and Analysis Plan (S A Plan) for Letterkenny Army Depot. This document is intended to serve as the S A plan for the Groundwater Assessment and Abatement Plan (GWAAP) at the IWTP lagoons. The following points have been clarified in response to the Pennsylvania Department of Environmental Resources (PADER) correspondence of September 26, 1988.

Reference paragraph 1 of subject letter, static water level measurements will be made to 0.01 feet. The plan has been changed to reflect this.

Reference paragraph 8 of subject letter, it was LEAD's understanding that a Sonic Interface Probe could be used for the detection of immiscible layers as requested by the department. The Sonic Interface Probe works on the principle of conductivity. The bottom of the probe, which is inserted into a well, houses two crystals. An immiscible layer in a well is an electron ion interface, which if encountered by the probe, will complete an electrical circuit. The measured response on the Sonic Interface Probe is a continuous audible tone and a red light. If ion free water is encountered in the well(s), an electrical circuit is not completed, thereby eliminating the continuous audible tone and red light. Conversely, individual transparent check valve bailers are housed in each well and if PADER is saisfied with a visual inspection of these bailers for immiscible layers, LEAD will gladly use this method of detection. The S A plan allows the flexibility of using either the probe or the bailers.

Reference paragraph 16 of subject letter, the order of collection for parameters did not correspond to the EPA Technical Enforcement Guidance Document (TEGD). This was an

oversight and LEAD stands corrected. The S A plan has been changed to reflect the corrected order for collection of parameters as outlined in the TGZD.

Referencing paragraph 17 of subject letter, PADER misunderstood the S A plan. Quadriplicate measurements of the indicator parameters are taken immediately after the purging of a well. The samples are collected in the order of their volatilization sensitivity. Once all of the samples have been collected for an individual well, quadruplicate measurements of the indicator parameters will be taken again as a measure of purging efficiency for that particular well. This entire procedure will then be repeated at the next well. LEAD has talked to several consulting firms in the area who conduct groundwater sampling and analysis. LEAD's method of purging and sampling to check the stability of the water being tested is a common practice among these firms. This procedure is also referenced in the TGZD, page 103. The stabilization criteria suggested in the department's letter of ±5% for conductivity, ±0.1 pH unit and ±0.1 Centigrade for temperature will be incorporated into our S A plan.

Referencing paragraph 24 of subject letter, LEAD feels that 1 sample of tapwater per year for use as a background sample is sufficient. The analytical results for LEAD's tapwater which was used for decontamination purposes while sampling have just been received, see Enclosure 2, and only two organics have been detected; chloroform and dichlorobromomethane. The presence of these organics are a result of LEAD's chlorination of its surface water for disinfection purposes. Trihalomethane(s) (THM) are commonly found in drinking water due to the interaction of chlorine and the organic substances naturally present in raw water. The regulatory limit for Total Trihalomethanes (TTHM) is 0.10 mg/l (ppm) so LEAD is well under this limit.

LEAD feels that quarterly sampling and analysis of the tapwater, at a cost of $320 per sample for EPA Method 624, is an inordinately expensive requirement and requests a waiver to sample once per year. It should be noted that tapwater is only used for the decontamination of our sampling pump. Further, the sampling pump is also decontaminated with distilled water. At no time is the pump used for the collection of the actual well samples, but only for purging purposes. The individual dedicated bailers in the wells are used for collection of the samples.

Referencing your paragraph with respect to well depths, the well depth has no effect on the static water level measurement, but an incorrect well depth will affect the determination of the amount of water in the well which

affects the amount of water to be purged. See page 3 and Enclosure 3 of the S A plan for clarification.

LEAD intends to submit an Appendix VIII/IX Sampling and Analysis Plan for the Department's review and approval by January 15, 1989. Upon approval of the Appendix VIII/IX S and A Plan, LEAD will begin contractual action to initiate this sampling. Unless unuaual delays are encountered, it is estimated that Appendix VIII/IX sampling could be completed within 90 days of the department's approval. If any undocumented contaminants are discovered during the Appendix VIII/IX sampling, the S A plan for the GWAAP will be modified accordingly.

LEAD would like to point out that Kellogg Environmental Services, Inc. of Mechanicsburg, PA, performed the analysis of the point-of-compliance wells for the third quarter of 1988. These results are being submitted to the department under a separate cover. When a change in a contracted laboratory occurs, a change in the Quality Control/Quality Assurance (QC/QA) Plan also takes place including the list of test methods used by Kellogg Environmental Services, Inc. This additional information has been included with the S A plan.

The Department has requested that LEAD carefully read the requirements of Chapter 75.264 regarding assessment and abatement, with emphasis on 75.264(18) through 75.264(23). This reference is incomplete and LEAD would like clarification as to which subsections of Chapter 75.264 the Department is requiring.

The Department's comment on a shorter scheduling period for the GWAAP in order to meet the deadline of submitting the assessment report has been noted and considered. Compliance with this request is difficult to respond to because of LEAD's interaction with USATHAMA.

The third quarter sampling of the point-of-compliance monitoring wells was conducted during October 17th and 20th. The Department was informed of this sampling event. LEAD intends to perform fourth quarter sampling during the second or third week of January. The Department will be notified when an exact date has been determined. LEAD would like clarification concerning the method of immiscible layer detection preferred by the Department and the Chapter 75.264 reference.

If there are any questions concerning this response, please contact Ms. Peg Gobrecht at (717)267-8433.

Sincerely,

Robert G. Holt

Encl

Robert G. Holt
Chief, Environmental
Management Division

Exhibit B-2 to Attachment

DEPARTMENT OF THE ARMY
LETTERKENNY army DEPOT
CHAMBERSBURG, PENNSYLVANIA 17201

REPLY TO
ATTENTION OF: Environmental Management Division

January 20, 1989

Bureau of Waste Management
ATTN: Mr. Tim Alexander
One Ararat Boulevard
Harrisburg, PA 17110

Dear Mr. Alexander,

Referencing correspondence between the Environmental Management Division at Letterkenny Army Depot (LEAD) and the Bureau of Waste Management at the Pennsylvania Department of Environmental Resources (PADER) concerning a proposed parameter list for the Sampling and Analysis Plan for the Groundwater Quality Assessment and Abatement Plan, the depot proposes that the following parameters should be analyzed for at this time:

a. Replicate analyses on all wells for the indicator parameters. Indicator parameters are pH, Total Organic Halogen (TOX), Total Organic Carbon (TOC) and specific conductivity.

b. The water quality parameter Manganese, Mn, which has exceeded the secondary drinking water maximum contaminant level (MCL) in the downgradient wells but not in the upgradient well.

c. The Volatile Organic Analysis (VOA) by the EPA Method 601/602 which is analysis by gas chromatograph (GC) for the following organics:

1. Trans-1,2-Dichloroethylene
2. Cis-1,2-Dichloroethylene
3. Trichloroethylene
4. Vinyl chloride
5. 1,1-Dichloroethylene
6. 1,1-Dichloroethane
7. 1,2-Dichloroethane
8. Methylene chloride
9. Chloroform
10. Benzene
11. 1,1,2-Trichloroethane
12. Tetrachloroethene
13. Chloroethane
14. 1-1-1 Trichloroethane

It is understood that this list is subject to change once the Appendix IX sampling is performed or at the

discretion of the department. Thank you for your assistance in this matter. If there are any questions concerning this response, please contact me at (717) 267-8483.

Sincerely,

Robert J. Holt

for Peggy L. Gobrecht

FACILITY: PA-213820503 DEPARTMENT OF ARMY MATL DEV & READINESS COM LETTERKENNY ARMY DEPOT
ADDRESS: ATTN: SDSLE-EN CHAMBERSBURG PA 172014150

PROJECT: LK-A-10 NAME: VOLATILE ORGANIC COMPOUNDS EMISSIONS VARIOUS LOCATIONS:
MEDIA: AIR POLLUTANT CATGY: STAT PROJECT ASSESSMENT: L COMPLIANCE STATUS: ESRE
ACCOUNT: MCA PROJECT CONTACT: ROBERT G. HOLT TELEPHONE: (717) 267-9690
SYSTEM DATES DESIGN COMPLETED CONTRUCTION DATES FINAL COMPLIANCE YEAR FUNDING EST COST: 500.0
PREPARED/REVISED DATE START COMP REQUIRED DATE REQUIRED PROGRESS: WRK
01/87 12/87 09/89 07/84 04/87 04/87 87 FISCAL YR COMPL:

	PRE 1985	1985	1986	1987	1988	1989	1990	1991	1992
BUDGETED:	0.0	0.0	80.0	100.0	200.0	1,300.0	2,500.0	2,000.0	0.0
FUNDED:	0.0	0.0	80.0	0.0	200.0	0.0	0.0	0.0	0.0
REVISED:			01/28/87	01/28/87	12/30/87	12/30/87	12/30/87	12/30/87	

NARRATIVE: LEAD WAS ISSUED A DELAYED COMPLIANCE ORDER BY STAT E OF PENNSYLVANIA IN JULY 84. LEAD WAS DIRECTED TO REDUCE THE VOLATILE ORGANIC COMPOUNDS (VOC'S) ASS OCIATED WITH SURFACE COATING APPLICATION OF CHEMIC AL AGENT RESISTANT COATINGS TO STATE AIR QUALITY L IMITS. THE DCO REQUIRED LEAD TO IMPLEMENT BEST AVA ILABLE TECHNOLOGY AND REDUCTION USE OF HIGH VOC PA INTS BY 21 APR 86. LEAD HAS BEEN GIVEN EXTENSION O N DCO TO 21 APR 87 TO MEET STATE REGULATION. LEAD NOW COMPLIES WITH STATE AIR QUALITY EMISSION REGS.

PROJECT: LK-A-24 NAME: ASBESTOS SURVEY VARIOUS LOCATIONS:
MEDIA: AIR POLLUTANT CATGY: HAZD PROJECT ASSESSMENT: H COMPLIANCE STATUS: ESDL
ACCOUNT: INDUSTRIAL FUND PROJECT CONTACT: BOB KICHLINE TELEPHONE: (717) 267-9690
SYSTEM DATES DESIGN COMPLETED CONTRUCTION DATES FINAL COMPLIANCE YEAR FUNDING EST COST: 1,000.0
PREPARED/REVISED DATE START COMP REQUIRED DATE REQUIRED PROGRESS: WRK
06/88 06/88 00/00 00/00 00/00 00/00 88 FISCAL YR COMPL:

	PRE 1985	1985	1986	1987	1988	1989	1990	1991	1992
BUDGETED:	0.0	0.0	0.0	0.0	175.0	825.0	0.0	0.0	0.0
FUNDED:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REVISED:					06/17/88	06/17/88			

NARRATIVE: BASEWIDE ASBESTOS SURVEY TO DETERMINE HEALTH HAZARDS.

PROJECT: LK-A-25 NAME: ASBESTOS ABATEMENT PROJECT VARIOUS LOCATIONS:
MEDIA: AIR POLLUTANT CATGY: HAZD PROJECT ASSESSMENT: H COMPLIANCE STATUS: ESDL
ACCOUNT: INDUSTRIAL FUND PROJECT CONTACT: BOB KICHLINE TELEPHONE: (717) 267-9690
SYSTEM DATES DESIGN COMPLETED CONTRUCTION DATES FINAL COMPLIANCE YEAR FUNDING EST COST: 2,580.0
PREPARED/REVISED DATE START COMP REQUIRED DATE REQUIRED PROGRESS: PP
06/88 06/88 00/00 00/00 00/00 00/00 88 FISCAL YR COMPL:

	PRE 1985	1985	1986	1987	1988	1989	1990	1991	1992
BUDGETED:	0.0	0.0	0.0	0.0	250.0	550.0	550.0	520.0	270.0
FUNDED:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REVISED:					06/17/88	06/17/88	06/17/88	06/17/88	06/17/88

NARRATIVE: TO BE FURTHER DEFINED BY ASBESTOS SURVEYS. WILL ABATE EMPLOYEE HEALTH HAZZARDS.

ATTACHMENT 5 to LEAD IAG

FACILITY: PA-213820503 DEPARTMENT OF ARMY MATL DEV & READINESS COM LETTERKENNY ARMY DEPOT
ADDRESS: ATTN: SDSLE-EN CHAMBERSBURG PA 172014150

PROJECT: LK-A-26 NAME: RADON SURVEYS VARIOUS LOCATIONS:
MEDIA: AIR POLLUTANT CATGY: HAZD PROJECT ASSESSMENT: H COMPLIANCE STATUS: ESDL
ACCOUNT: INDUSTRIAL FUND PROJECT CONTACT: BOB HOLT TELEPHONE: (717) 267-9690

SYSTEM DATES PREPARED/REVISED	DESIGN COMPLETED DATE	CONTRUCTION DATES START	COMP	FINAL COMPLIANCE REQUIRED DATE	YEAR FUNDING REQUIRED	EST COST:	625.0
06/88 06/88	00/00	00/00	00/00	00/00	89	PROGRESS:	PP
						FISCAL YR COMPL:	

	PRE 1985	1985	1986	1987	1988	1989	1990	1991	1992
BUDGETED:	0.0	0.0	0.0	0.0	0.0	326.0	163.0	163.0	0.0
FUNDED:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REVISED:						06/17/88	06/17/88	06/17/88	

NARRATIVE: BASEWIDE RADON SURVEY TO DETERMINE HEALTH HAZARDS.

PROJECT: LK-A-27 NAME: RADON ABATEMENT PROJECTS VARIOUS LOCATIONS:
MEDIA: AIR POLLUTANT CATGY: HAZD PROJECT ASSESSMENT: H COMPLIANCE STATUS: ESDL
ACCOUNT: INDUSTRIAL FUND PROJECT CONTACT: BOB HOLT TELEPHONE: (717) 267-9690

SYSTEM DATES PREPARED/REVISED	DESIGN COMPLETED DATE	CONTRUCTION DATES START	COMP	FINAL COMPLIANCE REQUIRED DATE	YEAR FUNDING REQUIRED	EST COST:	1,260.0
06/88 06/88	00/00	00/00	00/00	00/00	89	PROGRESS:	PP
						FISCAL YR COMPL:	

	PRE 1985	1985	1986	1987	1988	1989	1990	1991	1992
BUDGETED:	0.0	0.0	0.0	0.0	0.0	126.0	378.0	315.0	252.0
FUNDED:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REVISED:						06/17/88	06/17/88	06/17/88	06/17/88

NARRATIVE: TO BE FURTHER DEFINED BY RADON SURVEYS. WILL ABATE EMPLOYEE HEALTH HAZARDS.

FACILITY: PA-213820503 DEPARTMENT OF ARMY MATL DEV & READINESS COM LETTERKENNY army DEPOT
ADDRESS: ATTN: SDSLE-EN CHAMBERSBURG PA 172014150
PROJECT: A-P-54 NAME: PESTICIDE STOR & MIX FAC VARIOUS LOCATIONS:
MEDIA: PESTICIDES POLLUTANT CATGY: HAZD PROJECT ASSESSMENT: H COMPLIANCE STATUS: ESOP
ACCOUNT: INDUSTRIAL FUND PROJECT CONTACT: ROBERT G. HOLT TELEPHONE: (717) 267-9690
SYSTEM DATES DESIGN COMPLETED CONTRUCTION DATES FINAL COMPLIANCE YEAR FUNDING EST COST: 200.0
PREPARED/REVISED DATE START COMP REQUIRED DATE REQUIRED PROGRESS: DES
12/87 06/86 11/87 08/88 00/00 88 FISCAL YR COMPL:

	PRE 1985	1985	1986	1987	1988	1989	1990	1991	1992
BUDGETED:	380.0	200.0	0.0	200.0	200.0	0.0	0.0	0.0	0.0
FUNDED:	0.0	200.0	0.0	0.0	200.0	0.0	0.0	0.0	0.0
REVISED:				12/30/87	12/30/87				

NARRATIVE: CONSTRUCT A FACILITY FOR THE STORAGE AND MIXING OF PESTICIDES AND HERBICIDES. "ON HOLD" PENDING NEW START ANALYSIS. (FY87 PROJECT - DEFERRED).

FACILITY: PA-213820503 DEPARTMENT OF ARMY MATL DEV & READINESS COM LETTERKENNY ARMY DEPOT
ADDRESS: ATTN: SDSLE-EN CHAMBERSBURG PA 172014150
PROJECT: A039B NAME: INSTALLATION RESTORATION SURVEY & CLEANUP VARIOUS LOCATIONS:
MEDIA: CERCLA POLLUTANT CATGY: PH3 PROJECT ASSESSMENT: H COMPLIANCE STATUS: ESOF
ACCOUNT: DERA PROJECT CONTACT: ERIC KAUFFMAN TELEPHONE: (301) 671-3921
SYSTEM DATES DESIGN COMPLETED CONTRUCTION DATES FINAL COMPLIANCE YEAR FUNDING EST COST: 14,656.6
PREPARED/REVISED DATE START COMP REQUIRED DATE REQUIRED PROGRESS: WRK
07/83 12/87 09/89 00/00 00/00 04/88 81 FISCAL YR COMPL:

	PRE 1985	1985	1986	1987	1988	1989	1990	1991	1992
BUDGETED:	1,357.7	267.9	2,600.0	2,900.0	3,500.0	1,000.0	3,000.0	500.0	300.0
FUNDED:	1,357.7	267.9	1,883.0	2,548.0	0.0	0.0	0.0	0.0	0.0
REVISED:		01/08/86	01/15/87	12/30/87	06/26/86	12/30/87	12/30/87	12/30/87	12/30/87

NARRATIVE: CONTAMINATED GROUNDWATER FROM PAST INDUSTRIAL CHEM ICAL DISPOSAL. MONIDTORING WELLS INSTALLED DURING FY81-83. SOUTHEASDTERN INDUSTRIAL AREA AS A POSSIB LE SOURCE OF OFF-POST CONTAMINATION BEING INVESTI- GATED DURING F483. REMEDIAL ACTION ENGINEERING ANA LYSIS INITIATED 2Q FY83. TO BE UPDATED IN FY87 CONSIDERING INNOVATIVE TECHNOLOGIES TESTED BETWEEN FY85 & FY86. OFFPOST INVESTIGATION INITIATED IN 4Q FY86.

PROJECT: LK-W-11 NAME: LETTERKENNY INSTALLATION TESTORATION PLAN. VARIOUS LOCATIONS:
MEDIA: CERCLA POLLUTANT CATGY: GHAT PROJECT ASSESSMENT: COMPLIANCE STATUS: OTHR
ACCOUNT: DERA PROJECT CONTACT: ROBERT G. HOLT TELEPHONE: (717) 267-9690
SYSTEM DATES DESIGN COMPLETED CONTRUCTION DATES FINAL COMPLIANCE YEAR FUNDING EST COST: 12,125.6
PREPARED/REVISED DATE START COMP REQUIRED DATE REQUIRED PROGRESS: DES
01/87 12/87 10/86 10/86 12/87 00/00 87 FISCAL YR COMPL:

	PRE 1985	1985	1986	1987	1988	1989	1990	1991	1992
BUDGETED:	1,357.7	267.9	2,600.0	2,900.0	3,500.0	500.0	500.0	500.0	0.0
FUNDED:	1,357.7	267.9	1,833.0	2,900.0	0.0	0.0	0.0	0.0	0.0
REVISED:	12/30/87	12/30/87	12/30/87	12/30/87	12/30/87	12/30/87	12/30/87	12/30/87	

NARRATIVE: LETTERKENNY HAS SIGNIFICANAT AMOUNTS OF GROUND WAT ER CONTAMINATION RESULTING FROM PAST DISPPSAL PRAC TICES OF TOXIC SUBSTANCE. AS A RESULT, USATHAMA I S CONDUCTION EXTENSIVE REMEDIAL INVESTIGATIONS (IR) AND FEASIBILITY STUDIES (FS) TO DETERMINE THE EXTENT OF CONTAMINATION AND CONTAMINANATS. ONCE T HE SOURCES AND EXTENT OF CONTAMINATION IS KNOWN CORRTECTIVE REMEDIAL ACTIONS WILL BE PROPOSED AND IMPLEMENTED.

FACILITY: PA-213820503 DEPARTMENT OF ARMY MATL DEV & READINESS COM LETTERKENNY ARMY DEPOT
ADDRESS: ATTN: SDSLE-EN CHAMBERSBURG PA 172014150
NAME: GROUNDWATER SAMPLING/ANALYSIS VARIOUS LOCATIONS:
POLLUTANT CATGY: GWAT
PROJECT CONTACT: ROBERT G. HOLT
PROJECT ASSESSMENT: H COMPLIANCE STATUS: ESDF
TELEPHONE: (717) 267-9690

PROJECT: LK-SF-8
MEDIA: SOLID WASTE
ACCOUNT: OMA
SYSTEM DATES
PREPARED/REVISED
01/85 12/87

DESIGN COMPLETED DATE: 09/89
CONTRUCTION DATES START: 01/85 COMP: 12/85
FINAL COMPLIANCE REQUIRED DATE: 09/87
YEAR FUNDING REQUIRED: 88
EST COST: 1,260.0
PROGRESS: WRK
FISCAL YR COMPL:

	PRE	1985	1986	1987	1988	1989	1990	1991	1992
BUDGETED:	0.0	160.0	160.0	160.0	160.0	200.0	300.0	300.0	300.0
FUNDED:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REVISED:						12/30/87	12/30/87	12/30/87	12/30/87

NARRATIVE: LKAD HAS GROUNDWATER CONTAM FROM PAST DISPOSAL ACTIVITIES, REQUIRING ONGOING MONITORING. LKAD ALSO HAS INDUSTRIAL WASTE LAGOONS, THE SLUDGE IN WHICH IS CONSIDERED HAZ. POLLUTANTS ARE VOCS FROM EXISTING GROUNDWATER POLLUTION; ELECTROPLATING RINSE WATER AND 1,1,1 TRICHLOROETHANE IN SLUDGE CONTAINED IN SURFACE IMPOUNDMENTS. APPLICABLE STANDARDS ARE PADER TITLE 25, CHAPTER 75.265(N) AND 40 CFR PART 265.91.

