West Valley Demonstration Project

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PREPARED BY:

L. E. Krieger — 4/15/96
Cognizant Author — Date

APPROVED BY:

C. L. Repp — 4/15/96
Cognizant Manager — Date

West Valley Nuclear Services Co., Inc.
P.O. Box 191
West Valley, NY 14171-0191

RFIVE:0000873.01

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RCRA FACILITIES INVESTIGATION (RFI) WORK PLAN
WEST VALLEY DEMONSTRATION PROJECT
WEST VALLEY, NEW YORK
FALL 1993

Prepared for:

U. S. Department of Energy
Idaho Field Office
West Valley Project Office

Prepared by:

West Valley Nuclear Services Co., Inc.
P. O. Box 191
Rock Springs Road
West Valley, New York 14171

RFIVE:0000873.01

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Page 1 of 7

Page No.	Section No.	Description of Changes
Cover Page on WV-1816 form		Change "Workplan" to "Work Plan"
3-15	3.3.1, para 1	The procedures - Change "Collection/Quality Assurance -- Sampling and Analysis Plan" to "Collection and Quality Assurance Plan"
B-6	1.3, para 1	To design - Change "U.S.G.S. (1984), and U.S.G.S. (1985)" to "Bergeron et al. (1984), and Bergeron et al. (1985)."
B-30	1.6, para 1	Stream Sediment - - Delete "Stream Sediment Sampling Procedures" - Delete "Sediment sampling procedures will conform to those described in Draft I of the Sampling and Analysis Plan for Facilities Assessment." - Add "Deleted"

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Page No.	Section No.	Description of Changes
B-39	1.7.1.1, para 3	Several - Change "(Environmental Characterization of the West Valley Site, E. D. Picazo, S. Marchetti, D. P. Wilcox, West Valley Nuclear Services Co., Inc., West Valley, New York 14171.)" to "(Picazo, Marchetti, and Wilcox 1984)."
B-40	1.7.1.1, para 3	The May - Change "identified in the soils characterization Sampling and Analysis Plan (WVNS 1990. Sampling and Analysis Plan for Facility Related SWMU Characterization Activities, West Valley Demonstration Project, West Valley, New York Draft F)." to "in accordance with existing procedures."
B-100	1.8	Quality - Change "March 1991." to "March 29, 1991."
B-136	1.13.5, para 3	The principal - - Delete the underline with "Functional Guidelines for Evaluating Organics Analyses" - Change "EPA, February 1, 1988, (EPA 68-01-6699) and Functional Guidelines for Evaluating Inorganic Analyses, EPA, July 1, 1988," to "(U.S. Environmental Protection Agency February 1, 1988), EPA 68-01-6699, and Functional Guidelines for Evaluating Inorganic Analyses, U.S. Environmental Protection Agency July 1, 1988),"
B-194	Table B-12	NYS - Change "revised August 1989" to "March 29, 1991."
F-1 - F-3	References	Analytical - - Delete "Analytical Chemistry. December 1980. 52:14." - Add "Deleted"

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Page No.	Section No.	Description of Changes
F-1 - F-3	References	ASME - - Move "ASME NQA-1-1989." to after "Facilities." - Add "American Society of Mechanical Engineers. 1989." before "Quality"
F-1 - F-3	References	U.S. Geological - - Replace "U.S. Geological Survey." with "Bergeron, M.P., et al. 1984." - Change "Hyrogeology" to "Hydrogeology" - Replace "USGS Open-File Report, 1984." with "U.S. Geological Survey Open File Report 84."
F-1 - F-3	References	Yager. Records - - Replace "Yager." with "Bergeron, M.P. 1985." - Change "USGS Open File Report 83-682, 1985." to "U.S. Geological Survey Open File Report 83-682."
F-1 - F-3	References	Bergeron, M.P. 1988 - Change "USGS" to "U.S. Geological Survey"
F-1 - F-3	References	Bergeron, M.P. 1987 - Change "USGS" to "U.S. Geological Survey"
F-1 - F-3	References	Dames & Moore - - Add "Co., Inc." after "Services" - Delete "1986"
F-1 - F-3	References	QA Program for U.S. - - Change "QA" to "Department of Army U.S. Army Toxic and Hazardous Materials Agency. August 1980. Quality Assurance" - Delete "August 1980."
F-1 - F-3	References	Eberhardt - - Change "Commerical" to "Commercial" - Change "Disposl" to "Disposal"

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Page No.	Section No.	Description of Changes
F-1 - F-3	References	WVDP Monitoring (1st part) - - Change "WVDP Monitoring Well Characterization (Letter, May 12, 1982)." to "Marchetti, S. December 17, 1982." - Change "(Letter, December 17, 1982)." to "Letter to W.H. Hannum. WD:82:0361."
F-1 - F-3	References	NYS Department - Change "NYS Department of Environmental Conservation, Division of Hazardous Substances Regulation. RCRA Quality Assurance Project Plan Guidance, revised August 1989." to "New York State Department of Environmental Conservation. March 29, 1991. RCRA Quality Assurance Project Plan Guidance. Albany, NY: Division of Hazardous Substances Regulation."
F-1 - F-3	References	NYSDOH - Change "NYSDOH" to "New York State Department of Health"
F-1 - F-3	References	Groundwater. August 1989 - - Add "New York State Energy Research and Development Authority. August 1989." before "Groundwater" - Change "(and companion reports). August 1989" to "2 vols. Liverpool, NY: Engineering-Science."
F-1 - F-3	References	Groundwater. September 1989 - - Add "_____. September 1989." before "Groundwater" - Change "Vol. 1, September 1989. Prepared by Engineering Science for NYSERDA." to "2 vols. Liverpool, NY: Engineering-Science."

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Page No.	Section No.	Description of Changes
F-1 - F-3	References	Picazo - Add "In *Waste Isolation in the U.S. Technical Programs and Public Education*, Vol. 2. West Valley Nuclear Services Co., Inc., West Valley, New York."
F-1 - F-3	References	Prudic - - Change "USGS" to "U.S. Geological Survey" - Add "Washington, D.C.: U.S. Government Printing Office."
F-1 - F-3	References	U.S. Environmental - - Add "1979." after "Agency." - Change "EPA 600." to "EPA-600/4-79-019."
F-1 - F-3	References	OSWER - Change "OSWER Directive 9355.97b." to "U.S. Environmental Protection Agency. March 1987. Data Quality Objectives for Remedial Response Activities, Development Process. Washington, D.C.: Office of Emergency and Remedial Response and Office of Waste Programs Enforcement EPA/540/G-87/003."
F-1 - F-3	References	Quality Assurance Program Requirements - - Delete "Quality Assurance Program Requirements for Nuclear Facilities. ANSI/ASME NQA-1-1986 and ASME NQA 1 1989." - Add "Deleted"
F-1 - F-3	References	Yager. Functional. 1988 - - Add February 1, 1988 and updated versions." before "Functional" - Change (EPA 68 01 6699)." to "EPA 68-01-6699." after "Analyses"
F-1 - F-3	References	Yager. Functional. July 1988 - Move "July 1, 1988 and updated versions." before "Functional"

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Page No.	Section No.	Description of Changes
F-1 - F-3	References	Yager. Interim - - Move "May 1989." in front of "Interim" - Change "Vols. I and II." to "2 vols. Washington, D.C.: Waste Management Division, Office of Solid Waste. EPA/SW-89-031."
F-1 - F-3	References	Yager. Test - - Change "3rd edition" to "3rd ed." - Change "(EPA/SW-846)." to "EPA/SW-846."
F-1 - F-3	References	WVDP - WVDP Monitoring Well Characterization (Letter WD:82:0102, dated May 12, 1982).
F-1 - F-3	References	WVNS Environmental - - Add "West Valley Nuclear Services Co., Inc. October 1982." before "WVNS" - Delete "October 1982 Draft 1982."
F-1 - F-3	References	WVNS. Radiological - - Move "1989." before "Radiological" - Add "WVDP-010," before "Rev. 3." - Delete "WVPO."
F-1 - F-3	References	WVNS. Sampling - - Delete "_____. Sampling and Analysis Plan (SAP) Groundwater Monitoring Network, Draft M, 1990." - Add "Deleted"
F-1 - F-3	References	WVNS. Sampling. Attachment A - - Delete "_____. Sampling and Analysis Plan (SAP) Groundwater Monitoring Network, Draft M. Attachment A: Project Health and Safety Plan. 1990." - Add "Deleted"
F-1 - F-3	References	Environmental - Delete "Environmental Information Documents:"
F-1 - F-3	References	Air - Change "Air Resources, Volumes I-III, WVDP EIS-015, West Valley Nuclear Services, December, 1992." to "_____. December 1992. Environmental Information Document, Air Resources. 3 vols. WVDP-EIS-015, Rev. 0."