PROJECT: LK-SW-1
MEDIA: SOLID WASTE
ACCOUNT: OMA
SYSTEM DATES
PREPARED/REVISED
07/84 12/87

NAME: BEST MANAGEMENT PRACTICES STUDY/PLAN
POLLUTANT CATGY: HAZD
PROJECT CONTACT: ROBERT G. HOLT
PROJECT ASSESSMENT: M VARIOUS LOCATIONS:
COMPLIANCE STATUS: PSDF
TELEPHONE: (717) 267-9609

DESIGN COMPLETED DATE: 00/00
CONTRUCTION DATES START: 04/84 COMP: 12/86
FINAL COMPLIANCE REQUIRED DATE: 00/00
YEAR FUNDING REQUIRED: 84
EST COST: 148.0
PROGRESS: WRK
FISCAL YR COMPL:

	PRE	1985	1986	1987	1988	1989	1990	1991	1992
BUDGETED:	30.0	30.0	0.0	30.0	118.0	0.0	0.0	0.0	0.0
FUNDED:	0.0	30.0	0.0	30.0	0.0	0.0	0.0	0.0	0.0
REVISED:				12/30/87	12/30/87				

NARRATIVE: STUDY INDUSTRIAL PROCESSES CONTRIBUTING TO THE IWTP TO DETERMINE OPTIMUM USE OF PROCESSES,EQUIPMENT, AND SUPPLIES TO REDUCE GENERATION OF HAZARDOUS WASTES. POLLUTANTS ARE INDUSTRIAL WASTES INCLUDING HAZARDOUS WASTES.

PROJECT: LK-SW-12
MEDIA: SOLID WASTE
ACCOUNT: DERA
SYSTEM DATES
PREPARED/REVISED
01/87 12/87

NAME: CLOSURE LEAD STORAGE LAGOONS IAW RCRA
POLLUTANT CATGY: GWAT
PROJECT CONTACT: ROBERT G. HOLT
PROJECT ASSESSMENT: H VARIOUS LOCATIONS:
COMPLIANCE STATUS: ESDF
TELEPHONE: (717) 267-9690

DESIGN COMPLETED DATE: 03/88
CONTRUCTION DATES START: 11/86 COMP: 12/87
FINAL COMPLIANCE REQUIRED DATE: 00/00
YEAR FUNDING REQUIRED: 88
EST COST: 3,700.0
PROGRESS: DES
FISCAL YR COMPL:

	PRE	1985	1986	1987	1988	1989	1990	1991	1992
BUDGETED:	0.0	0.0	0.0	2,550.0	300.0	750.0	100.0	100.0	0.0
FUNDED:	0.0	0.0	0.0	2,550.0	0.0	0.0	0.0	0.0	0.0
REVISED:				12/30/87	12/30/87	12/30/87	12/30/87	12/30/87	

NARRATIVE: PHYSICAL INSPECTION OF IWTP STORAGE LOGOONS REVEALED THAT ONE AND POSSIBLY BOTH HAVE SERIOUS STRUCTURAL CRACKS. CONSEQUENTLY, LEAD HAS DETERMINED THE BEST COURSE OF ACTION IS TO INSTALL SLUDGE FILTER PRESSES AND DRYERS AS BAT FOR HANDLING SLUDGE. BECAUSE LAGOONS ARE RCRA REGULATED, A CLOSURE PLAN MUST BE PREPARED AND SUBMITTED TO REGULATORY AGENCIES UPON FINAL APPROVAL, LEAD WILL CLOSE IWTP LAGOON IAW REQUIREMENTS OF RCRA.

FACILITY: PA-213820503 DEPARTMENT OF ARMY MATL DEV & READINESS COM LETTERKENNY ARMY DEPOT
ADDRESS: ATTN: SDSLE-EN CHAMBERSBURG PA 172014150

PROJECT: LK-SW-13 NAME: DISPOSAL PCP CONTAMINATION BY BIODEGREDATION VARIOUS LOCATIONS:
MEDIA: SOLID WASTE POLLUTANT CATGY: HAZD PROJECT ASSESSMENT: M COMPLIANCE STATUS: ESDF
ACCOUNT: DERA PROJECT CONTACT: ROBERT G. HOLT TELEPHONE: (717) 267-9690
SYSTEM DATES DESIGN COMPLETED CONTRUCTION DATES FINAL COMPLIANCE YEAR FUNDING EST COST: 1,500.0
PREPARED/REVISED DATE START COMP REQUIRED DATE REQUIRED PROGRESS: PP
12/87 12/87 10/90 11/88 01/91 00/00 89 FISCAL YR COMPL:

	PRE 1985	1985	1986	1987	1988	1989	1990	1991	1992
BUDGETED:	0.0	0.0	0.0	0.0	0.0	250.0	1,000.0	175.0	50.0
FUNDED:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REVISED:						12/29/87	12/29/87	12/29/87	12/29/87

NARRATIVE: LETTERKENNY ARMY DEPOT PROPOSES TO DISPOSE OF AMMUNITION BOXES AND OTHER DEBRIS CONTAMINATED WITH PENTACHLOROPHENOLS BY USING MICROORGANISMS THAT ARE CAPABLE OF DETOXIFYING PCP THROUGH BIODEGREDATION. AN EXPERIMENTAL LANDFILL/LANDFARMING OPERATION WOULD BE CONSTRUCTED AND APPROPRIATE MICROORGANISMS INTRODUCED TO DETOXIFY THE PCP CONTAMINATED WOOD. SUCH A LANDFARMING PRACTICE WOULD SAVE CONSIDERABLE MONEY IF CONVENTIONAL DISPOSAL WERE USED.

PROJECT: LK-SW-17 NAME: HAZMIN DESIGN AND CONSTRUCT SPENT SOLVENT R VARIOUS LOCATIONS:
MEDIA: SOLID WASTE POLLUTANT CATGY: HAZD PROJECT ASSESSMENT: M COMPLIANCE STATUS: ESDP
ACCOUNT: DERA PROJECT CONTACT: ROBERT G. HOLT TELEPHONE: (717) 267-9690
SYSTEM DATES DESIGN COMPLETED CONTRUCTION DATES FINAL COMPLIANCE YEAR FUNDING EST COST: 200.0
PREPARED/REVISED DATE START COMP REQUIRED DATE REQUIRED PROGRESS: PP
06/88 06/88 11/85 02/87 12/87 00/00 87 FISCAL YR COMPL:

	PRE 1985	1985	1986	1987	1988	1989	1990	1991	1992
BUDGETED:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FUNDED:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REVISED:									

NARRATIVE: MINIMIZATION, U.S. EPA RCRA AMENDMENTS OF 1984 REQUIRE ALL HAZARDOUS WASTE GENERATORS TO CERTIFY WRITING THAT THEY HAVE AN ACTIVE HW STREAM MINIMIZATION PROGRAM IN OPERATION BY SEPT 1985. THERE IS NO ACTIVE SOLVENT RECOVERY ON RECYCLING PROGRAM AT LETTERKENNY. CONSTRUCTION OF A SOLVENT RECOVERY SYSTEM IS NECESSARY TO COMPLY WITH FEDERAL LAWS AND REGULATIONS.

PROJECT: LK-SW-18 NAME: HAZARDOUS WASTE DISPOSAL VARIOUS LOCATIONS:
MEDIA: SOLID WASTE POLLUTANT CATGY: HAZD PROJECT ASSESSMENT: M COMPLIANCE STATUS: OTHR
ACCOUNT: INDUSTRIAL FUND PROJECT CONTACT: ROBERT G. HOLT TELEPHONE: (717) 267-9690
SYSTEM DATES DESIGN COMPLETED CONTRUCTION DATES FINAL COMPLIANCE YEAR FUNDING EST COST: 492.0
PREPARED/REVISED DATE START COMP REQUIRED DATE REQUIRED PROGRESS: CNTS
06/88 06/88 00/00 00/00 00/00 00/00 88 FISCAL YR COMPL:

	PRE 1985	1985	1986	1987	1988	1989	1990	1991	1992
BUDGETED:	0.0	0.0	0.0	0.0	135.0	107.0	50.0	50.0	50.0
FUNDED:	0.0	0.0	0.0	0.0	135.0	0.0	0.0	0.0	0.0
REVISED:					06/17/88	06/17/88	06/17/88	06/17/88	06/17/88

NARRATIVE: ANNUAL DISPOSAL OF HAZARDOUS WASTE.

FACILITY: PA-213820503 DEPARTMENT OF ARMY MATL DEV & READINESS COM LETTERKENNY ARMY DEPOT
ADDRESS: ATTN: SDSLE-EN CHAMBERSBURG PA 172014150

PROJECT: LK-SW-19 NAME: PREPARE & IMPLEMENT CLOSURE/POST CLOSURE PLAN VARIOUS LOCATIONS:
MEDIA: SOLID WASTE POLLUTANT CATGY: HAZD PROJECT ASSESSMENT: M COMPLIANCE STATUS: ESDP
ACCOUNT: INDUSTRIAL FUND PROJECT CONTACT: ROBERT G. HOLD TELEPHONE: (717) 267-9690

SYSTEM DATES PREPARED/REVISED	DESIGN COMPLETED DATE	CONTRUCTION DATES START	CONTRUCTION DATES COMP	FINAL COMPLIANCE REQUIRED DATE	YEAR FUNDING REQUIRED	EST COST:	5,450.0
06/88 06/88	00/00	00/00	00/00	00/00	90	PROGRESS: PP	

	PRE 1985	1985	1986	1987	1988	1989	1990	FISCAL YR COMPL: 1991	1992
BUDGETED:	0.0	0.0	0.0	0.0	0.0	0.0	500.0	4,500.0	4,500.0
FUNDED:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REVISED:							06/17/88	06/17/88	06/17/88

NARRATIVE: PREPARE AND IMPLEMENT PLANS FOR CLOSURE AND POST CLOSURE COSTS PROJECTED IN FY91 AND GW MONITORING THEREAFTER.

PROJECT: LK-SW-20 NAME: TEST/CERTIFY/REMOVE UNDERGROUND STORAGE TAN VARIOUS LOCATIONS:
MEDIA: SOLID WASTE POLLUTANT CATGY: LUST PROJECT ASSESSMENT: H COMPLIANCE STATUS: ESDP
ACCOUNT: INDUSTRIAL FUND PROJECT CONTACT: ROBERT G HOLT TELEPHONE: (717) 267-9690

SYSTEM DATES PREPARED/REVISED	DESIGN COMPLETED DATE	CONTRUCTION DATES START	CONTRUCTION DATES COMP	FINAL COMPLIANCE REQUIRED DATE	YEAR FUNDING REQUIRED	EST COST:	500.0
06/88 06/88	00/00	00/00	00/00	00/00	89	PROGRESS: PP	

	PRE 1985	1985	1986	1987	1988	1989	1990	FISCAL YR COMPL: 1991	1992
BUDGETED:	0.0	0.0	0.0	0.0	0.0	100.0	200.0	200.0	0.0
FUNDED:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REVISED:						06/17/88	06/17/88	06/17/88	

NARRATIVE: TEST ALL UST TO DETERMINE INTEGRIETY. REMOVE CONTAMINATION FROM FAILED TANKS AND REPLACE FAILED TANKS.

PROJECT: LK-SW-21 NAME: INSTALL RUNON/RUNOFF CONTROLS FOR OB GRNDS VARIOUS LOCATIONS:
MEDIA: SOLID WASTE POLLUTANT CATGY: HAZD PROJECT ASSESSMENT: M COMPLIANCE STATUS: ESDP
ACCOUNT: INDUSTRIAL FUND PROJECT CONTACT: ROBERT G HOLT TELEPHONE: (717) 267-9690

SYSTEM DATES PREPARED/REVISED	DESIGN COMPLETED DATE	CONTRUCTION DATES START	CONTRUCTION DATES COMP	FINAL COMPLIANCE REQUIRED DATE	YEAR FUNDING REQUIRED	EST COST:	100.0
06/88 06/88	00/00	00/00	00/00	00/00	90	PROGRESS: PP	

	PRE 1985	1985	1986	1987	1988	1989	1990	FISCAL YR COMPL: 1991	1992
BUDGETED:	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
FUNDED:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REVISED:							06/17/88		

NARRATIVE: INSTALL CONTROLS TO PREVENT SURFACE WATER RUN-ON TO OB PADS AND PREVENT CONTAMINANT RUNOFF

FACILITY: PA-213820503 DEPARTMENT OF ARMY MATL DEV & READINESS COM LETTERKENNY ARMY DEPOT
ADDRESS: ATTN: SDSLE-EN CHAMBERSBURG PA 172014150
PROJECT: LK-SW-22 NAME: UPGRADE DEACT FURNACE CONTROL & PERFORMANCE VARIOUS LOCATIONS:
MEDIA: SOLID WASTE POLLUTANT CATGY: CORA PROJECT ASSESSMENT: H COMPLIANCE STATUS: ESOP
ACCOUNT: INDUSTRIAL FUND PROJECT CONTACT: ROBERT G HOLT TELEPHONE: (717) 267-9690
SYSTEM DATES DESIGN COMPLETED CONTRUCTION DATES FINAL COMPLIANCE YEAR FUNDING EST COST: 1,000.0
PREPARED/REVISED DATE START COMP REQUIRED DATE REQUIRED PROGRESS: PP
06/88 06/88 00/00 00/00 00/00 00/00 89 FISCAL YR COMPL:

	PRE 1985	1985	1986	1987	1988	1989	1990	1991	1992
BUDGETED:	0.0	0.0	0.0	0.0	0.0	1,000.0	0.0	0.0	0.0
FUNDED:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REVISED:						06/17/88			

NARRATIVE: UPGRADE DEACTIVATION FURNACE TO COMPLY WITH RCRA MONITORING AND PERFORMANCE STANDARDS, APE FUNDED.

PROJECT: LK-SW-23 NAME: HAZMN - TABLETOP SOLVENT DISTILLATION UNIT VARIOUS LOCATIONS:
MEDIA: SOLID WASTE POLLUTANT CATGY: HAZD PROJECT ASSESSMENT: H COMPLIANCE STATUS: ESOL
ACCOUNT: DERA PROJECT CONTACT: ROBERT G HOLT TELEPHONE: (717) 267-9690
SYSTEM DATES DESIGN COMPLETED CONTRUCTION DATES FINAL COMPLIANCE YEAR FUNDING EST COST: 7.0
PREPARED/REVISED DATE START COMP REQUIRED DATE REQUIRED PROGRESS: PP
06/88 06/88 00/00 00/00 00/00 00/00 88 FISCAL YR COMPL:

	PRE 1985	1985	1986	1987	1988	1989	1990	1991	1992
BUDGETED:	0.0	0.0	0.0	0.0	7.0	0.0	0.0	0.0	0.0
FUNDED:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REVISED:					06/17/88				

NARRATIVE: MINIMIZATION - TABLETOP SOLVENT DISTILLATION UNIT WOULD RECOVER SOLVENT FROM LIQUID DEGREASER, PAINT , OIL, AND PAINT STRIPPER WASTES. THIS PROJECT WO ULD REDUCE HW AND LOOW REUSE OF RECOVERED SOLVENT & OIL, CONSISTENT W/THE INTENT OF THE RCRA, PA SOL ID WASTE MGMT REGS, & THE DOD'S HAZMIN PGM. OPA FUNDS. B-350. ANNUAL SAVINGS - $13,385.

FACILITY: PA-213820503 DEPARTMENT OF ARMY MATL DEV & READINESS COM LETTERKENNY ARMY DEPOT
ADDRESS: ATTN: SDSLE-EN CHAMBERSBURG PA 172014150
PROJECT: A098L NAME: UPGRADE INDUSTRIAL WASTE TREATMENT PLANT VARIOUS LOCATIONS:
MEDIA: WATER POLLUTANT CATGY: PRET PROJECT ASSESSMENT: H COMPLIANCE STATUS: PSDF
ACCOUNT: MCA PROJECT CONTACT: ROBERT G. HOLT TELEPHONE: (717) 267-9690

SYSTEM DATES	DESIGN COMPLETED	CONTRUCTION DATES		FINAL COMPLIANCE	YEAR FUNDING	EST COST:	1,800.0
PREPARED/REVISED	DATE	START	COMP	REQUIRED DATE	REQUIRED	PROGRESS: DES	
07/83 08/87	09/89	10/88	04/91	07/88	89	FISCAL YR COMPL:	

	PRE 1985	1985	1986	1987	1988	1989	1990	1991	1992
BUDGETED:	0.0	0.0	0.0	0.0	0.0	1,800.0	0.0	0.0	0.0
FUNDED:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REVISED:					01/08/86	01/28/87	01/28/87		

NARRATIVE: PROJECT TO UPGRADE IWTP. CURRENTLY, PLANT IS OPERATING AT CAPACITY, AND OCCASIONALLY EXCEEDS EFFLUENT LIMITATIONS ESTABLISHED UNDER NPDES PERMIT NO. PA0010502. RENOVATION AND UPGRADE OF PLANT AND EQUIPMENT WILL ALLOW LEAD IWTP TO BE OPERATED WITHIN NPDES PERMIT OPERATING REQUIREMENTS.

PROJECT: A098M NAME: REVISE SPCC & ISCP PLANS VARIOUS LOCATIONS:
MEDIA: WATER POLLUTANT CATGY: SPCC PROJECT ASSESSMENT: H COMPLIANCE STATUS: ESDP
ACCOUNT: OMA PROJECT CONTACT: ROBERT G. HOLT TELEPHONE: (717) 267-9690

SYSTEM DATES	DESIGN COMPLETED	CONTRUCTION DATES		FINAL COMPLIANCE	YEAR FUNDING	EST COST:	180.0
PREPARED/REVISED	DATE	START	COMP	REQUIRED DATE	REQUIRED	PROGRESS: WRK	
02/84 12/87	09/89	01/87	04/87	00/00	88	FISCAL YR COMPL:	

	PRE 1985	1985	1986	1987	1988	1989	1990	1991	1992
BUDGETED:	40.0	40.0	40.0	40.0	40.0	40.0	0.0	40.0	0.0
FUNDED:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REVISED:				01/15/87	12/30/87	01/15/87		12/30/87	

NARRATIVE: LEAD SPILL PREVENTION CONTROL & COUNTERMEASURE PLAN (SPCC) & INSTALLATION SPILL CONTINGENCY PLAN (ISCP) ARE BOTH OVERDUE FOR REVISION. BOTH AR 200-1 & 40 CFR 112.5 REQUIRE REVISION AT 3 YR INTERVALS. LEAD SPCC PLAN IS DATED 7/79 & SHOULD HAVE BEEN REVIEWED & REVISED IN 1982. ISCP PLAN IS DATED 11/79 & WAS DUE FOR REVISION IN 1982.

PROJECT: LK-SW-14 NAME: INSTALL GROUND WATER MONITORING WELLS-AMMO VARIOUS LOCATIONS:
MEDIA: WATER POLLUTANT CATGY: GWAT PROJECT ASSESSMENT: H COMPLIANCE STATUS: ESDF
ACCOUNT: INDUSTRIAL FUND PROJECT CONTACT: ROBERT G. HOLT TELEPHONE: (717) 267-9690

SYSTEM DATES	DESIGN COMPLETED	CONTRUCTION DATES		FINAL COMPLIANCE	YEAR FUNDING	EST COST:	450.0
PREPARED/REVISED	DATE	START	COMP	REQUIRED DATE	REQUIRED	PROGRESS: PP	
12/87 12/87	03/88	11/88	08/89	00/00	89	FISCAL YR COMPL:	

	PRE 1985	1985	1986	1987	1988	1989	1990	1991	1992
BUDGETED:	0.0	0.0	0.0	0.0	0.0	450.0	200.0	150.0	100.0
FUNDED:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REVISED:						12/29/87	12/29/87	12/29/87	12/29/87

NARRATIVE: LETTERKENNY ARMY DEPOT HAS RECEIVED RCRA PART A INTERIM STATUS TO TREAT REACTIVE HAZARDOUS WASTE AT IT'S AMMUNITION BURNING AND DEMOLETION GROUNDS. THERE IS NO EXISTING RCRA GROUND WATER MONITORING WELLS INSTALLED AT THESE TREATMENT SITES. RCRA MONITORING WELLS SHOULD BE INSTALLED TO MONITOR THESE ACTIVE WASTE DISPOSAL SITES AND TO COMPLY WITH RCRA PART B FINAL PERMITTING REQUIREMENTS.

FACILITY: PA-213820503 DEPARTMENT OF ARMY MATL DEV & READINESS COM LETTERKENNY ARMY DEPOT
ADDRESS: ATTN: SDSLE-EN CHAMBERSBURG PA 172014150

PROJECT: LK-SW-15 NAME: REPLACEMENT OF IWTA WASTE COLLECTION LINES VARIOUS LOCATIONS:
MEDIA: WATER POLLUTANT CATGY: HAZD PROJECT ASSESSMENT: M COMPLIANCE STATUS: ESRO
ACCOUNT: MCA PROJECT CONTACT: ROBERT G. HOLT TELEPHONE: (717) 267-9690

SYSTEM DATES	DESIGN COMPLETED	CONTRUCTION DATES		FINAL COMPLIANCE	YEAR FUNDING	EST COST:	16,000.0
PREPARED/REVISED	DATE	START	COMP	REQUIRED DATE	REQUIRED	PROGRESS:	PP
12/87 12/87	06/90	04/91	12/91	00/00	89	FISCAL YR COMPL:	

	PRE 1985	1985	1986	1987	1988	1989	1990	1991	1992
BUDGETED:	0.0	0.0	0.0	0.0	0.0	500.0	15,000.0	250.0	250.0
FUNDED:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REVISED:						12/29/87	12/29/87	12/29/87	12/29/87

NARRATIVE: FIELD INVESTIGATIONS IN CONSTRUCTION WITH RCRA/CERCLA/SARA STUDIES INDICATE THAT LETTERKENNY ARMY DEPOT'S INDUSTRIAL WASTE COLLECTION LINES MAY BE LEAKING HAZARDOUS POLLUTANTS INTO THE DEPOT GROUND WATER. SOME OF THESE CONTAMINANTS MAY EVEN BE MIGRATING OFF-DEPOT. LEAD HAS VERY OLD INDUSTRIAL WASTE LINES AND THEY SHOULD BE EXAMINED AND REPLACED TO REDUCE THE POTENTIAL FOR HAZARDOUS WASTE TO ESCAPE FROM THESE LINES.

PROJECT: LK-W-7 NAME: HOOKUP BOILER ROOM DRAINS TO I.W. LINE VARIOUS LOCATIONS:
MEDIA: WATER POLLUTANT CATGY: HAZD PROJECT ASSESSMENT: M COMPLIANCE STATUS: ESDP
ACCOUNT: OMA PROJECT CONTACT: ROBERT G. HOLT TELEPHONE: (717) 267-5406

SYSTEM DATES	DESIGN COMPLETED	CONTRUCTION DATES		FINAL COMPLIANCE	YEAR FUNDING	EST COST:	200.0
PREPARED/REVISED	DATE	START	COMP	REQUIRED DATE	REQUIRED	PROGRESS:	PP
07/84 12/87	09/89	10/87	06/88	07/77	88	FISCAL YR COMPL:	

	PRE 1985	1985	1986	1987	1988	1989	1990	1991	1992
BUDGETED:	0.0	200.0	0.0	200.0	200.0	0.0	0.0	0.0	0.0
FUNDED:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REVISED:					01/15/87	12/30/87	12/30/87		

NARRATIVE: PROJECT TO CONNECT BOILER ROOM DRAINS TO IWTP DISTRIBUTION LINE. PA DER REQUIRES BOILER BLOWDOWN TO BE TREATED BEFORE DISCHARGE TO A RECEIVING STREAM TO REMOVE POLLUTANTS CAUSED BY SCALE PREVENTION TREATMENT OF BOILER WATER. SEE PL 92-500, 40CFR 122.21, TABLE IV.

DESCOM Control No.:LE0008 Printout As Of: Tue Nov 15 1988

08/15/88 RCS DD-M(SA) 1383 REPORT EXHIBIT 2 ACTIVE

US ARMY MATERIEL COMMAND MEDIA: SOLID WASTE (RCRA) ACCOUNT: DERA

FACILITY: PA-2138-20503 LETTERKENNY ARMY DEPOT CITY: CHAMBERSBURG STATE: PA
MAILING ADDRESS: SDSLE-EN ZIP: 17201-4150

PROJECT NUMBER: LK-SW-12 PROJECT NAME: CLOSURE LEAD IWTP LAGOONS IAW RCRA VARIOUS LOCATIONS: N

POLLUTANT CATEGORY: GWAT PROJECT ASSESSMENT: HIGH COMPLIANCE STATUS: ESI

PROJECT CONTACT: ROBERT G. HOLT TELEPHONE: 717-267-9690 EST COST: 33

DEIGN COMPLETED DATE	CONSTRUCTION DATES START	CONSTRUCTION DATES COMP	FINAL COMPLIANCE REQUIRED DATE	YEAR FUNDING REQUIRED	FISCAL YEAR COMPLETED	STATUS: CON
388	1188	1190	1189	89		

		PRE 1987	1987	1988	1989	1990	1991	1992	1993	1994	199
DERA	BUDGETED:	.0	2550.0	2140.0	130.0	100.0	100.0	.0	.0	.0	
	FUNDED:	.0	2500.0	2140.0	.0	.0	.0	.0	.0	.0	

NARRATIVE: PHYSICAL INSPECTION OF IWTP STORAGE LAGOONS REVEALED THAT ONE AND POSSIBLY BOTH HAVE SERIO US STRUCTURAL CRACKS CONSEQUENTLY, LEAD HAS DETERMINED THE BEST COURSE OF ACTION IS TO INS TALL SLUDGE FILTER PRESSES AND DRYERS AS BAT FOR HANDFLING SLUDGE. BECAUSE LAGOONS ARE RCR A REGULATED, A CLOSURE PLAN MUST BE PREPARED AND SUBMITTED TO REGULATORY AGENCIES UFON FIN AL APPROVAL, LEAD WILL CLOSE IWIP LAGOON IAW REQUIREMENTS OF RCRA. IRP SITE# LEAD-002

DESCOM Control No.:LE0009 Printout As Of: Tue Nov 15 1988

08/15/88 RCS DD-M(SA) 1383 REPORT EXHIBIT 2 ACTIVE

US ARMY MATERIEL COMMAND MEDIA: CERCLA ACCOUNT: DERA

FACILITY: PA-2138-20503 LETTERKENNY ARMY DEPOT CITY: CHAMBERSBURG STATE: PA
MAILING ADDRESS: SDSLE-EN ZIP: 17201-4150

PROJECT NUMBER: LK-W-11 PROJECT NAME: LEAD INSTALLATION RESTORATION PROGRAM VARIOUS LOCATIONS: N

POLLUTANT CATEGORY: GWAT PROJECT ASSESSMENT: HIGH COMPLIANCE STATUS: PSC

PROJECT CONTACT: ROBERT G. HOLT TELEPHONE: 717-267-9690 EST COST: 4300

DEIGN COMPLETED DATE	CONSTRUCTION DATES START	CONSTRUCTION DATES COMP	FINAL COMPLIANCE REQUIRED DATE	YEAR FUNDING REQUIRED	FISCAL YEAR COMPLETED	STATUS: DES
1088	1088	689		89		

		PRE 1987	1987	1988	1989	1990	1991	1992	1993	1994	19
DERA	BUDGETED:	3957.7	2900.0	1200.0	3000.0	5000.0	6500.0	5000.0	5000.0	5000.0	
	FUNDED:	1833.0	2900.0	1200.0	3369.0	.0	.0	.0	.0	.0	

NARRATIVE: LEAD HAS SIGNIFICANT AMOUNTS OF GW CONTAM RESULTING FROM PAST DISPOSAL PRACTICES OF TOXIC SUB. AS RESULT, USATHAIS CONDUCTING EXTENSIVE RI & FEASIBILITY STUDIES TO DETERMINE THE E XTENT OF CONTAM AND CONTAMINANTS. ONCE THE SOURSCES AND EXTENT OF CONTAM IS KNOWN, CORREC TIVE REMEDIAL ACTIONS WILL BE PROPOSED & IMPL. IRP SITE #LEAD-001&003. LEAD PLNS TO INSTL 4 GW PUMP & TREATMT SYS AT IW TREAT PLANT. THE TREATMT SYS WILL PUMP EST 50-100 GAL PER MI

DESCOM Control No.:LE0013 Printout As Of: Tue Nov 15 1988

08/15/88 RCS DD-M(SA) 1383 REPORT EXHIBIT 2 ACTIVE

US ARMY MATERIEL COMMAND MEDIA: SOLID WASTE (RCRA) ACCOUNT: INDUSTRIAL FUND

FACILITY: PA-2138-20503 LETTERKENNY ARMY DEPOT CITY: CHAMBERSBURG STATE: PA
MAILING ADDRESS: SDSLE-EN ZIP: 17201-4150

PROJECT NUMBER: LK-SW-15 PROJECT NAME: REPLACEMENT OF IWTP-WASTE COLLECTION LINES VARIOUS LOCATIONS: N

POLLUTANT CATEGORY: HAZD PROJECT ASSESSMENT: HIGH COMPLIANCE STATUS: ESDF

PROJECT CONTACT: ROBERT G. HOLT TELEPHONE: 717-267-9690 EST COST: 16000.0

DEIGN COMPLETED DATE	CONSTRUCTION DATES START	CONSTRUCTION DATES COMP	FINAL COMPLIANCE REQUIRED DATE	YEAR FUNDING REQUIRED	FISCAL YEAR COMPLETED	STATUS: FP
690	491	1291	92	89	92	

		PRE 1987	1987	1988	1989	1990	1991	1992	1993	1994	1995
INDUSTRIAL FUND	BUDGETED:	.0	.0	.0	.0	500.0	250.0	15250.0	.0	.0	.0
	FUNDED:	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

NARRATIVE: FIELD INVESTIGATIONS IN CONJUNCTION WITH RCRA/CERCLA/SARA STUDIES INDICATE THAT LETTERKENN Y ARMY DEPOT'S INDUSTRIAL WASTE COLLECTION LINES MAY BE LEAKING HAZARDOUS POLLUTANTS INTO THE DEPOT GROUND WATER. SOME OF THESE CONTAMINANTS MAY EVEN BE MIGRATING OFF-DEPOT. LEAD H AS VERY OLD INDUSTRIAL WASTE LINES AND THEY SHOULD BE EXAMINED AND REPLACED TO REDUCE THE POTENTIAL FOR HAZARDOUS WASTE TO ESCAPE FROM THESE LINES.

Attachment 6
Reimbursement of PADER Technical Assistance/Other Costs

1. The Army agrees to reimburse PADER for PADER's costs related to services provided to the Army and reasonable oversight costs incurred by PADER as described in Paragraph 2 of this Attachment, under its statutory authority including Section 2701(d) of DERP, 10 U.S.C. Section 2701(d) and CERCLA.

2. Services and oversight work which the Army agrees that PADER shall be reimbursed under this Attachment include the following types of work:

a. Support and assistance to the Army in the conduct of public participation activities in accordance with Federal and State requirements for public involvement.

b. Participation in the review and comment functions of the Army's Technical Review Committee.

c. Any other services specified in the Agreement, or as agreed to between the Army and PADER.

d. Field inspections, monitoring and oversight to ensure activities are implemented in accordance with the Agreement.

e. Review and oversight of the Army's identification, investigation and cleanup of any contamination possibly resulting from the release of hazardous substances or wastes at the Site.

f. Work performed by or on behalf of PADER pursuant to Section XVII (Project Managers).

g. Timely technical review and substantive comment on reports, studies or other submittals which the Army prepares and submits to PADER under the Agreement.

h. Identification and explanation of state requirements for the Army's implementation of the Agreement including state applicable or relevant and appropriate requirements ("ARARs").

3. Beginning April 1, 1989, PADER will provide a written itemization of costs related to implementation of the Agreement, and thereafter within 30 days after the end of each quarter of each Federal Fiscal Year.

4. The Army agrees to pay the costs itemized by PADER within 30 days of receipt of such itemization, subject to paragraph 9, provided that:

a. the costs are reasonable;

b. the costs are allocable to the Agreement; and

c. the costs are not violative of Federal or State statutes or regulations.

5. Payments shall be made payable to the "Hazardous Sites Cleanup Fund," shall designate the purpose of the payment as "Letterkenny Army Depot Oversight," and shall be sent to the PADER representative identified in Section XVII of the Agreement. PADER's acceptance of any payment hereunder shall not be construed as a waiver of PADER's rights to demand or seek relief to recover the entire amount due under the Agreement or otherwise.

6. The Army agrees to include as part of its annual request for authorization and appropriations Seventy Five-Thousand Dollars ($75,000) for the year FY 1990, for the purpose of funding the Army's obligations in Section XXXX. The Army agrees to advise PADER of the status of available funds within ten (10) days after the President signs the Appropriations bill and final program allocations are made by the Army. The Army has received authorization and appropriations of Seventy Five-Thousand Dolllars ($75,000) for FY 1989 to fund PADER's work as provided herein.

7. PADER shall maintain adequate accounting records sufficient to identify all costs related to the Agreement. PADER agrees to maintain these financial records for a period of 3 years from the termination date of the Agreement as specified in Section XXXVII of the Agreement. PADER agrees to provide the Army or its designated representative reasonable access to all financial records for the purpose of audit for a period of 3 years from the termination date of the Agreement as specified in Section XXXVII of the Agreement.

8. PADER agrees to provide the Army with funding projections to assist the Army in its requests for authorization and appropriation, as follows:

a. Within 90 days after finalization of deadlines as provided in Section XXIX of the Agreement, PADER will provide the Army with cost estimates for work to be performed by PADER as provided herein.

b. PADER will be responsible for submitting updated cost estimates on December 31 and June 30 of each year for FY 1989 - FY 1990. The Army will provide PADER with 30 days written notification of its need for the latest projected expenses as required for the Army's submission of the "1383 Funding Report."

9. In the event that the Army disputes any costs demanded by PADER, the Army shall submit a written statement of dispute to PADER within 30 days after receipt of such demand by PADER. Such statement of dispute shall specify the cost elements

under dispute, and the specific grounds for contesting the demand. PADER's demand shall not be subject to dispute by the Army if such statement of dispute is not submitted by the Army within the required time period. Dispute resolution shall proceed as follows:

a. The LEAD Project Manager and the PADER Project Manager shall be the primary points of contact to coordinate resolution of disputes.

b. If LEAD's Project Manager and PADER's Project Manager are unable to agree within 20 days of the Army's submission of a statement of dispute, the matter shall be referred to the installation commander or his designated representative, and the Regional Solid Waste Management of PADER, as soon as practicable, but in any event, within five (5) working days after the 20 day period.

c. The installation commander and the Regional Solid Waste Manager shall have 20 days to resolve the dispute. In the event that the dispute is not totally resolved within that time, PADER reserves all of its legal and equitable remedies to recover its costs.

Attachment 3

Solid Waste Management Unit List

1.	Acid Burning Pit Area	(LEAD-54)
2.	Ammunition Box Piles	(LEAD-60)
3.	Residue Burial Site	(LEAD-57)
4.	Open Burning Ground-1	(LEAD-56)
5.	Transformer Pad (where ?)	(SIA) ←
6.	Open Burning Ground-2	(LEAD-58)
7.	Burning Site/Neutralization Pit	(LEAD-59)
8.	Demolition Ground-1	(LEAD-62)
9.	Residue Drum Storage Area	(Ammo Area)
10.	Demolition Ground-2	(LEAD-55)
11.	Waste Oil Drum Stor. Autocraft Shop	(LEAD-44)
12.	Classified Paper Incinerator	(SIA) ←
13.	Waste Storage Pavillion	(LEAD-63)
14.	Building 3700	(LEAD-71) ←
15.	Lead Pig Storage Area	(SIA) ←
16.	Ore Pile Locations (K area)	(DA) ←

which ku still need looked at.

111-81

File
IN Solid WASTE
MANAGEMENT UNIT
file

3NW26

SWMU Study

ROUTING AND TRANSMITTAL SLIP Date 16 April 87

TO: (Name, office symbol, room number, building, Agency/Post)	Initials	Date
1. CDR, AMC (AMCSG) (AMCEN-A)		
2. CDR, DESCOM (AMSDS-T)		
3. CDR, LEAD (SDSLE-ESN)		
4. CDR, USATHAMA (AMXTH-TE)		
5.		

Action		File		Note and Return	
Approval		For Clearance		Per Conversation	
As Requested	X	For Correction		Prepare Reply	
Circulate		For Your Information		See Me	
Comment		Investigate		Signature	
Coordination		Justify			

REMARKS

1. Draft copy of report on solid waste management units at Letterkenny Army Depot is enclosed for your review. If any information is inaccurate, please provide corrections.

2, Please note that the figures in the final draft will be of higher quality.

3. Request that you reply NLT 15 May 1987 to CPT Todd Brown, AV 584-2024.

943-8881
ENVIRONMENTAL

DO NOT use this form as a RECORD of approvals, concurrences, disposals, clearances, and similar actions

FROM: (Name, org. symbol, Agency/Post)	Room No.—Bldg.
John W. Bauer USAEHA, ATTN: HSHB-ME-SG, APG, MD	Phone No. AV 584-2024

5041-102

OPTIONAL FORM 41 (Rev. 7-76)
Prescribed by GSA
FPMR (41 CFR) 101-11.206

☆ GPO : 1981 O - 361-529 (134)

HSHB-ME-SG

SUBJECT: Ground-Water Contamination Survey No. 38-26-0846-87, Evaluation of Solid Waste Management Units, Letterkenny Army Depot, Chambersburg, Pennsylvania, 9-13 February 1987

Commander
US Army Materiel Command
ATTN: AMCSG
5001 Eisenhower Avenue Alexandria, VA 22333-0001

EXECUTIVE SUMMARY

The purpose and recommendations of the enclosed report follow:

a. Purpose. The purpose of this survey was to identify all Solid Waste Management Units (SWMUs) at Letterkenny Army Depot (LEAD) and to review the adequacy of data which have been submitted on these as part of a pending Resource Conservation and Recovery Act Part B permit application under Section 3004(u) of the Hazardous and Solid Waste Ammendments of 1984.

b. Recommendation. To ensure regulatory compliance with Title 40, CFR, Part 264.101, and following the guidance of proposed Title 40, CFR, Part 270.14, the following recommendations are made.

(1) Prepare and submit soil sampling plans for SWMU's numbered LEAD-54, 58, 59, and 60.

(2) Prepare and submit a ground-water sampling plan for the Residue Burial Site (LEAD-57).

(3) Conduct a RCRA Facility Investigation at Open Burning Ground 1 (LEAD-56).

(4) Obtain and submit information (specified in Table 2) for inclusion in the final draft of this report.

FOR THE COMMANDER:

3 Encl

KARL J. DAUBEL
Colonel, MS
Director, Environmental Quality

CF:
HQDA (DASG-PSP) (w/out encl)
Cdr, DESCOM (AMSDS-T) (w/encl)
Cdr, LEAD (SDSLE-ESN) (2 cy) (w/encl)
Cdr, WRAMC, (PVNTMED Svc) (w/encl)
Cdr, MEDDAC, Ft. Meade (PVNTMED Svc) (2 cy) (w/encl)
Cdr, USATHAMA (AMXTH-TE) (w/encl)
Cdr, USAEHA Fld Spt Actv, Ft Meade (w/encl)

DRAFT

GROUND-WATER CONTAMINATION SURVEY
No. 38-26-0846-87
EVALUATION OF SOLID WASTE MANAGEMENT UNITS
LETTERKENNY ARMY DEPOT, CHAMBERSBURG, PENNSYLVANIA
9-13 February 1987

1. AUTHORITY. Letter, AMC, AMCEN-A, 13 November 1986, subject: Request for Technical Support, Evaluation of Solid Waste Management Units at U.S. Army Materiel Command (AMC) Installations.

2. REFERENCES. A list of references is provided in Appendix A.

3. PURPOSE. The purpose of this survey was to identify all Solid Waste Management Units (SWMUs) at Letterkenny Army Depot (LEAD) and to review the adequacy of data which have been submitted on these as part of a pending Resource Conservation and Recovery Act Part B permit application under Section 3004(u) of the Hazardous and Solid Waste Ammendments of 1984.

4. GENERAL.

a. Personnel Contacted.

(1) Mr. Robert Holt, Chief, Environmental and Natural Resources Branch, LEAD.

(2) Mr. Robert Kichline, Environmental Scientist, LEAD.

b. Background.

(1) Title 40, Code of Federal Regulations (CFR), Part 264.101 (a), requires that the owner or operator of a facility seeking a RCRA permit must institute corrective action as necessary to protect human health and the environment for all releases of hazardous wastes or hazardous constituents from any SWMU at the facility, regardless of the time at which waste was placed in the unit.

(2) Each of the SWMUs at LEAD must be identified and evaluated to determine if a hazardous constituent release has occurred, before a permit can be issued. Corrective action issues for any SWMU which has had a release to the environment will be addressed in the permit. This Agency has been requested to assist LEAD in identifying and evaluating all SWMU's on the installation.

5. FINDINGS AND DISCUSSION.

a. Geology. The installation is divided into five surface and ground-water drainage areas. They are illustrated in Figure 1. The bedrock geology at the installation is characterized by folded and faulted formations of limestone and shales. A more detailed discussion of the geology may be found in Appendix A, reference 16.