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Page No.	Section No.	Description of Changes
F-1 - F-3	References	Water - Change "Water Quality, WVDP EIS-006, West Valley Nuclear Services, December, 1992." to "_____. December 1992. Environmental Information Document, Water Quality. WVDP-EIS-006, Rev. 0."
F-1 - F-3	References	Hydrology - Change "Hydrology Series, Volume I-V, WVDP EIS-009, West Valley Nuclear Services, January, 1993." to "_____. January 1993. Environmental Information Document, Hydrology Series. 5 vols. WVDP-EIS-009, Rev. 0."
F-1 - F-3	References	Geology - Change "Geology, WVDP EIS-004, West Valley Nuclear Services, March, 1993." to "_____. March 1993. Environmental Information Document, Geology, WVDP-EIS-004, Rev. 0."
F-1 - F-3	References	Pathway - Change "Pathway Assessment, WVDP EIS-020, West Valley Nuclear Services, March 1993." to "_____. March 1993. Environmental Information Document, Pathway Assessment. WVDP-EIS-020, Rev. 0."
F-1 - F-3	References	Yager, R.M., 1985 - Change "United States" to "U.S."

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Page 1 of

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B-163 - B-169	Table B-2	Replacement of table
B-176 - B-178	Table B-4	Replacement of table
B-179	Table B-5	Replacement of table
B-192 - B-194	Table B-12	Replacement of table

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WVNS RECORD OF REVISION

DOCUMENT

If there are changes to the controlled document, the revision number increases by one. Indicate changes by one of the following:

- Placing an arrow at the beginning of the sentence or paragraph that was revised
- Placing a vertical black line in the margin adjacent to sentence or paragraph that was revised
- Placing the words GENERAL REVISION at the beginning of the text
- Placing either FC#> or PC#> at the beginning of a field/page change

Example:

The arrow in the margin indicates a change. >
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	Section 1.7.1.1, Changed "identified in the soils....,New York Draft F)." to in accordance with existing procedures."	B-40	
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	Table B-12, Changed "revised August 1989" to "March 29, 1991."	B-194	
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Plate 13 - Structure map which depicts the top of bedrock
Plate 14 - NRC Licensed Disposal Area

List of Attachments

B-1 Standard Method for Penetration Test & Split Barrel Sampling of Soils
B-2 Current Characterization of Wastes Placed in the CPC Waste Storage Area
B-3 1991 Sampling Results of Lagoon 3 Sediments
B-4 1988 EPTOX Sampling Results of the Sludge Pond
B-5 CDDL Closure Plan
B-6 Radiological Control Procedure RC-ADM-27
B-7 Groundwater and Soils Sampling Procedures
B-8 Soil and Sediment Sampling Procedures

1.0 INTRODUCTION

This section contains the purpose and objective of the RCRA Facility Investigation (RFI) Work Plan and an overview of work to date followed by a brief summary of the regulatory history of the site.

1.1 Purpose and Objective

The purpose of the RFI Work Plan is to provide a strategy for investigating the SWMUs listed in Tables 1-1 and 1-2. This work plan addresses the tasks defined in Attachment I of the 3008(h) Order on Consent, "Scope of Work For The RCRA Facility Investigation," with the exception of Tasks II and IV. Task II (pre-investigation of corrective measures technologies), has been submitted as a separate document. It is being reviewed to incorporate NYSDEC Comments. Task VI (laboratory and bench-scale studies) is premature at this time and will be scoped based on the results of the RFI or if necessary as part of corrective actions.