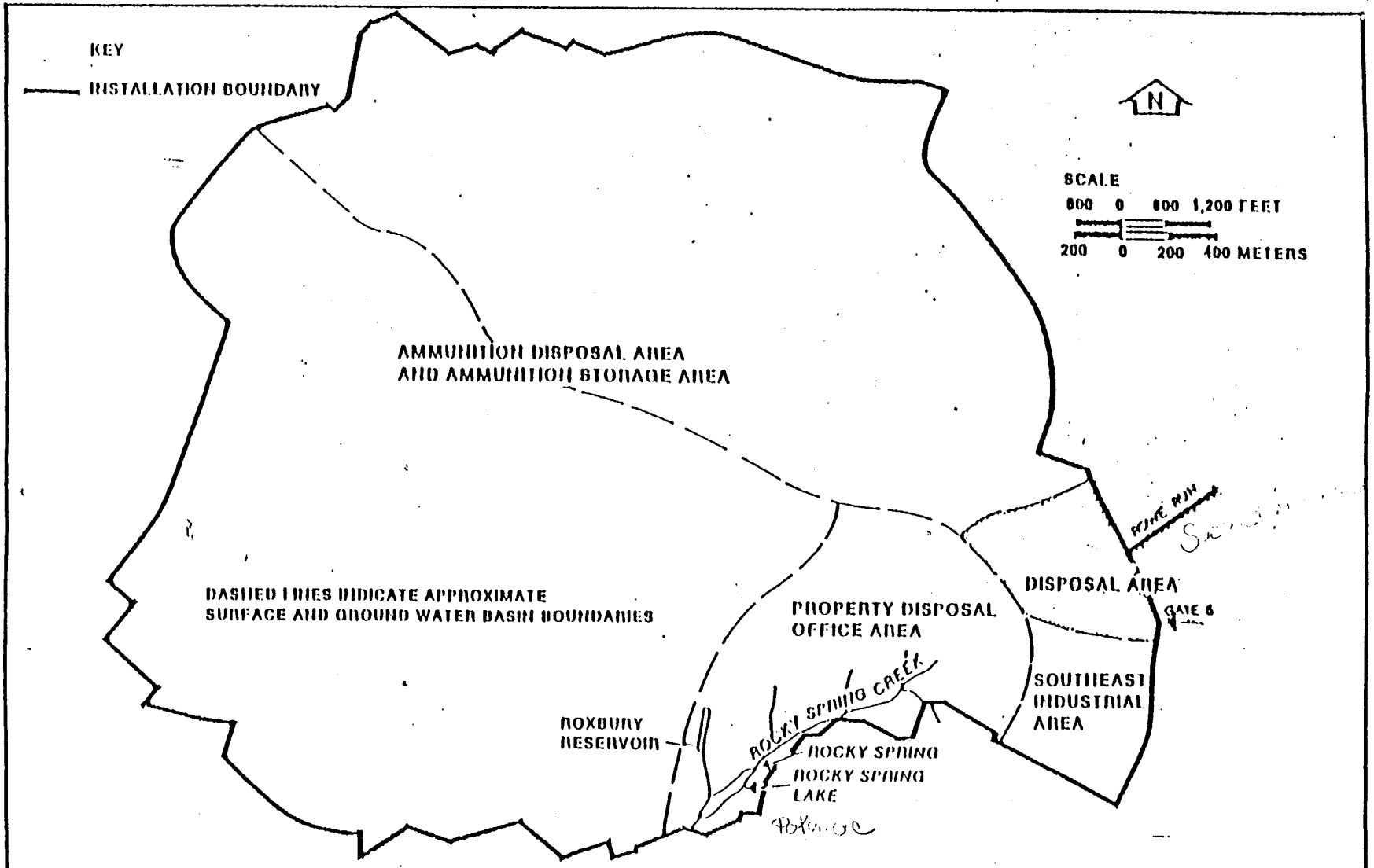


Figure 1
LETTERKENNY ARMY DEPOT DRAINAGE AREAS

b. SWMUs. LEAD originally submitted a list of 59 SWMUs to EPA Region 3 (Appendix A, references 1-3). This list was reviewed, and the sites were visited during this survey. It was determined that 9 of the units (Appendix B) did not meet the definition of a SWMU. Other units meeting the SWMU definition were also identified that had not previously been included on the SWMU submission. These have been included and the previously identified units have been renumbered. A total of 62 SWMUs have been listed in Table 1 and are shown on Figure 2.

c. Existing Ground-water Contamination. Previous environmental surveys at LEAD have documented ground-water contamination with offpost migration potential. The contaminants of concern are chlorinated volatile hydrocarbons and they exist in three of the drainage areas: the Property Disposal Office Area (PDOA), the Southeast Industrial Area (SIA), and the Disposa Area (DA). The U.S. Army Toxic and Hazardous Materials Agency (USATHAMA) has contracted for Remedial Investigations and Feasibility Studies (RI/FS) for these areas.

d. Ongoing RI/FS Work. Fifty-three of the SWMUs identified are located within the drainage areas where ground-water contamination exists. The ongoing RI/FSs are considering all of these SWMUs as potential contamination sources. Therefore, no further work, beyond that in progress, should be required at these units to satisfy the RFA or RFI requirements of Section 3004(u) of RCRA. The SWMUs that are located in these areas are as follows: LEAD-1 through LEAD-13 in the SIA; LEAD-14 through LEAD-30 in the DA; and LEAD-31 through LEAD-52 in the PDO area. The water treatment plant (LEAD-53) is located between the SIA and the PDO areas. It discharges part of its waste to each area. Site specific information on each of these SWMUs is included in appendix C.

e. SWMUs Located Outside RI/FS Study Areas. Nine units are located in the ammunition disposal area drainage system and have not been considered in ongoing RI/FS work. Table 2 summarizes the work needed for each of these SWMUs. Five of the units within this area will require more sampling as part of the RFA to determine if a release has occurred. One unit has had a significant release of explosive constituents and will require an RFI to determine the potential impact of that release. Site specific information on all of the SWMUs located within the ammunition area is included in appendix D. This information includes recommendations for future work.

f. Information Requirements. Installation personnel have been asked to gather additional information on some of the SWMUs. Table 3 lists the units and the type of information required.

6. CONCLUSIONS.

a. No further work beyond the RI/FS efforts in progress is required to satisfy RFA requirements at any of the SWMUs located in the PDOA, SIA, or DA (LEAD-1 through LEAD-53).

TABLE 1: SOLID WASTE MANAGEMENT UNITS AT LETTERKENNY ARMY DEPOT

UNIT NUMBER	UNIT NAME	UNIT NUMBER	UNIT NAME
LEAD-1	Building 424	LEAD-32	Revetments @ DRMO
LEAD-2	Building 435	LEAD-33	Building 675
LEAD-3	Building 37	LEAD-34	Bulk Liquid Waste Storage
LEAD-4	Building 57	LEAD-35	Drummed Non-liq. HW Stor.
LEAD-5	Building 42	LEAD-36	Blast Dust Piles
LEAD-6	Building 51	LEAD-37	Sanitary Landfill 3
LEAD-7	Storm Water Discharge	LEAD-38	Combat Vehicle Test Track
LEAD-8	Building 228	LEAD-39	Landfill 6
LEAD-9	Building 12	LEAD-40	Trash Burning/Transfer Pit
LEAD-10	Building 13	LEAD-41	Storage Site No. 2
LEAD-11	Building 14	LEAD-42	Former Fire Training Pit
LEAD-12	Building 1	LEAD-43	Current Fire Training Pit
LEAD-13	Building 4	LEAD-44	Building 3238, Auto Crafts
LEAD-14	Building 349	LEAD-45	Radioactive Waste Storage
LEAD-15	Building 350	LEAD-46	Sludge Spreading Area 1
LEAD-16	Building 351	LEAD-47	Building 2357, Laundry
LEAD-17	Building 320	LEAD-48	Washout Plant
LEAD-18	Building 370	LEAD-49	Sludge Spreading Area 2
LEAD-19	IWTP, Building 360	LEAD-50	Sewage Treatment Plant
LEAD-20	Industrial Waste Ditch	LEAD-51	Bldg 2325, Pest Control
LEAD-21	Sediment Burial Site	LEAD-52	Deactivation Furnace
LEAD-22	Oil Burning Pit	LEAD-53	Water Treatment Plant
LEAD-23	Burn Pit	LEAD-54	Acid Burning Pit
LEAD-24	Lagoon	LEAD-55	Demolition Ground 2—
LEAD-25	Partially Revetted Area	LEAD-56	Open Burning Ground 1—
LEAD-26	Storage Site No. 1	LEAD-57	Residue Burial Site —
LEAD-27	Sanitary Landfill 4	LEAD-58	Open Burning Ground 2—
LEAD-28	Sanitary Landfill 5	LEAD-59	Burning Site/Neut. Pit
LEAD-29	Sanitary Landfill 1	LEAD-60	Ammunition Box Piles
LEAD-30	Sanitary Landfill 2	LEAD-61	Package STP
LEAD-31	DRMO Storage	LEAD-62	Demolition Ground 1

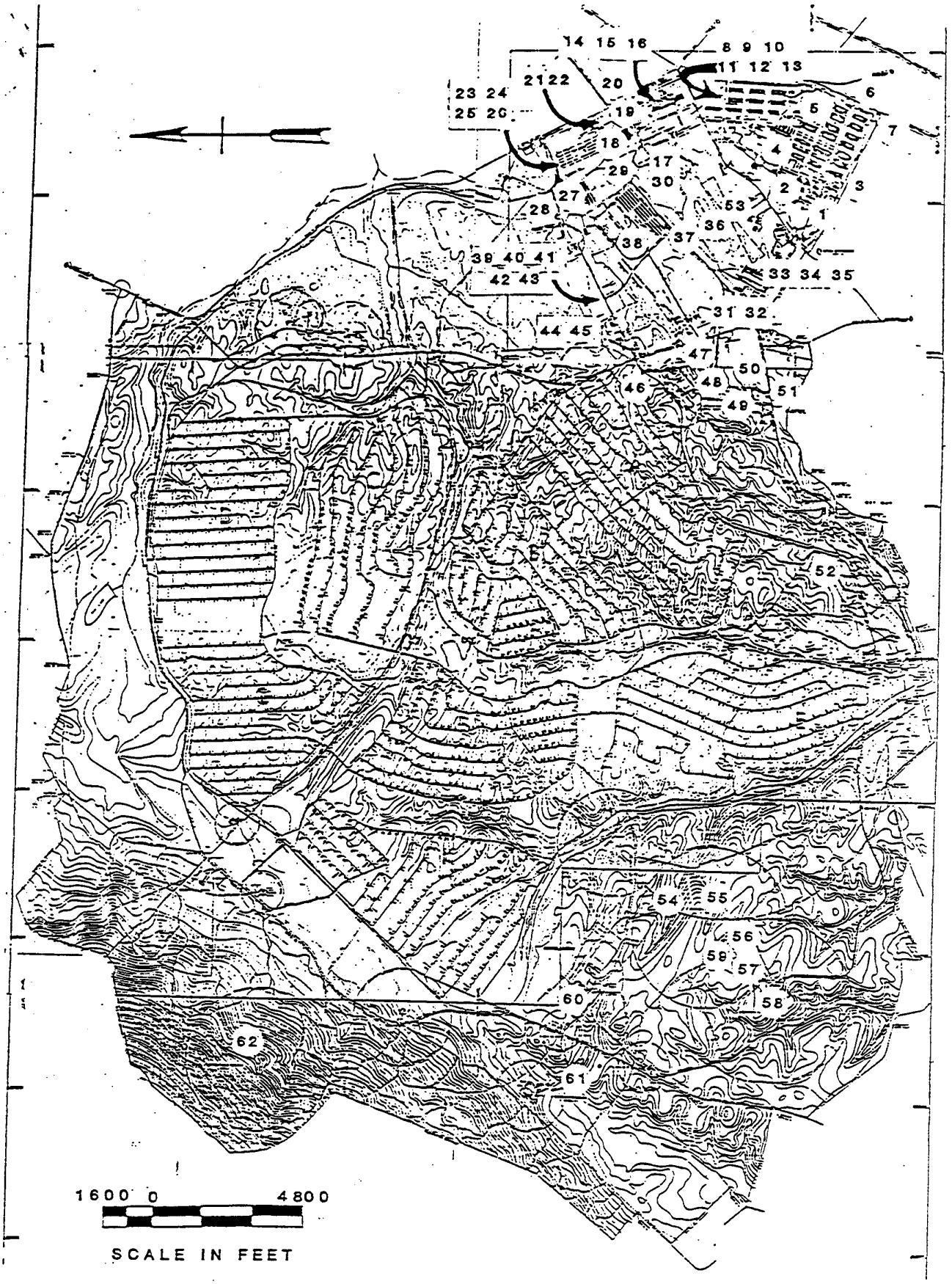


FIGURE 2: LOCATIONS OF SWMUs AT LETTERKENNY ARMY DEPOT

TABLE 2: SWMUs LOCATED IN THE AMMUNITION AREA AND RECOMMENDED ACTIONS

UNIT NUMBER	UNIT NAME	SIGNIFICANT RELEASE RFI REQUIRED	RELEASE UNKNOWN SAMPLING UNDER RFA REQUIRED	NO RELEASE NO ACTION REQUIRED
LEAD-54	Acid Burning (Neutralization) Pits		Soil samples from the bottom of the pit should be analyzed for heavy metals, explosives, and an organic screen.	
LEAD-55	Demo Ground 2			Very few of the samples taken contained contaminants and those that did were at low levels.
LEAD-56	Open Burning Ground 1	Ground-water monitoring should be done to determine if explosives contamination found in the soils has leached into the ground-water.		
LEAD-57	Residue Burial Site		Ground water around this site should be monitored for heavy metals and explosives.	
LEAD-58	Open Burning Ground 2		Soil samples from inside the burn cages and around the chambers should be analyzed for heavy metals, explosives, dioxin, and PCP.	
LEAD-59	Burning Site/ Neutralization Pit		Soil samples from the bottom of the pit and from the fenced in area should be analyzed for heavy metals, explosives, and an organic screen.	
LEAD-60	Ammunition Box Piles near Building 3700		Composite soil samples from under the piles should be analyzed for pentachlorophenol.	
LEAD-61	Package Sewage Treatment Plant			No evidence of releases at the plant. Treatment of domestic sewage makes release of hazardous constituents unlikely.
LEAD-62	Demolition Ground 1			Activities at this area were similar to but less frequent than those at Demolition Ground 2. Since only low levels of contamination were found there, then very low levels could be expected at this unit.

TABLE 3: INFORMATION TO BE GATHERED BY THE INSTALLATION

UNIT NUMBER	UNIT NAME	INFORMATION REQUIREMENT
LEAD-8	Building 228 Battery Shop	When did they stop using this building as a battery shop? 1978 Has the sump been cleaned out? YES
LEAD-6	Building 51	When was this building taken out of use?
LEAD-61	Package STP	Where do waste solids go?

VERIFY DATA PROVIDED

NEED RESPONSE

ANSWERED

b. No evidence of significant contamination exists or is expected at the SWMUs numbered LEAD-55, 61, or 62.

c. Further sampling is required to determine if a hazardous constituent release has occurred at the SWMUs numbered LEAD-54, 57, 58, 59, and 60.

d. An RFI is required at the Open Burning Ground 1 (LEAD-56).

7. RECOMMENDATIONS: To ensure regulatory compliance with Title 40, CFR, Part 264.101, and following the guidance of proposed Title 40, CFR, Part 270.14, the following recommendations are made.

a. Prepare and submit soil sampling plans for SWMU's numbered LEAD-54, 58, 59, and 60.

b. Prepare and submit a ground-water sampling plan for the Residue Burial Site (LEAD-57).

c. Conduct an RFI at Open Burning Ground 1 (LEAD-56).

d. Obtain and submit information (specified in Table 2) for inclusion in the final draft of this report.

8. TECHNICAL ASSISTANCE: Questions concerning this survey may be referred to CPT Todd Brown or Mr. John Bauer, this Agency, AUTOVON 584-2024 or commercial (301) 671-2024.

9. Additional copies of this report are furnished for mailing to HQDA (DAEN-ZCF-U/DAEN-ZCE), and Comdt, Academy of Health Sciences, US Army (HSHA-IPM).

TODD M. BROWN
CPT, MS
Sanitary Engineer

APPROVED:

FREDERICK W. BOECHER
LTC, MS
Chief, Waste Disposal Engineering Division

APPENDIX A
REFERENCES

1. Report, Letterkenny Army Depot, undated, Solid and Hazardous Waste Management Units, Listing of Materials Submitted to U.S. EPA in Response to the Notice of Violation.

2. Report, Letterkenny Army Depot, undated, Solid and Hazardous Waste Management Units, Site Specific List and Description of Hazardous Waste Management Sites.

3. Report, Letterkenny Army Depot, undated, Solid and Hazardous Waste Management Units, List and Description of Notices of Violation Issued by State and EPA.

4. Report, U.S. Army Toxic and Hazardous Materials Agency, January, 1980, Installation Assessment of Letterkenny Army Depot, Report No. 161.

5. Letter, this Agency, HSE-EW-A/WP, undated, subject: Water Quality Biological Consultation No. 32-24-0214-80, Fish-Kill-Fish-Restocking, Letterkenny Army Depot, Chambersburg, PA, 11-13 December 1979.

6. Letter, this Agency, HSE-ES, 19 February 1982, subject: Results of Analysis.

7. Letter, this Agency, HSHB-ES-T, 14 April 1982, subject: Results of Analysis.

8. Letter, this Agency, HSHB-ES-E, 18 April 1983, subject: Results of Analysis.

9. Letter, this Agency, HSE-ES/WP, 26 February 1982, subject: Hazardous Waste Management Consultation No. 39-26-0155-82, Letterkenny Army Depot, Chambersburg, PA, 19-22 July 1981.

10. Letter, this Agency, HSHB-ES/WP, 19 May 1982, subject: Hazardous Waste Management Evaluation No. 37-26-0171-82, Letterkenny Army Depot, Chambersburg, PA 5-14 October 1981.

11. Letter, this Agency, HSHB-ES-T/WP, 17 September 1982, subject: Hazardous Waste Management Consultation No. 39-26-0211-82, Letterkenny Army Depot, Chambersburg, PA, 26-27 April 1982.

12. Letter, this Agency, HSHB-ES-H/WP, 17 May 1985, subject: Hazardous Waste Management Consultation No. 37-26-0565-85, Letterkenny Army Depot, Chambersburg, Pennsylvania, 25-28 February 1985.

13. Letter, this Agency, HSHB-ES-H/WP, 6 September 1983, subject: Phase 2, Hazardous Waste Management Special Study No. 39-26-0147-83, DARCOM Open-Burning/Open-Detonation Grounds Evaluation, Letterkenny Army Depot, Chambersburg, Pennsylvania, 2 - 13 May 1982.

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15. Battelle, Pacific Northwest Laboratories, Project Management Division, Office of Hazardous Waste Management. 1983. Environmental Contamination Survey of Letterkenny Army Depot: Property Disposal Office Drainage System. Prepared for Letterkenny Army Depot, Chambersburg, PA and the U.S. Army Toxic and Hazardous materials Agency, Aberdeen Proving Ground, MD.

16. Battelle, Pacific Northwest Laboratories, Project Management Division, Office of Hazardous Waste Management. 1983. Environmental Contamination Survey of Letterkenny Army Depot: Exploratory and Confirmatory Phases. Prepared for Letterkenny Army Depot, Chambersburg, PA and the U.S. Army Toxic and Hazardous materials Agency, Aberdeen Proving Ground, MD.

17. Environmental Science and Engineering, Inc. June 1986, Remedial Investigation/Feasibility Study at Letterkenny Army Depot Draft Technical Plan A005. Prepared for the U.S. Army Toxic and Hazardous materials Agency, Aberdeen Proving Ground, MD.

18. Letter, USATHAMA, AMXTH-IR-R, 17 October 1986, subject: Southeast Industrial Area (SIA) Remedial Investigation (RI).

19. Environmental Science and Engineering, Inc. August 1986, Remedial Investigation of the Disposal Area at Letterkenny Army Depot, Final Report A00A. Prepared for the U.S. Army Toxic and Hazardous materials Agency, Aberdeen Proving Ground, MD.

20. Letter, this Agency, HSHB-ES-G, 6 October 1986, subject: Final Report, Ground-water Consultation No. 38-26-0927-87, Letterkenny Army Depot, Chambersburg, Pennsylvania, 28-29 October 1985, 22-23 January 1986, and 15-16 April 1986.

APPENDIX B
UNITS PREVIOUSLY IDENTIFIED AS SWMUs
THAT ARE BEING REMOVED FROM THE SWMU LIST

The units listed in this appendix were originally identified as SWMUs but for the indicated reason, are being eliminated from the SWMU list for Letterkenny Army Depot.

UNIT NAME: Projectile Range

REASON FOR ELIMINATION: The Army and HQ, EPA have agreed that ranges will not be considered SWMUs. They do not contain solid waste.

UNIT NAME: CS Test Site

REASON FOR ELIMINATION: This area was used to test CS grenades. This type of testing is not a waste management operation and therefore this area is not a SWMU.

REFERENCE: (Appendix A) 4

UNIT NAME: Area K, Special Weapons Storage

REASON FOR ELIMINATION: This area was used to store special weapons from 1958-1966. They were transported off post in 1966. They were not waste and therefore the area is not a SWMU.

REFERENCE: (Appendix A) 1

UNIT NAME: Building 11, Electron tube storage

REASON FOR ELIMINATION: Electron tubes known to contain radioactive material were stored in this building. These tubes were not wastes. The building should not be considered a SWMU.

REFERENCE: (Appendix A) 1

UNIT NAME: Tank 811

REASON FOR ELIMINATION: Reportedly, radiological items were stored in this tank in the past. Currently, the tank is used to store DS2 (a decontamination agent). Neither the radiological items nor the DS2 were wastes and therefore the tank should not be a SWMU.

UNIT NAME: Dock 45, Malathion Spill

REASON FOR ELIMINATION: A spill of Malathion estimated to be less than 55 gallons occurred on 1 March 1979. This spill area does not meet the definition of a SWMU. The storage sheds at Dock 45 were being used for material storage at the time of the site visit. No wastes were observed.

REFERENCE: (Appendix A) 3

UNIT NAME: Rocky Spring Lake

REASON FOR ELIMINATION: This lake does not contain or receive waste and therefore is not a SWMU.

JNIT NAME: Building 3700

REASON FOR ELIMINATION: Components of missile fuel (UDMH, IRFNA, aniline, and furfural alcohol) were analyzed in the laboratory in building 3700 during missile draining operations. Wastes were taken to the acid burning pits (Unit LEAD-54 or LEAD-59). Wastes were not managed at this building and therefore it should not be a SWMU.