This RFI work plan contains three main sections and eight appendices (A-H) as follows:

- Section 1.0 contains the purpose and objective of this work plan and a brief description of the work performed to date.

- Section 2.0 and Appendix B contain the information relating to the description of current site conditions, which addresses Task I of Attachment I to the 3008(h) Order. Additional information related to current site conditions is contained in reports which are being provided as references.

- Section 3.0 contains the technical approach summary, which describes the WVDP approach to conducting the RCRA Facility Investigation. (Task IV of Attachment I to the 3008(h) Order). The Solid Waste Management Units (SWMUs) under investigation are identified in this section.

- Appendices A through E contain the project management plan, the sampling and analysis plan, the data management plan, the health and safety plan and the community relations plan, respectively. These address Task III of Attachment I of the 3008(h) Order. Also, Tasks V, investigation analyses and VII, reporting, of Attachment I of the 3008(h) Order are addressed cumulatively in Appendices B & C of this workplan.

- Appendices F and G contain the main references used to develop this work plan and a list of acronyms, respectively.

The scope of work described in this RFI Work Plan has been tailored to the specific conditions and circumstances at the WVDP and is based on Attachment 1 (Scope of Work for the RFI) of the 3008(h) Consent Order. The WVDP proposes to use historical information in combination with unit specific groundwater and soil/sediment investigations as an initial phase to assess the SWMUs (refer to Appendix B for a description of the investigatory approach for each SWMU). Additional future investigative needs may be necessary at specific locations at the WVDP.

The WVDP has identified forty SWMUs. Because some SWMUs are contiguous or so close together as to make monitoring of separate units impractical, the individual SWMUs have been grouped and ranked into eleven larger units -- super-solid waste management units (SSWMUs). The SSWMUs and their constituent SWMUs are listed in Tables 1-1 and 1-2. A RFI report will be developed for each of the remaining 9 SSWMUs. For two SSWMUs; the Hazardous Waste Storage Lockers and the RTS Drum Cell, there is sufficient information at this time to determine that there is no release or potential for release action is not necessary. Information to support this position is presented in Appendix B. Each RFI report will assess the SSWMU and constituent SWMUs by examining the following information:

- Operational History - Review of historical plant information

- Environmental Setting - Review of historical and ongoing studies

- Contamination Characterization - Review of historical information and collection of media specific environmental samples as specified in Appendix B for each SWMU (includes both groundwater monitoring and soil sampling programs).

- Potential impacts on receptors

The reports will determine one or more of the following:

- There is no evidence of a release or likelihood of a release of hazardous waste or hazardous constituents that poses a threat to human health and the environment.

- Additional focused investigations are necessary to determine if a release of hazardous waste or hazardous constituents has occurred.

- Corrective Actions are required.

The strategy for the background review and field investigation of these SSWMUs is detailed in Appendix B. Performing the investigation in a phased approach will allow a more clearly focused assessment of areas of the most environmental concern at the facility. Future investigations, if necessary, will be tailored to the specific conditions and circumstances defined in the initial effort and will be focused on the specific units, releases, and exposure pathways identified.

In order to provide detailed information describing the site's environmental setting, reports have been prepared for the following site specific subject areas which are germane to the RFI investigation process:

- Geology

- Water Quality

- Hydrogeology Series (groundwater and vadose zone)

- Air Resources
- Pathway Analysis

The reports will be provided to the EPA/DEC under separate cover and will be utilized in the RFI reports. Existing environmental documentation, regional geologic and hydrologic data, and routine monitoring data obtained in order to comply with DOE Orders will also be used to supplement the information.

The SSWMUs will be investigated in the order noted in Appendix A, the Project Management Plan, under "RFI Activities Schedule." As shown, the individual RFI reports for those SSWMUs with higher priority will be addressed first. The WVDP will follow the procedures identified in RCRA and the 3008(h) Order when a determination of no further action for a facility unit is required.