UNIT NAME: Building 431, Calibration Laboratory

REASON FOR ELIMINATION: Mercury barometer tubes were purged and the waste mercury was shipped to Redstone Arsenal for reuse or resale. Standard calibration sources consisting of Co-60, Sr-90, and Cs-137 have been stored here. Personnel working in this building were interviewed during the site visit. It did not appear that any wastes were generated. This building does not meet the definition of a SWMU.

REFERENCE: (Appendix A) 1

APPENDIX C
SITE SPECIFIC INFORMATION ON SWMUs LOCATED WITHIN REMEDIAL INVESTIGATION/FEASIBLITY STUDY AREAS

Ground-water contamination has led to Remedial Investigations and Feasibility Studies (RI/FS)in three drainage systems on post: the Southeast Industrial Area, the Disposal Area, and the Property Disposal Office Area. All of the SWMUs located in these drainage areas are suspect contamination sources in the ongoing RI/FSs. Therefore, it is recommended that no further action be required at these sites under section 3004(u) of RCRA, because any problems will be addressed in the ongoing RI/FS efforts.

SOUTHEAST INDUSTRIAL AREA: Unit locations are depicted on Figure C-1.

LEAD-1

UNIT NAME: Building 424, Drum Storage and Underground Waste Oil Tank

APPROXIMATE DIMENSIONS: Tank - 269 gallons

TIME OF OPERATION: Unknown - present

DESCRIPTION OF ACTIVITIES/WASTES: Used oil is stored in an underground steel box at this building. On the north side of this building, across the road, there are several empty, corroded drums. Stains were observed on the pavement below an empty drum labeled as used 1,1,1-trichloroethane.

REFERENCE: Site visit

LEAD-2

UNIT NAME: Building 435, Dock 2, Waste Oil Tank

APPROXIMATE DIMENSIONS: 5000 gallons

TIME OF OPERATION: Unknown - present

DESCRIPTION OF ACTIVITIES/WASTES: Used oil is stored in an underground steel tank at this building.

REFERENCE: Site visit

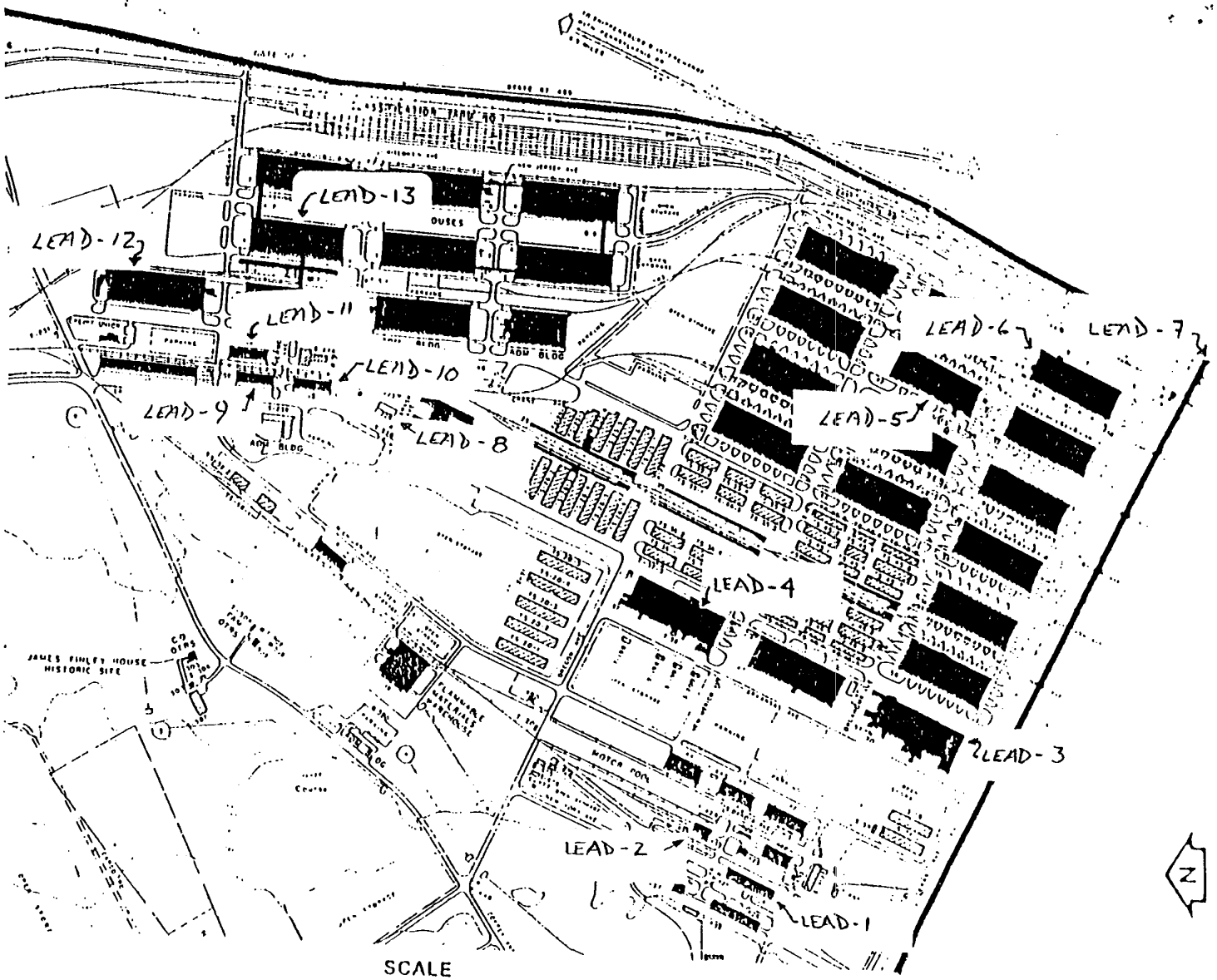

LEAD-13
LEAD-12
LEAD-11
LEAD-10
LEAD-9
LEAD-8
LEAD-6
LEAD-7
LEAD-5
LEAD-4
LEAD-3
LEAD-2
LEAD-1
JAMES FINLEY HOUSE HISTORIC SITE
N
SCALE
600 0 600 1,200 FEET
200 0 200 400 METERS

FIG C-1

LEAD-3

UNIT NAME: Building 37, Support and Teardown Sections.

APPROXIMATE DIMENSIONS: 200 X 500 feet

TIME OF OPERATION: 1943 - present

DESCRIPTION OF ACTIVITIES/WASTES: Discharges from this building have contained detergents, solvents, sodium hydroxide, phosphates, carbon, phenol, iron, zinc, lead, ammonia, aluminum, and trichloroethylene. (Ref 1)

Waste paint, corrosion remover, and paint stripper have also been generated at this building. These were sent to Storage Area No. 1. (Unit LEAD-26) (Ref 10)

During the site visit, drums of the following wastes were observed around the building: 1,1,1-trichloroethane, used oil filters, and waste paint filters on pallets next to a storm drain at the northwest corner; waste paint filters and unlabeled drums believed to be sand blasting dust on the east side; and stacks of empty drums awaiting transport to building 350 for triple rinsing on the west side. Several drums of 1,1,1-trichloroethane (pure product) were stored at the southeast corner of building 37. Stains and wet ground were evident in the vicinity of the solvent drums that were in use. A tank trailer was also parked nearby for the collection of used oil. The ground under this tanker was stained.

REFERENCE: (Appendix A) 1, 10

LEAD-4.

UNIT NAME: Building 57, Vehicle Shop

APPROXIMATE DIMENSIONS: 200 X 500 feet

TIME OF OPERATION: 1943 - present

DESCRIPTION OF ACTIVITIES/WASTES: Wash Racks were located at the south end of the building. Sodium hydroxide and detergents used here are discharged to the Industrial Waste Treatment Plant.

The following wastes were observed during the site visit:

West side of building: Waste paint filters and paint waste contaminated with thinner, water, and dirt were stored in 55-gallon drums on pallets. Near the north end of the building, the battery shop stores battery hulls outside on racks and on pallets. All the drums and batteries were located on pavement that sloped toward a storm drain. None of the drums or batteries were protected from vehicular traffic.

South side: Drums of used oil and "dirty sludge" were stored on pallets. These were not protected from vehicular traffic.

East side: Drums of used paint filters were stored on this side of the building.

There was also a 479-gallon underground tank containing used oil at this site.

REFERENCE: (Appendix A) 1, 10

LEAD-5

UNIT NAME: Building 42, Waste Oil Tank

APPROXIMATE DIMENSIONS: 182 gallons

TIME OF OPERATION: Unknown - present

DESCRIPTION OF ACTIVITIES/WASTES: Used oil is stored in an underground steel box at this building. Drums of waste trichloroethylene and metal and flux residues have been stored on a paved area on the south side of the building. This building was not observed during the site visit.

REFERENCE: (Appendix A) 18

LEAD-6

UNIT NAME: Building 51, Radiological Calibration Equipment

APPROXIMATE DIMENSIONS: 200 X 500 feet

TIME OF OPERATION: Closed mid-80's

DESCRIPTION OF ACTIVITIES/WASTES: This building was being used for office space during the site visit. However, previous activities included paint removal and application procedures. Glass blast dust residue submitted for EP Toxicity analysis in February 1982 yielded 6900 mg/l of cadmium (Ref 7). These activities generated approximately 2600 -2700 gallons per year of used trichloroethylene solvent which reportedly was recovered on post. Approximately 1300 gal/yr of paint and paint thinner wastes were generated. 4800 to 5000 gal/yr of used hydraulic fluid were also generated. (Ref 10)

REFERENCE: (Appendix A) 1, 7, 10

LEAD-7

UNIT NAME: Storm water Discharge Ditch

APPROXIMATE DIMENSIONS: Not applicable

TIME OF OPERATION: Current

DESCRIPTION OF ACTIVITIES/WASTES: The discharge of storm water from the bulk of the industrial-administrative complex south of Coffey Avenue enters this ditch which is located at the southeastern corner of the depot. The ditch leads to the Conococheague Basin and ultimately to the Potomac River near Hagerstown, Maryland. The storm water has occasionally contained excessive amounts of metals and oil and grease. Prior to 1974, this problem was controlled by pumping the wastewater from a sump at the outfall through an oil recovery system and back into the stream. The outfall was later equipped with a steel gravity weir followed by straw-filled barriers. Several oily stains on rocks and soils and a slight sheen on the water were observed during the site visit and the straw filled barriers were not present.

REFERENCE: (Appendix A) 1, 4

LEAD-8

UNIT NAME: Building 228, Battery Shop

APPROXIMATE DIMENSIONS: 40 X 100 feet

TIME OF OPERATION: Unknown

DESCRIPTION OF ACTIVITIES/WASTES: Sulfuric acid was drained from batteries into an underground concrete holding tank (3.8 cu m capacity) lined with acid-proof brick; the tank had never been emptied over a 10-year period (1964-1974). In 1980, the effluent was being discharged to the IWTP.

At the time of the site visit, this building was being used for storage. A floor drain is located in the middle of the floor in the shop. The sump for waste acid was located at the north end of the building under a shed. It could not be determined if the sump currently contained any waste.

REFERENCE: (Appendix A) 4

LEAD-9

UNIT NAME: Building 12

APPROXIMATE DIMENSIONS: 80 X 200 feet

TIME OF OPERATION: 1943 - present

DESCRIPTION OF ACTIVITIES/WASTES: Drums of waste oil and solvents were being stored in a bermed area on the north side of the building.

REFERENCE: (Appendix A) 18

LEAD-10

UNIT NAME: Building 13

APPROXIMATE DIMENSIONS: 80 X 200 feet

TIME OF OPERATION: Current

DESCRIPTION OF ACTIVITIES/WASTES: Drums of waste 1,1,1-trichloroethane, alcohols, thinner, and copper sulfate were stored in a bermed area on the south side of the building. Metal and flux residue wastes were stored on the west side. This building was not visited during the on-site survey.

REFERENCE: (Appendix A) 18

LEAD-11

UNIT NAME: Building 14

APPROXIMATE DIMENSIONS: 80 X 200 feet

TIME OF OPERATION: 1943 - present

DESCRIPTION OF ACTIVITIES/WASTES: Drums of waste CARC paint and 1,1,1-trichloroethane contaminated with paint chips were stored on pallets at the south end of the building. The area was unbermed and near a storm drain. No evidence of spills was observed.

REFERENCE: (Appendix A) 18

LEAD-12

UNIT NAME: Building 1, North, Plating Shop and Artillery Repair.

APPROXIMATE DIMENSIONS: 200 X 500 feet

TIME OF OPERATION: Current

DESCRIPTION OF ACTIVITIES/WASTES: Effluent has contained chromium, manganese, zinc, nitrate, phosphate, and sodium hydroxide. (Ref 1)

Prior to the IWTP wastewater line hookup (1965), all spills and wastewaters flowed through the stormwater lines (Ref 18).

Sandblasting operations at this building have used steel shot and quartzite sand to strip metal parts associated with weapon recoil mechanisms. Waste dust was collected in 55-gallon drums. (Ref 11)

Drums of waste observed around this building during the site visit included motor oil and an unlabeled bulging drum on the south side; blast dust, 1,1,1-trichloroethane product, and used oil on the east side; and chromic acid, paint residue, xylene, used 1,1,1-trichloroethane, paint filters, blast residue, and chromium trioxide on the north side. All drums were stored on pallets on the pavement. No protection from vehicular traffic was provided.

REFERENCE: (Appendix A) 1, 10, 11, 18

LEAD-13

UNIT NAME: Building 4, Waste Oil Tank

APPROXIMATE DIMENSIONS: 202 gallons

TIME OF OPERATION: Unknown - present

DESCRIPTION OF ACTIVITIES/WASTES: Used oil is stored in an underground steel box at this building. Small amounts of waste have been stored on a concrete dock between buildings 4 and 2.

REFERENCE: (Appendix A) 18

DISPOSAL AREA: Unit locations are depicted on Figure C-2.

LEAD-14

UNIT NAME: Building 349 Main Boiler Plant

APPROXIMATE DIMENSIONS: 100 X 120 feet

TIME OF OPERATION: Current

DESCRIPTION OF ACTIVITIES/WASTES: Wastes contained phosphate, hydrazine, tannin, and caustics. The blowdown from this boiler discharges to the IWTP.

REFERENCE: (Appendix A) 1

LEAD-15

UNIT NAME: Building 350, Vehicle Shops

APPROXIMATE DIMENSIONS: 250 X 1200 feet

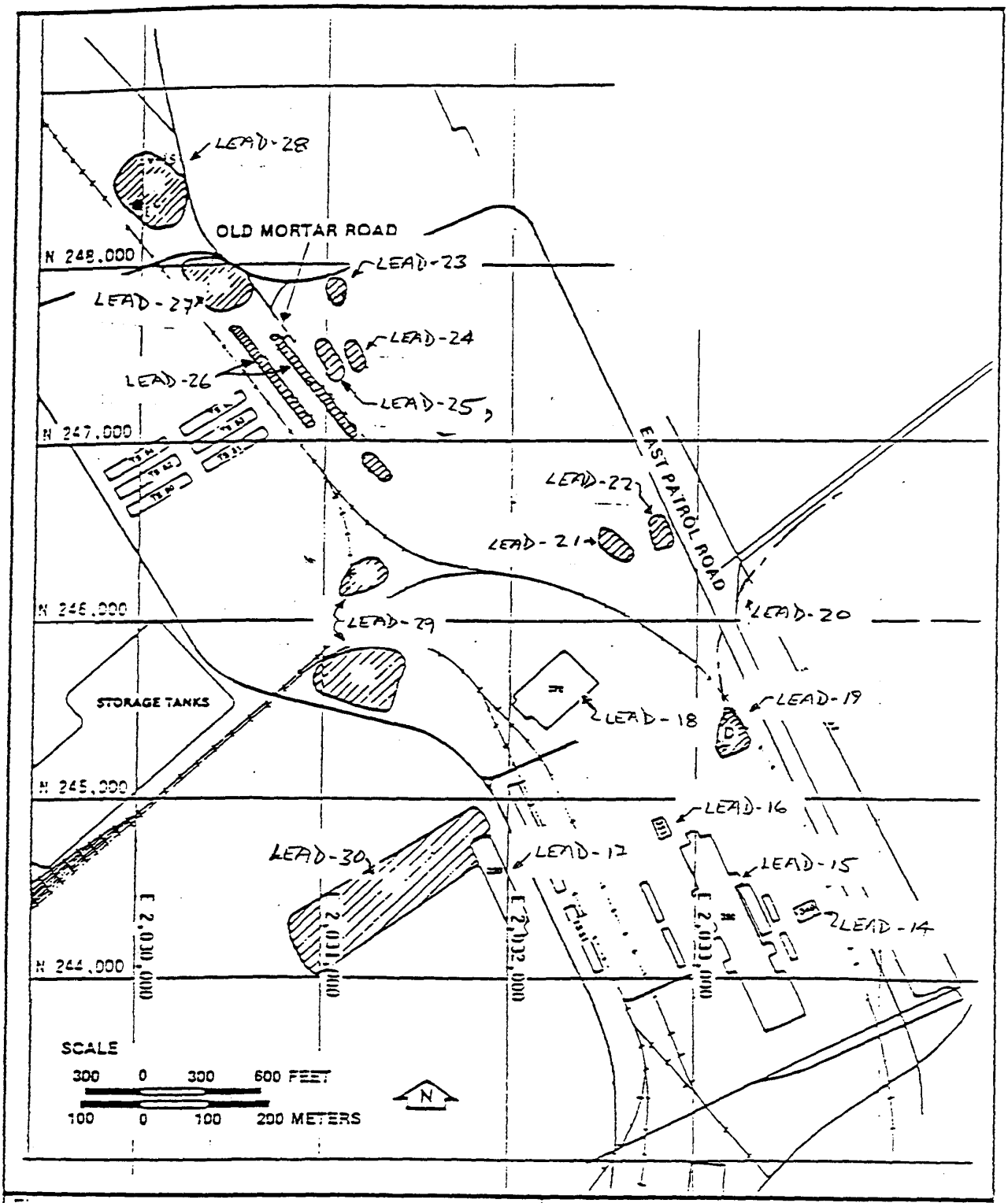
TIME OF OPERATION: Current

DESCRIPTION OF ACTIVITIES/WASTES: Wastes have included aluminum, chromium, iron, zinc, nitrates, phosphates, sodium hydroxide, solvents, cutting oils, xylene, trichloroethylene, and paint and corrosion remover. The trichloroethylene was reportedly distilled onpost and the xylene and paint and corrosion remover were sent to Storage Area No. 1.

Samples taken in 1981 from the steel blasting operation at this building tested positive for cadmium EP toxicity at 5.0 mg/l. (Ref 6)

The following wastes were observed around this building during the site visit: drummed blast residue on the south side; four storage batteries and some used antifreeze on the west side; drums of used oil, antifreeze, and hydraulic oil on the north side; and drummed blast dust, 1,1,1-trichloroethane sludge, nanapeel, and waste paint filters on the east side. A covered storage shed with a concrete floor and bermed sides is also located on the east side of the building. This shed was nearly full of drummed hazardous wastes similar to the other wastes in the vicinity of this building.

REFERENCE: (Appendix A) 1, 6


LEAD-28
OLD MORTAR ROAD
N 248,000
LEAD-23
LEAD-27
LEAD-24
LEAD-26
LEAD-25
N 247,000
EAST PATROL ROAD
LEAD-22
LEAD-21
N 246,000
LEAD-29
LEAD-20
STORAGE TANKS
LEAD-18
LEAD-19
N 245,000
LEAD-16
LEAD-30
LEAD-17
LEAD-15
LEAD-14
E 2,030,000
E 2,031,000
E 2,032,000
E 2,033,000
N 244,000
SCALE
300 0 300 600 FEET
100 0 100 200 METERS
N

Figure

C-2

LEAD-16

UNIT NAME: Building 351

APPROXIMATE DIMENSIONS: 75 X 120 feet

TIME OF OPERATION: Current

DESCRIPTION OF ACTIVITIES/WASTES: Wastes have or may contain detergents, sodium hydroxide, solvents, oil and grease, and contents of a paint stripping operation. (Ref 1)

At the time of the site visit, this building was a steam cleaning operation and drums of steam cleaning sludge were being stored outside. Liquid wastes flow to the IWTP.

REFERENCE: (Appendix A) 1

LEAD-17

UNIT NAME: Building 320, Waste Oil Tank

APPROXIMATE DIMENSIONS: Tank - 550 gallons

TIME OF OPERATION: 1977 - present

DESCRIPTION OF ACTIVITIES/WASTES: Used oil is stored in an underground steel tank at this building. Drum storage areas have been reported on the south and east sides of the building.

REFERENCE: (Appendix A) 18

LEAD-18

UNIT NAME: Building 370, Electronic Fire Control and High Altitude Systems, Supply, and Support Branches.

APPROXIMATE DIMENSIONS: 250 X 400 feet

TIME OF OPERATION: Mid 1950's - present

DESCRIPTION OF ACTIVITIES/WASTES: Operations utilize compounds of aluminum, chromium, fluorides, nitrates, sulfates, caustic, solvents, and detergents in various quantities.

This building also contained radioactive luminous compounds used in azimuth indicators.

Washoff from an outdoor parts cleaning operation has been responsible for the presence of Methylene Blue Active Substances in runoff in the Building 370 area.

Results of EP Toxicity analysis performed on a sample from the building 370 (steel) dust collector collected in November 1981, showed cadmium at 5.0 mg/l and chromium at 5.5 mg/l.