This RFI work plan is primarily based on various federal and state guidance documents and regulations, including:

- Administrative Order on Consent Docket No. II RCRA-3008(h) - 92-0202
- Interim Final RCRA Facility Investigation (RFI) Guidance, May 1989
- NYSDEC Guidance on RCRA Quality Assurance Project Plans, revised March 29, 1991.
- 40 CFR Parts 264, 265, 270 and 271, Corrective Action for Solid Waste Management Units (SWMUs) at Hazardous Waste Management Facilities, Federal Register, Vol 55., NO 145, Friday, July 27, 1990 Proposed Rule.

A complete list of references appears in Appendix F.

1.2 Regulatory History and Compliance Activities

A brief history of the operations at the WVDP is presented in Section 2.1. During the course of site operations, which began in 1966 to the present time, the regulatory requirements have evolved to meet the changing regulatory and site specific needs. It is not the intent of this work plan to describe in detail this

regulatory history. However, key elements of the regulatory and operational history include the following:

- New York State Office of Atomic Development (OAD) was formed in 1959 to coordinate atomic development and regulations in New York. The OAD acquired the 3345 acre site in 1961 for the purpose of storing nuclear fuels and radioactive waste.

- In 1962 Davison Chemical Co. a subsidiary of W. R. Grace Co., outlined plans to the Atomic Energy Commission (AEC) to construct a commercial reprocessing plant and established Nuclear Fuel Services, Inc. (NFS). Also in 1962 OAD became the New York Atomic Research and Development Authority (NYARDA).

- In the following year AEC, NFS and NYARDA conducted a series of negotiations culminating in contracts for NFS to build and operate a nuclear fuel reprocessing plant with the State of New York responsible for the wastes in perpetuity.

- In 1963 a permit to construct the NFS plant was issued by the AEC. Construction was completed in 1966.

- April 1966 NRC issues Operating License CSF-1 to NFS as operator and NYARDA as owner of facilities on 3300 acre site.

- Plant operated between 1966 and 1972.

- Proposed modifications to the plant in 1972 were determined by the AEC to require the retrofit of the process plant and a complete licensing review.

- In 1976 NFS notified the New York State Energy Research and Development Authority (NYSERDA) previously NYARDA, that it intended to surrender responsibility for all wastes to NYSERDA after its current lease expired in 1980.

- The Fiscal Year 1978 Authorization Act (Public Law 950-238, Section 105) instructed the Department of Energy (DOE) to study future options for the site.

- In 1980 Congress passed the West Valley Demonstration Project (WVDP) Act, Public Law 96-368 which directs DOE to solidify the high-level waste and decontaminate and decommission material and hardware used for the project in accordance with Nuclear Regulatory Commission (NRC) requirements.

- October 1980, cooperative agreement between U.S. Department of Energy and NYSERDA on the Western New York Nuclear Service Center to establish a cooperative framework for implementation of WVDP.

- In September 1981, the NRC Operating License SCF-1 was amended to transfer possession of the facility to DOE for conduct of the WVDP.

- September 1981, the WVDP Memorandum of Understanding (MOU) between the U.S. Department of Energy and the U.S. Nuclear Regulatory Commission established procedures for review and consultation by the NRC with respect to activities conducted at the WNYNSC by the DOE under the Act.

- The Atomic Energy Act (AEA) together with the Energy Reorganization Act (ERA) authorizes DOE and NRC to regulate radioactive material operations. DOE carries out its regulatory responsibilities through DOE Orders and in accordance with the Memorandum of Understanding between the DOE and the NRC.

- The SWMUs at the WVDP were identified in 1987 in response to questions regarding solid waste management practices (RCRA 3007 "Request for Information"). The solid waste management units include both inactive and currently active and operational units.

- The New York State Department of Environmental Conservation (NYSDEC) was given authorization to regulate radiological mixed waste by the Environmental Protection Agency (EPA) effective June 5, 1990.

- The WVDP submitted a Part A permit application in June 1990 for the treatment and storage of radioactive mixed waste and currently operates under interim status.

Pursuant to the 3008(h) Consent Order, the WVDP is required to conduct a RCRA Facility Investigation (RFI) to determine if any corrective actions are needed. This RFI Work Plan is a requirement of that Order.

1.3 Overview of Work to Date

A description of current site conditions is given in Section 2.0 and Appendix B where individual SWMUs are discussed. A substantial amount of environmental monitoring and data gathering has been performed on-site since 1966 to meet both operational and regulatory requirements. A main task of the scope of work for the RFI is to perform a comprehensive review of previous environmental work as it applies to the SWMUs. As such, a detailed description of relevant past environmental studies including pertinent findings will be presented in the RFI reports as they relate to the objectives of the RFI.

Prior to 1982 monitoring was done in accordance with the NRC operating license and effluent discharge permits. Since DOE assumed control of the Project, data has been routinely collected as directed by DOE Environmental Monitoring Orders (e.g., 5400.1 and 5400.5). The environmental monitoring program at the WVDP is comprised of effluent monitoring, off-site environmental surveillance, and on-site monitoring for specific biological and physical characteristics of the area. Effluent air and liquid emissions are monitored in accordance with standards promulgated by the EPA and incorporated in DOE orders. Plant effluents as regulated by NESHAPS and SPDES are also monitored on a routine basis. These data are published in site annual reports and will be utilized to the extent practicable for SWMU characterization.

Since 1989, an expanded groundwater monitoring program has been established onsite and several environmental studies have been initiated to support site closure. Under the program, groundwater has been sampled for 8 rounds in 1991 and 1992 and analyzed for an indicator list of radiological and chemical parameters. Data for 1991 has

been validated and is provided along with this submittal. Data for 1992 is still being validated and will be provided at a later date pursuant to the schedule in Appendix A.

TABLE 1-1

List of SSWMUs

SSWMU #	Super Solid Waste Management Unit (SSWMU)
1	Low-Level Waste Treatment Facility (LLWTF) - includes former Lagoon 1, Lagoons 2-5, the LLWTF building, interceptors, and neutralizer pit
2	Miscellaneous Small Units - includes sludge ponds, solvent dike, effluent mixing basin, and paper waste incinerator
3	Liquid Waste Treatment System (LWTS) - includes LWTS, CSS, parts of main process building (sealed rooms)
4	High-Level Waste (HLW) Storage and Processing Area - includes HLW tanks, vitrification test tanks, STS, and vitrification facility
5	Maintenance Shop Leach Field - includes maintenance shop leach field
6	Low-Level Waste Storage Area includes old/new hardstands, lag storage, lag storage extensions and additions
7	Chemical Process Cell (CPC) Waste Storage Area - includes only the CPC waste storage area. This unit contains vessels, pipes, and other wastes that were removed from the chemical process cell.
8	Construction and Demolition Debris Landfill (CDDL) - includes the construction landfill only
9	NRC-Licensed Disposal Area (NDA) - includes NDA disposal areas, container storage area, and trench interceptor project
10	Rad Waste Treatment System (RTS) Drum Cell - includes the RTS Drum Cell - where low-level cemented radioactive waste is stored

TABLE 1-1 (concluded)

List of SSWMUs

SSWMU #	Super Solid Waste Management Unit (SSWMU)
12	Hazardous Waste Storage Lockers - includes four hazardous waste storage lockers

*NOTE: SSWMU #11 on site maps is the SDA, which is exclusive to NYSERDA investigation. NYSERDA is responsible for conducting RFI activities at the SDA.

TABLE 1-2

LIST OF INDIVIDUAL SOLID WASTE MANAGEMENT UNITS (SWMUs)

SWMU #	Super Solid Waste Management Unit (SSWMU)
1	Construction and Demolition Debris Landfill - Included as SSWMU #8
2	NRC-Licensed Disposal Area (NDA) - Included as SSWMU #9
3	Lagoon 1 - Included in SSWMU #1
4	Active LLWTF Lagoons 2-5 - Included in SSWMU #1
5	Demineralizer Sludge Ponds - Included in SSWMU #2
6	Solvent Dike - Included in SSWMU #2
7	Effluent Mixing Basin - Included in SSWMU #2
8	Maintenance Shop Leach Field - Included as SSWMU #5
9 & 9a	Old/New Hardstand Storage Area - Included in SSWMU #6