Glass blast dust and walnut hull dust submitted for EP Toxicity analysis in February 1982, yielded levels of Cadmium and Chromium as follows:

Glass dust	5.2 mg/l Cd and	<0.5 mg/l Cr
Walnut hull dust	2.6 mg/l Cd and	10.6 mg/l Cr

Wastes have included corrosion remover and rust inhibitor, paint and corrosion inhibitor, and triacid etch. The triacid etch was released to the IWTP and the inhibitors were sent to Storage Area No. 1. Other wastes generated and sent to Storage Area No. 1 included chromic acid/calcium sulfate bath, waste paint and paint thinner, and an aluminum treatment bath. Waste trichloroethylene was also generated and reportedly distilled onpost. (Ref 10)

During the site visit, drums of waste in storage on the south side of the building included waste paint filters, nanapeel, blast residue, and waste paint sludges contaminated with chemical strippers. These were stored on pallets on concrete. The concrete slopes toward a grassy area near the security fence.

Two other drum storage areas have been identified; one at the northeast corner and one at the northwest corner.

REFERENCE: (Appendix A) 1, 4, 6, 7, 10, 18

LEAD-19

UNIT NAME: Building 360 IWTP

APPROXIMATE DIMENSIONS: Not applicable

TIME OF OPERATION: 1954 to present

DESCRIPTION OF ACTIVITIES/WASTES: The industrial wastewater is comprised primarily of boiler blowdown, vehicular wash water (oil and grease, solvents, and detergents), and process wastewater from the repair and maintenance activities (iron, zinc, aluminum, chromium, manganese, chromic acid, nitric acid, sulfuric acid, nitrates, phosphates, sulfates, fluorides, sodium hydroxide, oil and grease, detergents, and solvents). Except for the blowdown from 30 small boilers, all of the industrial wastewater generated at the depot is routed to the IWTP which is a RCRA facility.

IWTP Lagoons: Some waste is removed to the lagoons. From 1954 to 1967, one unlined lagoon was used for sludge and industrial waste retention. Seepage form the lagoon into a sinkhole prompted modification of the facility. In 1967, the lagoon was enlarged and converted to the present two lagoons which are lined with 12.7 cm thick concrete.

The ground water around the IWTP lagoons is contaminated by several purgeable priority pollutant organic compounds at concentrations which exceed EPA proposed maximum contaminant levels or exceed EPA Health Advisory values for acute or chronic toxicity or for potential carcinoginicity. The concentrations detected in the downgradient wells are significantly greater than those detected in the upgradient well; therefore the contamination is most likely caused by leakage of the lagoons at some time. (Ref 20)

IWTP sludges tested negative for EP Toxicity in 1981.

REFERENCE: (Appendix A) 1, 9, 20

LEAD-20

UNIT NAME: Industrial Waste Ditch

APPROXIMATE DIMENSIONS: Not applicable

TIME OF OPERATION: Current

DESCRIPTION OF ACTIVITIES/WASTES: Effluent from the IWTP (Unit LEAD-19) flows through this unlined ditch to Rowe Run (off the installation). This ditch was cleaned out in 1976 and the sediment was buried or spread on the installation (Unit LEAD-21). This ditch also receives discharge from the stormwater system that serves the area orth of Coffey Avenue. On occasion, absorbents are placed in the ditch to collect oil that is discharged through the stormwater system.

REFERENCE: (Appendix A) 1

LEAD-21

UNIT NAME: Sediment Burial Site

APPROXIMATE DIMENSIONS: Unknown

TIME OF OPERATION: 1976

DESCRIPTION OF ACTIVITIES/WASTES: Sludges removed from the IWTP ditch were spread in this area. The exact location of the spreading could not be determined during the site visit. Geophysical surveys by USATHAMA contractors also failed to delineate this area. Monitoring well 81-9 is the closest downgradient well. Contamination found in this well is not believed to be from this unit.

REFERENCE: (Appendix A) 1, 19

LEAD-22

UNIT NAME: Oil Burning Pit

APPROXIMATE DIMENSIONS: Unknown

TIME OF OPERATION: Early 1970's

DESCRIPTION OF ACTIVITIES/WASTES: Reportedly, oils were burned at this location. This unit could not be identified during the site visit. Geophysical and soil gas sampling work done by USATHAMA contractors also failed to delineate this unit. Monitoring well 81-9 is located downgradient of the reported location of this unit. Contamination in this monitoring well exceeds levels found in most other wells on post. However, based on existing data, the source of the contamination may or may not be this unit.

REFERENCE: (Appendix A) 1, 19

LEAD-23

UNIT NAME: Burn Pit

APPROXIMATE DIMENSIONS: 80 X 120 feet

TIME OF OPERATION: Burn Pit: 1940's - mid 1960's

DESCRIPTION OF ACTIVITIES/WASTES: Waste oils, fuels that were unable to be sold, used paint, thinners, and other combustible materials were burned in a clay-lined pit located in this area. Residue was disposed of in a nearby landfill.

During the site visit, the burn pit was not visible. The area was covered with grasses.

REFERENCE: (Appendix A) 1, 2, 4, 10, 19

LEAD-24

UNIT NAME: Lagoon

APPROXIMATE DIMENSIONS: 75 X 40 feet enlarged to 50 X 200 feet

TIME OF OPERATION: circa 1957 - late 60's

DESCRIPTION OF ACTIVITIES/WASTES: An aerial photograph taken in 1957 showed a lagoon that was approximately 75 X 40 feet. A 1965 aerial photograph revealed two lagoons with an overall area of approximately 200 X 50 feet. Laboratory analytical results demonstrated measurable concentrations of 16 organic compounds. The depth at which concentrated materials have been identified indicates that contaminants have apparently migrated through the soils. Chemical analysis of ground water taken from a well installed below the fill material and screened in the water-bearing zone above bedrock (MW-7), indicated the highest concentrations of volatile organic contaminants found during investigations by Roy F. Weston Inc.

REFERENCE: (Appendix A) 19

LEAD-25

UNIT NAME: Partially Revetted Areas

APPROXIMATE DIMENSIONS: 275 X 80 feet

TIME OF OPERATION: circa 1965 - 1970

DESCRIPTION OF ACTIVITIES/WASTES: This unit includes five partially revetted areas identified in 1965 and 1970 aerial photographs. This area is part of the larger Storage Area Number 1 (Unit LEAD-26). Organic vapor readings during trenching operations in this area demonstrated significant organic concentrations in the vapor phase between depths of 0 to 4 feet. In addition, laboratory analyses confirmed the presence of organic contaminants in the soil. Visual observations and soil analytical results indicated that this unit was a disposal area for miscellaneous refuse. The organic concentrations in this area could potentially have resulted from the migration of organic compounds from the lagoon (Unit LEAD-24) or from other disposal activities at this unit. Ground-water monitoring wells installed within this area indicated the presence of several organic compounds.

REFERENCE: (Appendix A) 1, 2, 4, 10, 19

LEAD-26

UNIT NAME: Storage Site No. 1 and Waste Disposal Trenches

APPROXIMATE DIMENSIONS: See description

TIME OF OPERATION: 1940's to early 80's

DESCRIPTION OF ACTIVITIES/WASTES: The storage area was an unlined area where waste fuel was stored in 55-gallon drums and 1200-gallon portable tanks. The majority of wastes stored in drums at this location were classified as hazardous under RCRA. In 1981 there were approximately 1000, 55-gallon drums stored in this area. Approximately 20-30 of these were corroded, causing a spill hazard. Drummed materials included trichloroethylene sludges and still bottoms from distillation, chromic acid from plating operations, bluing salts, sodium hydroxide cleaning solutions, and used paint and rust removers.

Storage Site Number 1 was partially grassed over. No drums were present but the 1200-gallon storage tanks were still onsite.

Aerial photographs from 1957 indicate the presence of several liquid-containing trenches within this area. Photographs from 1965 and 1970 show filling, ground scarring, and ponding as an indication of disposal activities in this area. These trenches or disposal areas appear as elongated trenches paralleling the railroad tracks to the west. The dimensions of the three trenches, as determined from the aerial photographs, are 425 X 40 feet, 500 X 75 feet, and 300 X 30 feet.

17000 3750 900

REFERENCE: (Appendix A) 19

LEAD-27

UNIT NAME: Sanitary Landfill 4

APPROXIMATE DIMENSIONS: Unknown

TIME OF OPERATION: 1956-1964

DESCRIPTION OF ACTIVITIES/WASTES: This landfill contains trash, garbage, cans, empty pesticide cans, and medicines. Sludge from the IWTP and sediment dredged from an outfall ditch in 1973 were also spread in this area. This site, originally a swampy area, was filled in with shale and cinders and has since been used as a bulk oil storage site. Magnetometer results indicated the presence of four parallel trenches in this area. No significant levels of contamination have been detected in downgradient well EW-3.

REFERENCE: (Appendix A) 1, 19

LEAD-28

UNIT NAME: Sanitary Landfill 5; Security Landfill

APPROXIMATE DIMENSIONS: Unknown

TIME OF OPERATION: 1964-1978

DESCRIPTION OF ACTIVITIES/WASTES: This landfill was used to bury residue from the trash burning pits and IWTP sludge. It was leveled in 1978 to match existing terrain.

This landfill is surrounded by six monitoring wells. Levels of contaminants in ground water were generally low. A surface water sample taken from a stream draining this area did not contain volatile organics above criteria and contained no measurable heavy metals. Lead detected in the stream sediments was at a level slightly greater than in other samples taken on post. It did not appear that the security landfill area is contributing to the contaminant migration problem at LEAD.

REFERENCE: (Appendix A) 1, 19

LEAD-29

UNIT NAME: Sanitary Landfill 1

APPROXIMATE DIMENSIONS: Unknown

TIME OF OPERATION: 1941-1948

DESCRIPTION OF ACTIVITIES/WASTES: Trash and garbage were placed in this landfill. The area was covered with concrete rubble, soil, and Berks shale, and is now used as a vehicle storage site. An unknown number of crushed beryllium-phosphorescent tubes were also buried in this area. It is not clear if this burial site is part of Sanitary Landfill Number 1 or is located east of that location. Although some ground scarring was apparent in aerial photographs, a specific burial site could not be identified. Only a few minor magnetic anomalies appeared in a geophysical survey. Wells in the vicinity of this area did not contain any beryllium above the detection limit and only traces of volatile organics were found. The wells monitor other areas so the landfill may not be the source of the trace amounts of contamination found.

REFERENCE: (Appendix A) 1, 19

LEAD-30

UNIT NAME: Sanitary Landfill 2

APPROXIMATE DIMENSIONS: Unknown

TIME OF OPERATION: 1948-1952

DESCRIPTION OF ACTIVITIES/WASTES: Trash and garbage were disposed of in this landfill. Presently, parts of the Radar Test Site and Building 320 are located on the landfill site. Other portions of the landfill are used for vehicle storage. No monitoring wells monitor this landfill exclusively. Because the site is located near the ground-water divide, two ground-water flow directions must be considered when evaluating contaminant migration potential from this unit. One flow direction is probably toward the northeast where the nearest wells (approximately 2000 feet away) are downgradient of other suspected contamination sources. If the ground-water flow direction is toward the southeast, an existing well (Well 82-8) might be appropriately located to monitor ground-water quality associated with this landfill. However, due to uncertainty of ground-water flow direction and possible seasonal fluctuations of this flow direction, it is impossible to determine whether contaminants are migrating from this unit at this time.

REFERENCE: (Appendix A) 1, 2

PROPERTY DISPOSAL OFFICE AREA: Unit locations are depicted on Figure C-3.

LEAD-31

UNIT NAME: DRMO STORAGE

APPROXIMATE DIMENSIONS: 800 X 1000 feet

TIME OF OPERATION: Current

DESCRIPTION OF ACTIVITIES/WASTES: This area is used for the storage of used equipment that is awaiting reuse, recycling, or disposal. Types of equipment stored are highly variable. Transformer oil was employed at the DRMO for dust abatement purposes. This practice was terminated in the early 1970's and shale has been placed over the area. Sediment samples taken in 1979 from the DRMO (then DPDO) yard contained Aroclor 1254 at 1.46 ppm and Aroclor 1260 at 2.31 ppm. Pesticides, herbicides, and insecticides stored outside building G reportedly have leaked in the past.

REFERENCE: (Appendix A) 2, 4, 5

LEAD-32

UNIT NAME: Two Revetments at DRMO

APPROXIMATE DIMENSIONS: 100 X 100 feet

TIME OF OPERATION: Unknown

DESCRIPTION OF ACTIVITIES/WASTES: These revetments, located at the south end of the DRMO area (Unit LEAD-31), were used to store drums of the following expended compounds: hydraulic oil, chromic acid, engine oil, transmission fluid, trichloroethylene, carbon remover, paint remover, caustic compounds (EC900 and EC905), and PCB's. The shale underlying these units has been periodically resurfaced with on-depot soil. Spill containment was in the form of earthen dikes. Drainage from each storage area was accomplished by a 6-inch drain equipped with a manually operated valve and an imbiber valve which prevents the flow of gasoline, benzene, toluene, ethylbenzene, styrene, and 1,1,1-trichloroethane. Surface drainage from this area flows through the Rocky Spring Lake recreational area.

This unit was identified as a source of trichloroethylene and 1,1,1-trichloroethane ground-water contamination.

These revetments were being used to store used oil, paint waste, and paint filters at the time of the site visit. One drum was labelled as paint waste and methyl ethyl ketone.

REFERENCE: (Appendix A) 1, 15

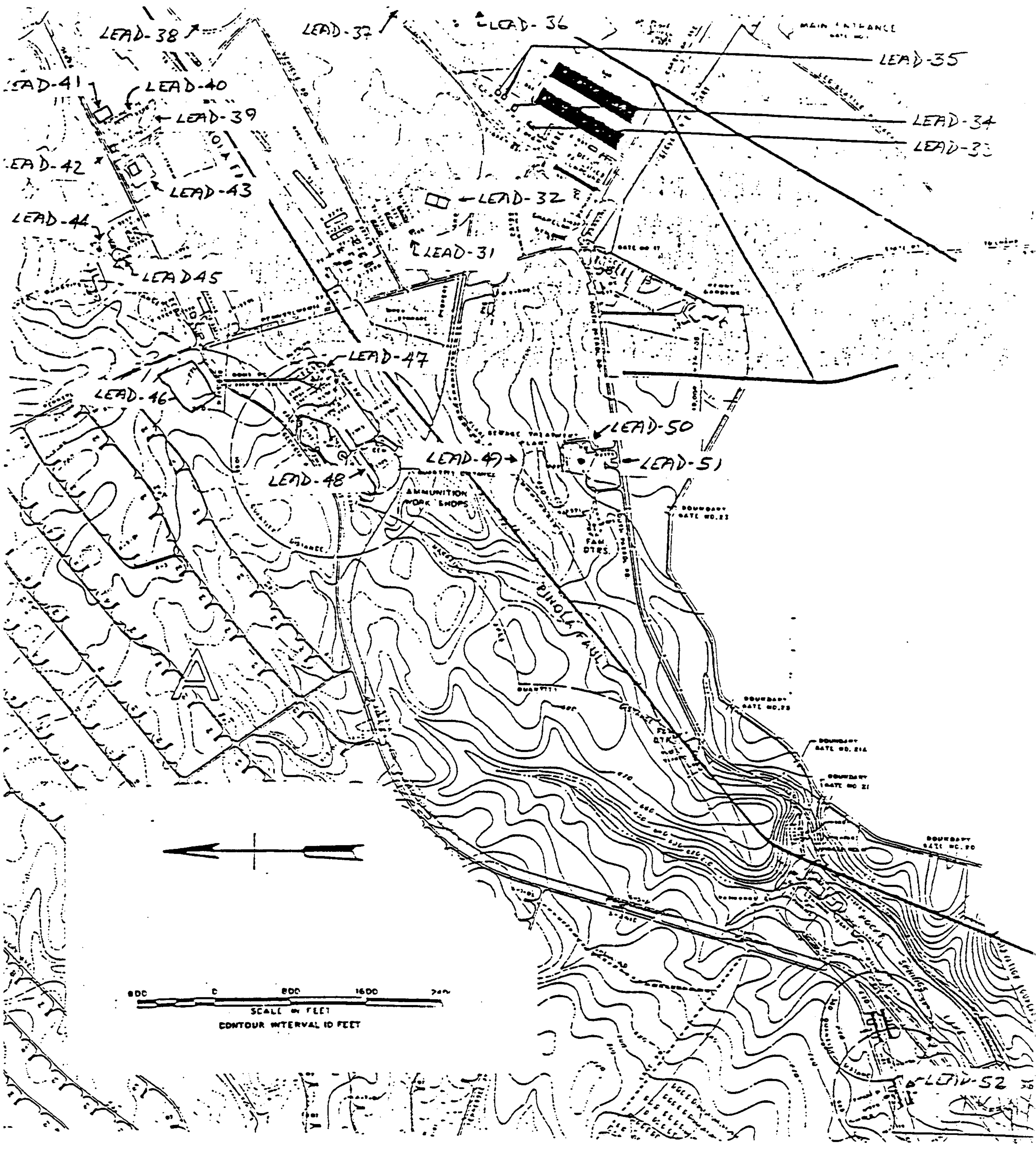

LEAD-38
LEAD-37
LEAD-36
MAIN ENTRANCE
LEAD-35
LEAD-41
LEAD-40
LEAD-39
LEAD-34
LEAD-33
LEAD-42
LEAD-43
LEAD-32
LEAD-44
LEAD-31
LEAD 45
LEAD-47
LEAD-46
LEAD-50
LEAD-49
LEAD-51
LEAD-48
AMMUNITION WORK SHOPS
FAM QTRS.
PINOLE FAULT
A
BOUNDARY GATE NO. 22
BOUNDARY GATE NO. 21A
BOUNDARY GATE NO. 21
BOUNDARY GATE NO. 20
800 0 800 1600
SCALE IN FEET
CONTOUR INTERVAL 10 FEET
LEAD-52

FIGURE C-3

LEAD-33

UNIT NAME: Hazardous Waste Storage Building No. 675

APPROXIMATE DIMENSIONS: 100 feet X 60 feet Metal Building

TIME OF OPERATION: Current

DESCRIPTION OF ACTIVITIES/WASTES: The floor of this building is a 6-inch thick concrete slab with a 6-inch high containment curb. This facility was being used to store hazardous waste in 55-gallon drums. This is a RCRA-permitted facility (Part A). Two 10,000-gallon waste oil underground tanks are also located in this vicinity at building 696.

REFERENCE: (Appendix A) 1

LEAD-34

UNIT NAME: Bulk Liquid Waste Storage Slab

APPROXIMATE DIMENSIONS: 58.5 feet X 50 feet

TIME OF OPERATION: Current

DESCRIPTION OF ACTIVITIES/WASTES: This unit is a 10-inch thick concrete slab with a concrete curb for spill containment. A 5-foot high chain link fence surrounds the slab for security. The facility was being used to store hazardous waste in portable 1200-gallon tanks and 55-gallon drums. This is a RCRA-permitted facility (Part A).

REFERENCE: (Appendix A) 2

LEAD-35

UNIT NAME: Drummed Hazardous Non-liquid Waste Storage Slab

APPROXIMATE DIMENSIONS: Two bermed areas 75 X 75 feet each

TIME OF OPERATION: Current

DESCRIPTION OF ACTIVITIES/WASTES: This shale bermed area is located just north of the bulk liquid waste storage slab and was being used for storage of hazardous waste solids which have a minimal potential for hazardous constituent release.

REFERENCE: Site visit

LEAD-36

UNIT NAME: Blast Dust Piles

APPROXIMATE DIMENSIONS: Unknown

TIME OF OPERATION: Unknown

DESCRIPTION OF ACTIVITIES/WASTES: It has been reported that samples removed from one of the piles were hazardous by the characteristic of EP Toxicity. These wastes were generated by paint and rust removal operations. Installation personnel indicated that follow-up sampling of these piles showed that they were not EP Toxic. Only one small pile was reported to be in existence at the time of the site visit. The site was not visited.

REFERENCE: (Appendix A) 11

LEAD-37

UNIT NAME: Sanitary Landfill 3

APPROXIMATE DIMENSIONS: 3 acres

TIME OF OPERATION: 1952-1956?

DESCRIPTION OF ACTIVITIES/WASTES: This landfill reportedly contains trash, garbage, residue from trash burning pits, and IWTP sludge. USATHAMA has installed monitoring wells in the area. Personnel contacted during the site visit indicated that this landfill was still being used in the 1970's.

REFERENCE: (Appendix A) 1, 2

LEAD-38

UNIT NAME: Combat Vehicle Test Track

APPROXIMATE DIMENSIONS: 1000 X 2000 feet

TIME OF OPERATION: Unknown

DESCRIPTION OF ACTIVITIES/WASTES: This area is used to test tanks and other vehicles which have been rebuilt at LEAD. The land areas within the test track roadways were used for the disposal of industrial waste sludge from the IWTP.

Based on ground-water data from this area, the sludge that has been landfarmed in this area is not considered as a possible source for ground-water contamination detected in the Rocky Spring area. (Ref 17, p 2-4)

REFERENCE: (Appendix A) 4, 17

LEAD-39

UNIT NAME: Landfill 6

APPROXIMATE DIMENSIONS: Unknown

TIME OF OPERATION: Unknown to 1986

DESCRIPTION OF ACTIVITIES/WASTES: This unit was used for burial of burning pit residue as well as tank periscopes, oil filters, decontamination/impregnation kits, fluorescent light tubes, and other metal and fiberglass assemblies having no resale value. This landfill is located just southeast of the trash burning pits and has recently been closed. USATHAMA contractors were taking soil samples in the vicinity of this landfill at the time of the site visit.