TABLE 1-2 (continued)

LIST OF INDIVIDUAL SOLID WASTE MANAGEMENT UNITS (SWMUs)

SWMU #	Super Solid Waste Management Unit (SSWMU)
10	Paper Waste Incinerator - Included in SSWMU #2
11 & 11a	Kerosene Tanks and NDA Container Storage - Included in SSWMU #9
12 & 12a	Vitrification Test Facility Waste Storage Tank - Included in SSWMU #4 Tanks not used to store hazardous waste were taken out of service after vitrification cold testing; may be re-used for another purpose.
13	High-Level Waste Tank Farm - Included in SSWMU #4
14	Chemical Process Cell (CPC) Waste Container Storage Area - Included as SSWMU #7
15	Containerized Low-Level and Transuranic Waste Storage Area (Lag Storage) - Included in SSWMU #6
16 & 16a	Lag Storage Building, Extension and Addition Areas - SSWMU #6
17, 17a & 17b	Low-Level Waste Treatment Facility (LLWTF) - Included in SSWMU #1, 17a is included as the neutralization pit and 17b represents the interceptor.

TABLE 1-2 (continued)

LIST OF INDIVIDUAL SOLID WASTE MANAGEMENT UNITS (SWMUs)

SWMU #	Super Solid Waste Management Unit (SSWMU)
18 & 18a	Liquid Waste Treatment System (LWTS) - Included in SSWMU #3, 18a represents the list of sealed rooms
19	Supernatant Treatment System (STS) - Included in SSWMU #4
20	High-Level Waste Vitrification Facility - Included in SSWMU #4
21	RTS Drum Cell - Included as SSWMU #10
22	Cement Solidification System (CSS) - Included in SSWMU #3
23	Trench Interceptor Project - Included in SSWMU #9
24	Hazardous Waste Storage Lockers
25	Inactive Scrap Material Landfill Adjacent to Bulk Storage Warehouse (Page 12 of Consent Order)
26	Subcontractor Maintenance Area
27	Fire Brigade Training Area
28	Vitrification Hardstand (No assessment required)

TABLE 1-2 (concluded)

29	Industrial Waste Storage Area
30	Cold Hardstand Area (near CDDL)
31	NDA Trench Soil Container Area
32	Old Sewage Treatment Facility
33	Existing Sewage Treatment Facility
34	Temp. Storage Locations for Well Purge Water
35	Construction and Demolition Area
36	Old School House
37	Contact Size Reduction Facility
38	Drum Super Compactor
39	Staging Area for NDA (Brick Wall)
40	Satellite Accumulation Areas and 90 Day Storage Areas

2.0 DESCRIPTION OF CURRENT CONDITIONS

This section and Appendix B address the requirements of Task I of Attachment I in the 3008(h) Order. The purpose of this section is to provide facility-related background information and a summary of what is known to date about hazardous waste and hazard constituents. Appendix B contains information on individual SWMUs together with the sampling and analysis program. Additional details about the facility or individual SWMUs will be provided in the SSWMU-specific RFI reports, which will further compile and evaluate operational history and monitoring data.

2.1 Facility Background

2.1.1 Introduction

The Western New York Nuclear Service Center (WNYNSC), near West Valley, New York and about 50 km (30 mi.) south of Buffalo, New York, was the location of the only commercial nuclear fuel reprocessing facility to have operated in the United States.

The New York State Energy Research and Development Authority (NYSERDA) owns the site and facilities. Nuclear Fuel Services, Inc. (NFS) the commercial operator, operated the plant and the WNYNSC under NRC Operating License CSF-1 from 1966 to 1972 on land leased by NFS from New York State, processing about 640 metric tons (1.4 million lbs) of spent reactor fuel. The reprocessing operation generated approximately 2.3 million liters (600,000 gal.) of high-level radioactive waste that was transferred into underground tanks for storage. In 1972 NFS closed the plant for modifications to expand its capabilities but subsequently decided not to resume operations. The terms of the contract between the state and NFS required the state to assume responsibility for the facilities and wastes when the NFS lease expired.