REFERENCE: (Appendix A) 1

LEAD-40

UNIT NAME: Trash Burning/Transfer Pits

APPROXIMATE DIMENSIONS: 3 acres

TIME OF OPERATION: Unknown - present

DESCRIPTION OF ACTIVITIES/WASTES: A series of pits were used to incinerate uncontaminated trash. One of the pits was used as a trash transfer point at the time of the site visit. Other pits were being used to segregate certain waste types; one contained paint cans and another contained wood products. Ground-water monitoring wells have been installed around this facility.

REFERENCE: (Appendix A) 1

LEAD-41

UNIT NAME: Revetted Storage Area / Storage Site No. 2

APPROXIMATE DIMENSIONS: Unknown

TIME OF OPERATION: Unknown - 1985

DESCRIPTION OF ACTIVITIES/WASTES: This unlined area was located just north of the trash burning/transfer pits and just east of the old fire training pit and was used to store drums of waste fuels and waste solvents prior to collection by a private contractor. In 1981, this site had about twelve 55-gallon drums of trichloroethylene sludge and still bottoms from distillation recovery. These items were stored on pallets in a bermed hardstand area. The drums have been removed from the area and it has been regraded. Any contamination leaching from this site would be detected in the wells being used to monitor the old fire training pit.

REFERENCE: (Appendix A) 1, 4, 10

LEAD-42

UNIT NAME: Former Fire Training Pit

APPROXIMATE DIMENSIONS: 20 X 20

TIME OF OPERATION: Unknown to early 80's

DESCRIPTION OF ACTIVITIES/WASTES: Waste oils and fuels that could not be sold were burned in this clay-lined pit. It is located just north of the trash transfer point and has been identified as a possible source of the 1,1,1-trichloroethane and related compounds that are contaminating the ground-water in the Rocky Spring Lake vicinity. (Ref 15, 16)

At the time of the site visit, the pit was still open and contained some liquid and about five drums. The area surrounding the pit has been regraded.

REFERENCE: (Appendix A) 1, 2, 10, 15, 16

LEAD-43

UNIT NAME: Current Fire Training Pit and Drum Storage

APPROXIMATE DIMENSIONS: 25 X 25 pit; 1/2 acre storage.

TIME OF OPERATION: Unknown - present Oct. 1987

DESCRIPTION OF ACTIVITIES/WASTES: Used oil and diesel fuel were being stored in drums in a bermed area just west of the burning pit. During the site visit, USATHAMA contractors were sampling soil in the drum storage area and around the pit. Several drums in the storage area were leaking and the concrete lined pit contained oil.

REFERENCE: Site visit

LEAD-44

UNIT NAME: Building 3238, Auto Crafts Shop, Waste Oil Tank

APPROXIMATE DIMENSIONS: 500 gallons

TIME OF OPERATION: Unknown - present

DESCRIPTION OF ACTIVITIES/WASTES: Used oil is stored in an underground steel tank at this building. There were also five drums of waste oil stored in a bermed area southwest of the building.

REFERENCE: Site visit

LEAD-45

UNIT NAME: Radioactive Waste Storage Building

APPROXIMATE DIMENSIONS: 10 X 20 feet

TIME OF OPERATION: Current

DESCRIPTION OF ACTIVITIES/WASTES: Damaged and obsolete radiological commodities have been collected and packaged for final disposal in this building.

No number was displayed on this building at the time of the site visit, but it is located near buildings 3233, 3234, 3235, 3237, and 3238. The building is of block construction and has a shingled roof and a concrete floor.

REFERENCE: (Appendix A) 1

LEAD-46

UNIT NAME: Digested Sludge Spreading Area 1

APPROXIMATE DIMENSIONS: 5 acres

TIME OF OPERATION: Unknown

DESCRIPTION OF ACTIVITIES/WASTES: Digested sludges from the sewage treatment plant were spread on this grassy field located just northwest of the main entrance to the ammunition area. There is no evidence of vegetative stress or any other indications of contamination.

REFERENCE: (Appendix A) 1

LEAD-47

UNIT NAME: Building 2357, Laundry for explosive-contaminated clothing.

APPROXIMATE DIMENSIONS: 20 X 70 feet

TIME OF OPERATION: Current

DESCRIPTION OF ACTIVITIES/WASTES: This laundry has been used to lean clothing contaminated with explosive compounds. During the site visit, it appeared that the wastewater flowed through a baffled settling chamber to a manhole labeled "sewer". However, the site plans for this area show that waste from this laundry is discharged through a septic tank and leach field system.

REFERENCE: (Appendix A) 4

LEAD-48

UNIT NAME: Washout Plant

APPROXIMATE DIMENSIONS: 8175 square feet of buildings and work area

TIME OF OPERATION: 1948-1960; 1969-1975

DESCRIPTION OF ACTIVITIES/WASTES: The process water at the original plant was filtered through sawdust and wood shavings and then held in a storage tank for reuse as a rinse water. Although the plant was considered a closed system, some filtered wastewater was released to a nearby intermittent stream via overflow valves on the storage tank.

The new facility was constructed in 1969 and was also a closed system. The process water passed through sawdust, fiberglass, and activated charcoal filters before being pumped into a 17,000-liter storage tank. The process water in this system was completely confined, except when the storage tank was drained for sludge removal. The filtered water and sludge were taken to a revetted area at the burning grounds and burned. The various filtered materials and additional wastes from water reclamation and cleanup activities were burned at the explosives burning ground. The unit has been thoroughly cleaned out. Water used to wash down the equipment was pumped through a carbon filter and tested before discharge. During the site visit, no cracks were found in the storage sump at the end of the process line.

REFERENCE: (Appendix A) 1, 2

LEAD-49

UNIT NAME: Digested Sludge Spreading Area 2/Burning Area/Landfill

APPROXIMATE DIMENSIONS: 10 acres

TIME OF OPERATION: Unknown

DESCRIPTION OF ACTIVITIES/WASTES: This sludge spreading area could not be positively identified during the site visit. However, in this area there is evidence of burning and a possible landfill that had not been previously identified as a SWMU. Black soil stains still exist in this area. The exact location of this burning was northwest of the sewage treatment plant, just south of the ammunition area boundary fence. The open burning operation in this field ceased several years ago. No records of the types of materials burned were kept. Sampling of the distinct burn areas in 1985 showed very low concentrations of leachable metals and trace amounts of some pesticides and PCB's. These low levels did not pose any threat to human health or the environment.

REFERENCE: (Appendix A) 1, 2, 14

LEAD-50

UNIT NAME: Building 2326, Sewage Treatment Plant

APPROXIMATE DIMENSIONS: Not applicable

TIME OF OPERATION: 1971 - present

DESCRIPTION OF ACTIVITIES/WASTES: The treatment plant consists of a bar screen and comminutor unit, a grit chamber, a Parshall flume and Venturi meter, a combination contact chamber and reaeration tank, an upflow clarifier, an aerobic digestion tank, and a chlorine contact chamber. Discharge is to Rocky Spring Branch, just below the dam of Rocky Spring Lake. The digested sludge from the plant has been land spread (Units LEAD-46 and LEAD-49). The sludges tested negative for EP Toxicity in 1981.

At the time of the site visit, sludge had not been wasted in 3 or 4 years and was being accumulated in the sludge drying beds.

REFERENCE: (Appendix A) 1, 9

LEAD-51

UNIT NAME: Building 2325, Pest Control

APPROXIMATE DIMENSIONS: 20 X 50 feet

TIME OF OPERATION: Current

DESCRIPTION OF ACTIVITIES/WASTES: The building has been used for the storage of pesticides and herbicides. Behind the building, a disposal pit lined with sand and gravel was used for the discharge of washwater from equipment and container cleaning.

REFERENCE: (Appendix A) 4

LEAD-52

UNIT NAME: Deactivation Furnace, Building 1456

APPROXIMATE DIMENSIONS: 10,900 sq. ft. of buildings and work area.

TIME OF OPERATION: Unknown - present

DESCRIPTION OF ACTIVITIES/WASTES: This facility is an Ammunition Peculiar Equipment (APE) 1236 Deactivation Furnace equipped with an air pollution control system (APE 1236-E010). The deactivation furnace at LEAD was used to incinerate obsolete munitions which were fed into the rotary kiln at small feed rates by a feed conveyor. All incinerated items were manufactured munition end items. No bulk solid or liquid slurry feeds were incinerated. After incineration, the remaining metal casings were removed from the rotary kiln by a discharge conveyor. Exhaust gases must pass through a cyclone filter and baghouse prior to being emitted to the atmosphere.

Two samples of Deactivation Furnace ash were analyzed for EP Toxicity in early 1983. The significant results follow:
Heavy Ash 606 mg/L Pb
Light Ash 6100 mg/L Pb and 2.38 mg/L Cd

The following observations were made during the site visit. Casings and armored piercing incendiary (API) rounds were scattered around the discharge conveyor. The baghouse filters had burned out during the last use. These were lying on the ground next to the baghouse. Some ash was present on the concrete beneath the cyclone separator.

REFERENCE: (Appendix A) 2, 8

LEAD-53

UNIT NAME: Building 554, Water Treatment Plant

APPROXIMATE DIMENSIONS: Not applicable

TIME OF OPERATION: Current

DESCRIPTION OF ACTIVITIES/WASTES: This unit discharges solid wastes to two drainage basins. The sludge from the sedimentation basin goes through the storm sewer to the outfall at the southeast corner of the depot (Unit LEAD-7). The discharge is part of the SIA drainage area. The filter backwash flows to the woods near the gymnasium and the recreation area southwest of the DRMO. This area is part of the PDO drainage area. Wastes from the laboratory are neutralized and discharged to the sanitary sewer system. None of the solid wastes from the water treatment plant are expected to contain hazardous constituents at significant levels.

REFERENCE: Site visit

APPENDIX D
SITE SPECIFIC INFORMATION ON SWMUs LOCATED WITHIN THE AMMUNITION AREA

The units in this area are not being considered as possible contaminant sources in any of the RI/FS work currently underway at LEAD. Therefore, some of the units in this area will require confirmatory work to determine whether or not a release of hazardous constituents has occurred. One unit that has had a confirmed release will require an RFI. Figure D-1 shows the location of all SWMUs in the Ammunition Area.

LEAD-54

UNIT NAME: Acid Burning (neutralization) Pit

APPROXIMATE DIMENSIONS: 15 X 30 feet

TIME OF OPERATION: 1966-early 70's

DESCRIPTION OF ACTIVITIES/WASTES: This limestone-lined pit was used to neutralize IRFNA. It is located on the south side of building 3728 (Figure D-2).

RECOMMENDATION: Soil samples should be taken from the bottom of the pit to determine if a release has occurred. Parameters should include heavy metals, explosives, and an organic screen. This would have to be done before a permit could be issued.

REFERENCE: (Appendix A) 1

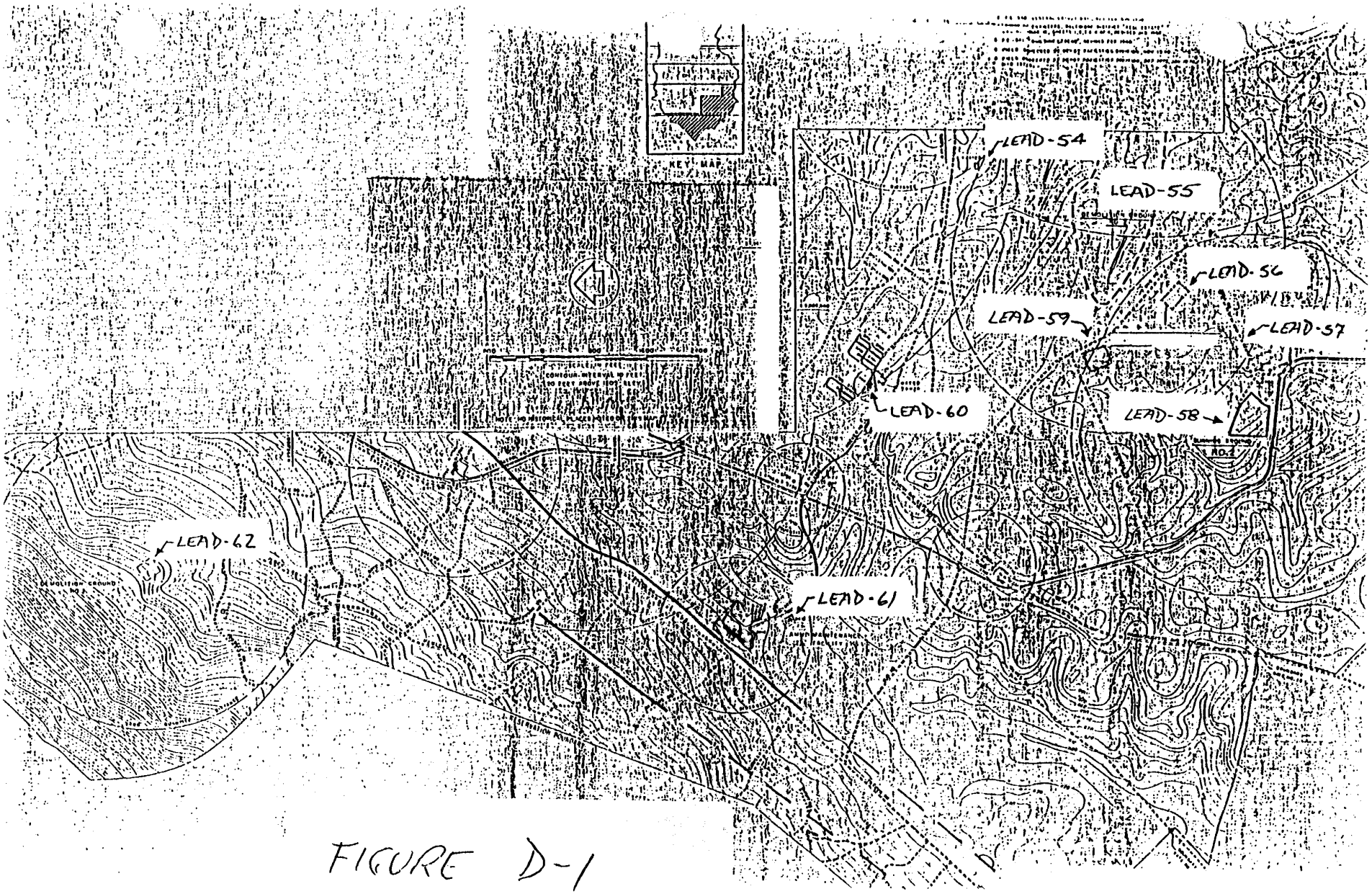

LEAD-54
LEAD-55
LEAD-56
LEAD-59
LEAD-57
LEAD-60
LEAD-58
LEAD-62
LEAD-61

FIGURE D-1

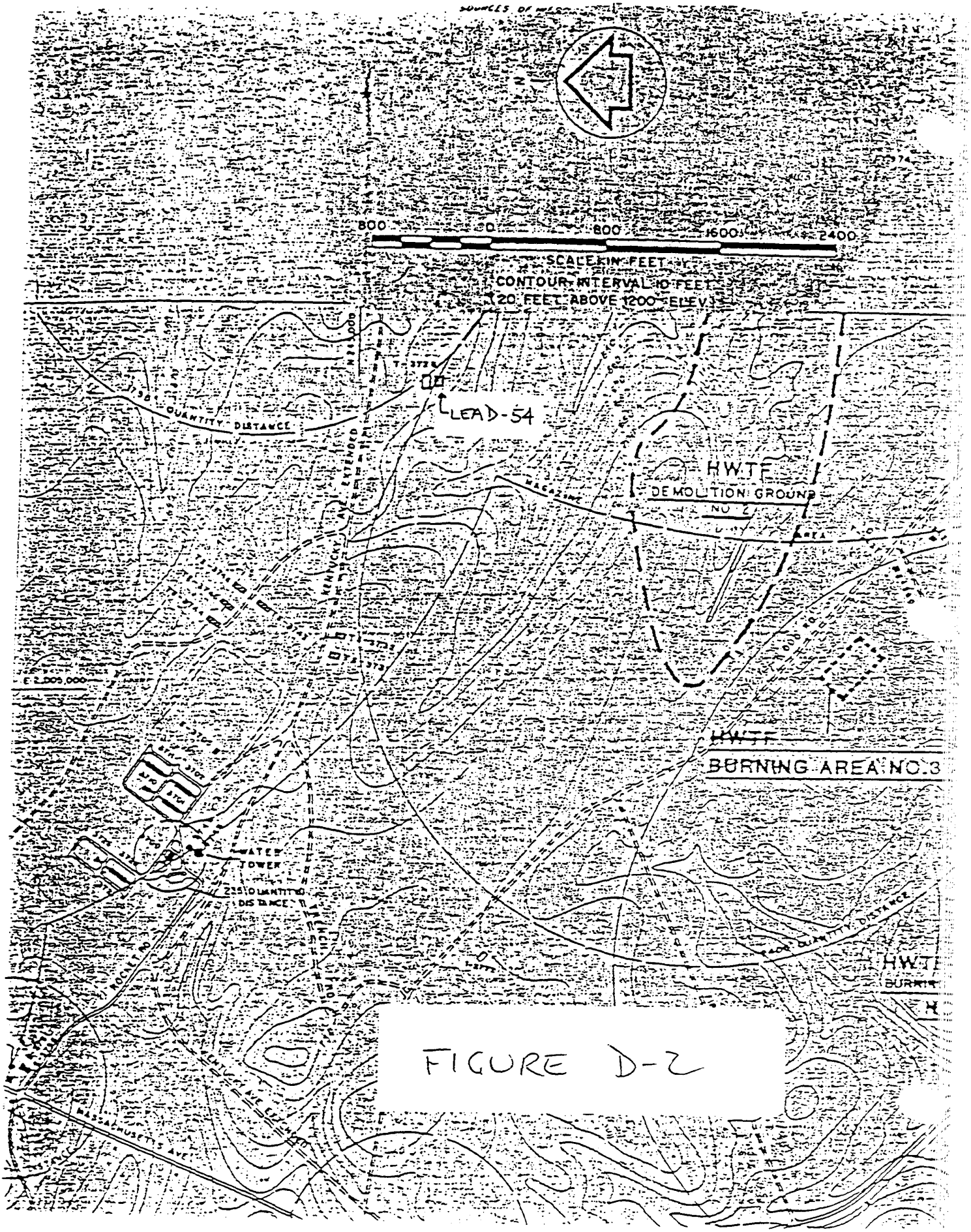

800
0
800
1600
2400
SCALE IN FEET
CONTOUR INTERVAL 10 FEET
(20 FEET ABOVE 1200 ELEV.)
LEAD-54
QUANTITY-DISTANCE
H.W.T.F.
DEMOLITION GROUND
NO. 2
MAGAZINE
BURNING AREA NO. 3
WATER TOWER
ROCKET RD
MASSACHUSETTS AVE

FIGURE D-2

LEAD-55

UNIT NAME: Demolition Ground 2

APPROXIMATE DIMENSIONS: 30 acres

TIME OF OPERATION: 1945-present

DESCRIPTION OF ACTIVITIES/WASTES: (Figure D-3) Obsolete or unserviceable explosives are placed in augered pits for detonation. A wide range of explosive materials, lead styphnate, and lead azide have been detonated at this facility. From 1962 to 1964, an unknown number of special weapon shells were detonated in the area. These items contained beryllium tubes, some fragments of which could have remained in the demolition ground or been buried at the residue burial site (Unit LEAD-57). Samples taken from this area in May 1982 contained explosives in only 8 of 48 samples. RDX (1.1 to 8.6 ppm) and 2,4,6-TNT (1.9 to 4.5 ppm) were the explosives detected. None contained EP Toxic metals. (Ref 13)

RECOMMENDATION: No further action required. Few of the samples taken contained contaminants and those that did were at low levels.

REFERENCE: (Appendix A) 1, 2, 13

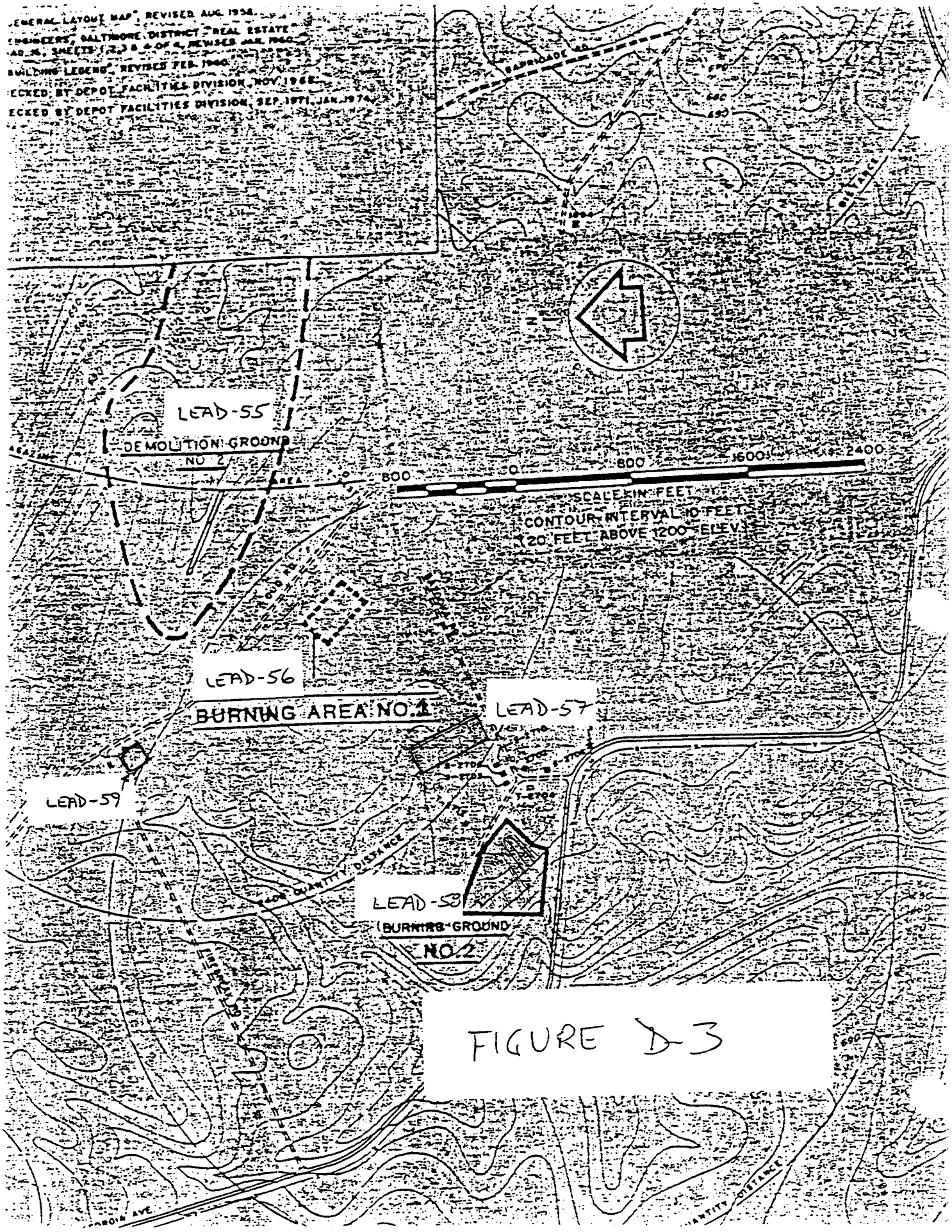

LEAD-55
DEMOLITION GROUND
NO 2
LEAD-56
BURNING AREA NO.1
LEAD-57
LEAD-59
LEAD-58
BURNING GROUND
NO.2
SCALE IN FEET
CONTOUR INTERVAL 10 FEET
20 FEET ABOVE 1200 ELEV.
800
0
800
1600
2400
QUANTITY DISTANCE

FIGURE D-3

LEAD-56

UNIT NAME: Open Burning Ground 1

APPROXIMATE DIMENSIONS: 5 acre open area.

TIME OF OPERATION: 1945-present (intermittent)

DESCRIPTION OF ACTIVITIES/WASTES: (Figure D-3) Items of an explosive nature, including white phosphorous, were burned on two pads at this location. Explosive contamination was found in 15 of the 16 soil samples taken from the southernmost pad in May 1982: HMX @ 1.0 to 58.0 ppm; RDX @ 1.0 to 1.3 ppm; 2,4,6-TNT @ 1.3 to 3.2 ppm; and 2,4-DNT @ 1.1 to 4.7 ppm. No EP Toxic metals were found. Eight of 15 samples taken from the northernmost pad at this site in May 1982, contained explosive constituents: HMX @ 2.2 ppm; RDX @ 4.6 ppm; 2,4,6-TNT @ 1.0 ppm; and 2,4-DNT @ 1.6 to 5.3 ppm. No EP Toxic metals were detected in these samples. (Ref 13)

At the time of the site visit, the north pad consisted of rails on the ground where projectiles were burned. The south pad had five burn pans used for propellant burning. Ash from the pans was collected, drummed, and tested for EP toxicity prior to disposal.

RECOMMENDATION: A significant release to the soil has been documented. To determine the potential impact, ground-water monitoring should be conducted to determine if the contaminants are migrating from the site. This would probably be done as part of an RFI.

REFERENCE: (Appendix A) 1, 2, 13

LEAD-57

UNIT NAME: Residue Burial Site

APPROXIMATE DIMENSIONS: 50 X 200 feet

TIME OF OPERATION: Unknown to 1985

DESCRIPTION OF ACTIVITIES/WASTES: (Figure D-3) This unit contains ash residue generated from the nearby propellant and contaminated material burning grounds.

RECOMMENDATION: The presence of significant quantities of explosive compounds and metals in the residue buried at this site is probable. Ground-water monitoring around this burial site is recommended to determine if a release to ground-water has occurred. This would have to be done before a permit could be issued.

REFERENCE: (Appendix A) 1

LEAD-58

UNIT NAME: Open Burning Ground 2

APPROXIMATE DIMENSIONS: 10 acres

TIME OF OPERATION: 1945-present (intermittent)

DESCRIPTION OF ACTIVITIES/WASTES: (Figure D-3) This area has been used for the incineration of contaminated wood products, paper, etc., that could not be salvaged. CARC paint filters were also burned at this site. Two large cages were used for burning contaminated wood and paper products at this site. Prior to the use of the DEAC furnace, seven burn chambers located at this site were used for the destruction of small arms ammunition.

RECOMMENDATION: Soil sampling inside burn cages and near burn chambers is recommended to determine if heavy metals, explosive constituents, pentachlorophenol, or dioxin have been released. This would have to be done before a permit could be issued.

REFERENCE: (Appendix A) 1, 12, 13

LEAD-59

UNIT NAME: Burning Site/Neutralization Pit

APPROXIMATE DIMENSIONS: 100 X 100 feet (fenced area); 20 X 40 feet (pit)

TIME OF OPERATION: 1958-1965

DESCRIPTION OF ACTIVITIES/WASTES: (Figure D-3) This site is located northwest of the propellant burning grounds and was used for the destruction of IRFNA, UDMH, hydrazine, SP-4, aniline, and furfural alcohol. A small leaching pit, located at the site, was occasionally used to neutralize the acid with limestone. An aluminum pipe lies in the bottom of the pit which is approximately 3 feet deep. The pit contained limestone cobbles about 3 inches in diameter.

RECOMMENDATION: Soil samples should be taken from the bottom of the pit and from the fenced-in area to determine if a release has occurred. Parameters should include heavy metals, explosives, and an organic screen. This would have to be done before a permit could be issued.

REFERENCE: (Appendix A) 1

LEAD-60

UNIT NAME: Ammunition Box Piles near Building 3700

APPROXIMATE DIMENSIONS: Not applicable

TIME OF OPERATION: 1958-1965

DESCRIPTION OF ACTIVITIES/WASTES: (Figure D-4) Several large piles of pentachlorophenol (PCP) treated ammunition boxes are located near this building. There is potential for PCP to leach from the boxes.

RECOMMENDATION: Composite soil sampling from under the piles should be accomplished to determine if a release has occurred. This would have to be done before a permit could be issued.

REFERENCE: (Appendix A) 1, Site Visit

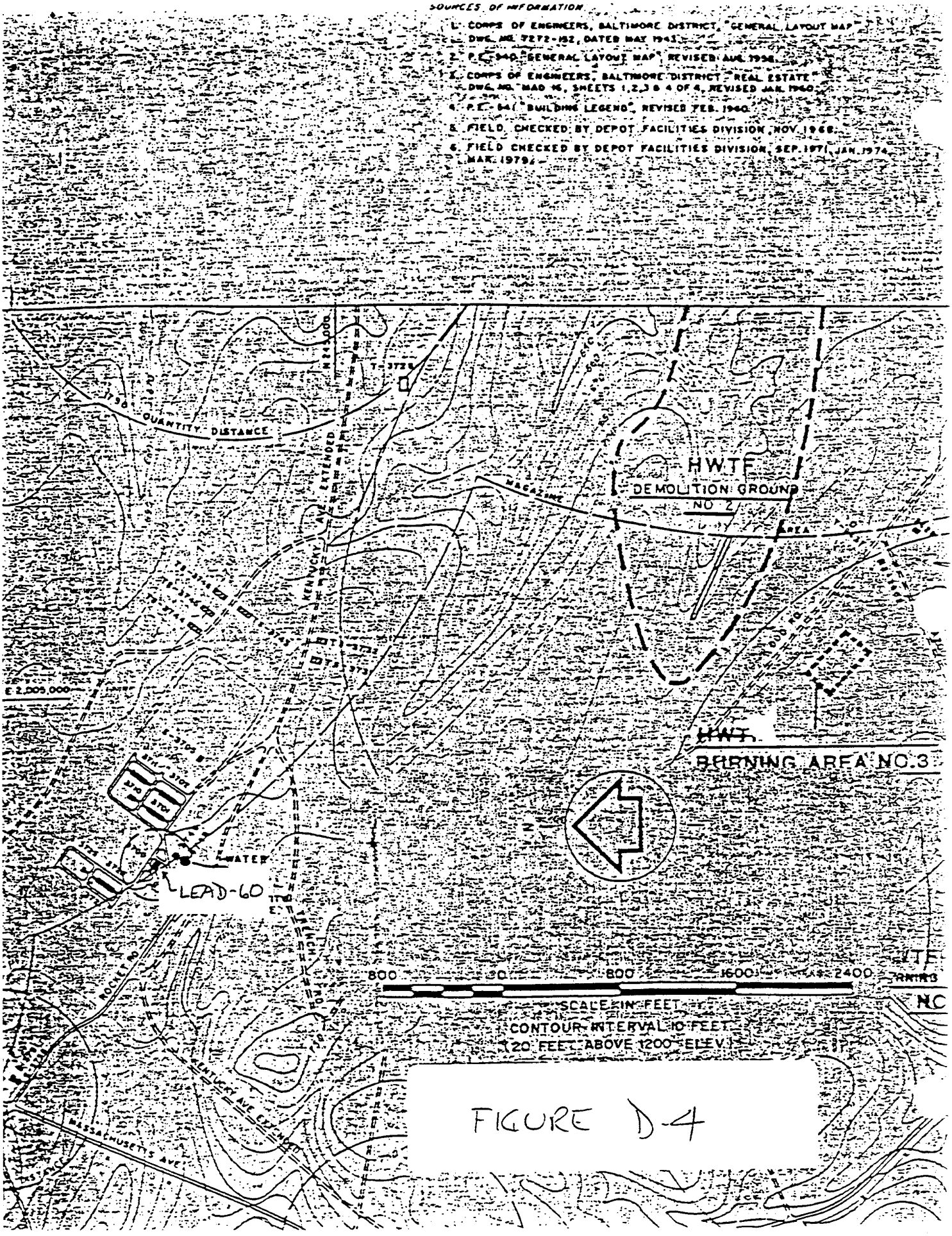

SOURCES OF INFORMATION
1. CORPS OF ENGINEERS, BALTIMORE DISTRICT, "GENERAL LAYOUT MAP" DWG. NO. 7272-152, DATED MAY 1943.
2. P.E. 340 "GENERAL LAYOUT MAP" REVISED AUG. 1956.
3. CORPS OF ENGINEERS, BALTIMORE DISTRICT "REAL ESTATE" DWG. NO. "MAD 16, SHEETS 1,2,3 & 4 OF 4, REVISED JAN. 1960.
4. P.E. 84 ("BUILDING LEGEND", REVISED FEB. 1960.
5. FIELD CHECKED BY DEPOT FACILITIES DIVISION, NOV. 1968.
6. FIELD CHECKED BY DEPOT FACILITIES DIVISION, SEP. 1971, JAN. 1974, MAR. 1979.
HWTF
DEMOLITION GROUND
NO. 2
BURNING AREA NO. 3
QUANTITY DISTANCE
KENTUCKY AVE. EXTENDED
MASSACHUSETTS AVE.
ROCKET RD.
WATER
LEAD-60
E 2,009,000
800
0
800
1600
2400
SCALE IN FEET
CONTOUR INTERVAL 10 FEET
120 FEET ABOVE 1200 ELEV.

FIGURE D-4

LEAD-61

UNIT NAME: Package Sewage Treatment Plant

APPROXIMATE DIMENSIONS: 15 X 20 feet

TIME OF OPERATION: Current

DESCRIPTION OF ACTIVITIES/WASTES: (Figure D-5) This plant provides service for the ammunition maintenance facility. The plant consists of a bar screen and comminutor unit, a primary aeration tank, primary and secondary clarifiers with recycling capability, a froth pump and spray apparatus, and a chlorine contact chamber.

(Have requested information from the installation to determine what happens to wasted solids.)

RECOMMENDATION: No action necessary.

REFERENCE: (Appendix A) 4

LEAD-62

UNIT NAME: Demolition Ground 1

APPROXIMATE DIMENSIONS: 15 acres

TIME OF OPERATION: 1945 - present (only occasional use since late 70's or early 80's)

DESCRIPTION OF ACTIVITIES/WASTES: (Figure D-6) This unit is located in the mountainous area on the western side of the depot and was used for the demolition of high explosive items containing standard explosives (tetryl, TNT, Comp B, tritonal, PETN, black powder, tetrytol, Comp C-3, pentolite, propellants, amatol, lead styphnate, and possibly lead azide). The majority of this area has been regraded and seeded. A small detonation crater still exists and is used for occasional EOD.

RECOMMENDATION: The activities at Demolition Ground 1 have been similar to but much less frequent than those at Demolition Ground 2. Since the extent of contamination at Demolition Ground 2 is very limited, it can be expected that the contamination at this area is also negligible. Therefore, no sampling should be required.

REFERENCE: (Appendix A) 1, 2, 13

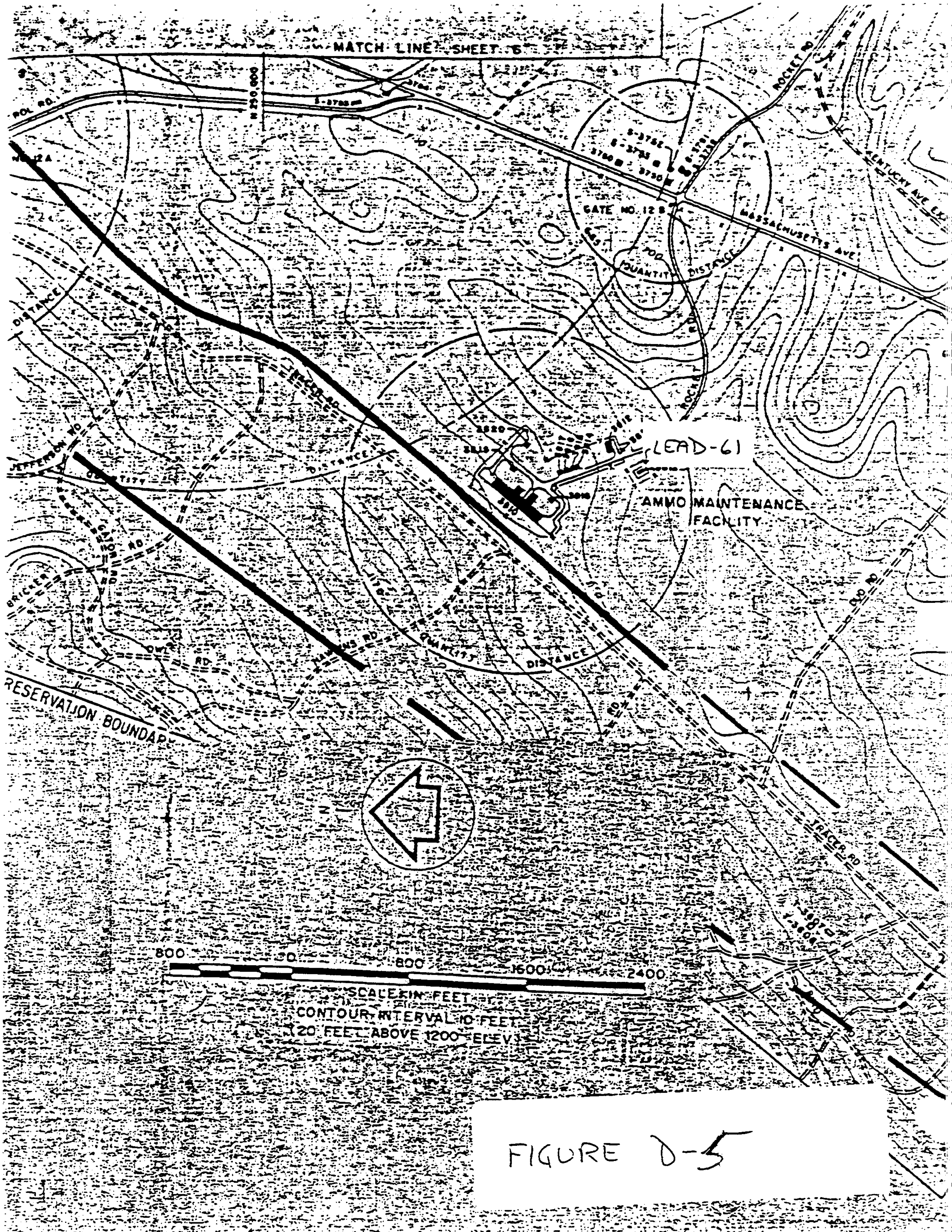

MATCH LINE SHEET 6
POL RD.
GATE NO. 12 S
MASSACHUSETTS AVE
KENTUCKY AVE EXT
ROCKET RD
QUANTITY DISTANCE
TRACER RD
JEFFERSON RD
BRICKER
RESERVATION BOUNDARY
LEAD-61
AMMO MAINTENANCE FACILITY
800 0 800 1600 2400
SCALE IN FEET
CONTOUR INTERVAL 10 FEET
(20 FEET ABOVE 1200 ELEV.)

FIGURE D-5

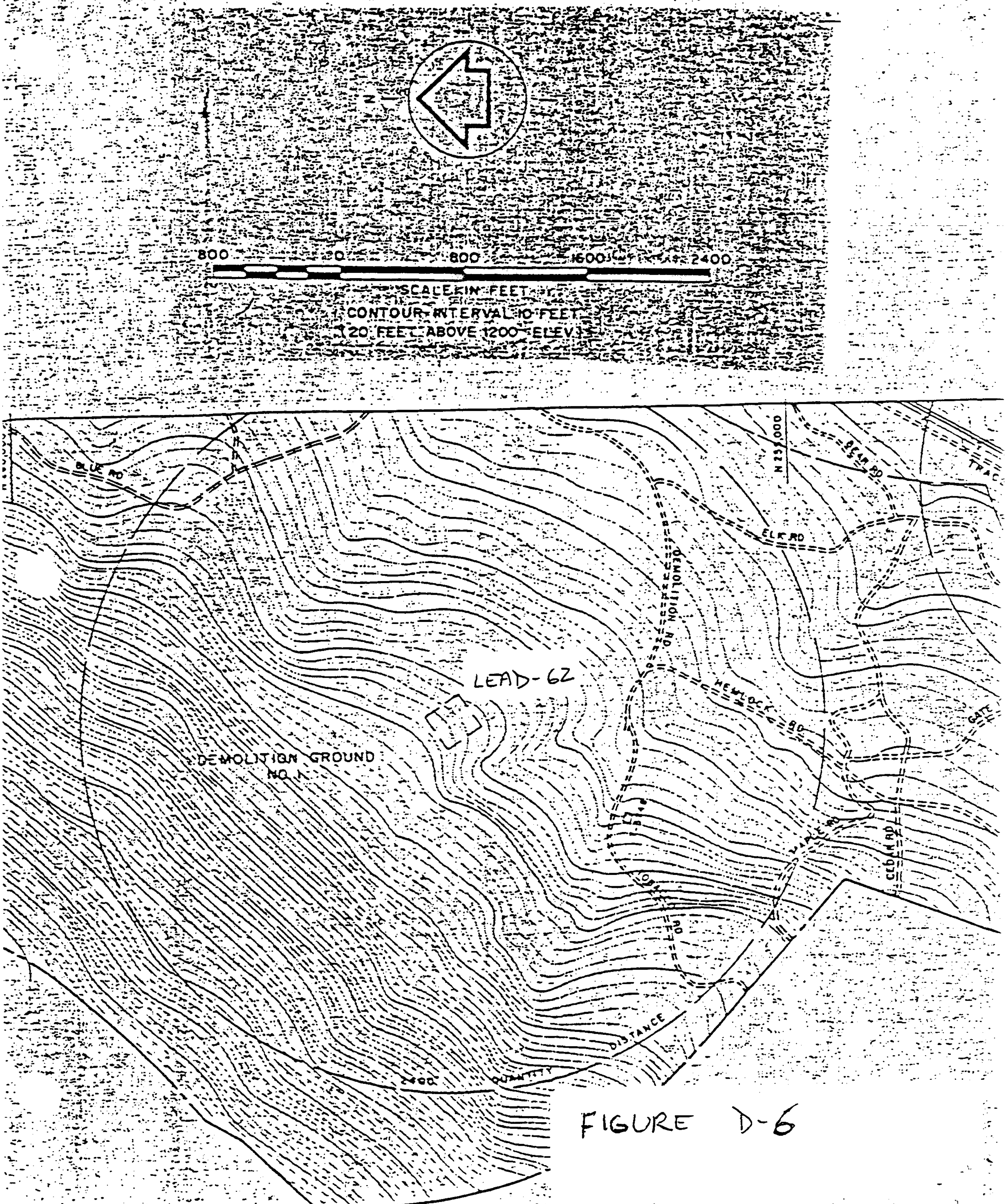

N
800
0
800
1600
2400
SCALE IN FEET
CONTOUR INTERVAL 10 FEET
(20 FEET ABOVE 1200 ELEV)
BLUE RD
BEAR RD
ELK RD
DEMOLITION RD
HEMLOCK RD
CEDAR RD
LEAD-62
DEMOLITION GROUND NO. 1
DISTANCE
QUANTITY
2400

FIGURE D-6