The Fiscal Year 1978 Authorization Act (Public Law 95-238, Section 105) instructed the Department of Energy (DOE) to study future options for the 1335- hectare (3300-acre) Western New York Nuclear Service Center at West Valley, New York. Less than 100 hectares (250 acres) of the site had been developed for the former reprocessing plant and associated facilities. The Department of Energy was also directed to

recommend an allocation of existing and future responsibilities for the WNYNSC among the federal government, the state of New York, and then-current industrial participants. The resulting study, the Western New York Nuclear Service Center Study Final Report and Companion Report, identified the high-level liquid waste as having the greatest potential to adversely affect the environment.

In 1980 Congress passed the West Valley Demonstration Project (WVDP) Act, Public Law 96-368, to demonstrate that high-level waste can be solidified in a form suitable for transportation and disposal; that suitable containers can be developed and the waste transported to a federal repository for permanent disposal; and that low-level and transuranic waste from the project in accordance with applicable licensing requirements can be safely disposed and the tanks, facilities, and any material and hardware used in connection with the project can be decontaminated and decommissioned in accordance with Nuclear Regulatory Commission (NRC) requirements. In September 1981, the NRC amended the Operating License CSF-1 to transfer possession of the facilities to DOE for conduct of the WVDP (NYSERDA continues to be licensed as the owner). On February 25, 1982, DOE assumed operational control of approximately 80 hectares (200 acres) of the 1335-hectares (3,300-acre) WNYNSC in order to conduct the WVDP. The Department of Energy (DOE) through its contractor, West Valley Nuclear Services Company Inc. (WVNS), a wholly-owned subsidiary of Westinghouse Electric Corporation, is currently performing operations as stipulated in the West Valley Demonstration Project Act the Memorandum of Understanding between the U.S. DOE and the U.S.N.R.C., and the Cooperative Agreement between DOE and NYSERDA.

2.1.2 Regional Setting

The Western New York Nuclear Service Center property comprises approximately 1335 hectares (3300 acres)[1] of northern Cattaraugus County, New York and approximately 6 hectares (14 acres) of southern Erie County New York (Figure 2-1 is a general regional location map). All active and inactive facilities are located on the Cattaraugus portion of the WNYNSC. This area is wholly drained by Buttermilk

[1]Units are consistently represented in metric with English in parenthesis except in cases of elevation (ft NGVD), drilling thickness (ft), and well construction details (in.).

Creek, which joins Cattaraugus Creek at the northern end of the property. Cattaraugus Creek flows northwest and empties into Lake Erie approximately 50 km (30 mi.) southwest of Buffalo, New York. The SWMUs are totally contained within 80 hectares of the 1335 hectares and therefore an adjacent property map is not included. A series of site area plates (oversized maps) are attached to the back of this document to represent pertinent boundary features, topography and hydrogeology, as well as SWMU locations and other pertinent site features.

Regional and site specific information associated with these maps is detailed in the environmental information documents provided as references. Site above ground and underground tanks are covered in a separate site document - WVDP-043; Oil, Hazardous Substances, and Hazardous Waste Spill Prevention Control and Countermeasures Plan. Tanks are registered with NYSDEC under registration number CBS-9-000-158. This has been submitted to the DEC Division of Water Bureau of Spill Prevention and Response and is updated annually.

The WVDP portion of the WNYNSC is divided into two areas, the north and south plateaus. The geology of the two areas is different, as shown in Figures 2-2 and 2-3. The north plateau is covered with alluvial and fluvial sand and gravel. On the south plateau, alluvium is absent and the Lavery till crops out at the surface. The operating plant facility and associated SWMUs are located on the north plateau. The disposal areas and the drum cell, are in the south plateau. The geology and hydrogeology of the site is described in references the environmental information documents provided as references.

2.1.3 Historical Use of the Facility for the Treatment, Storage,or Disposal of Waste

A brief history of the ownership of the site is summarized in Section 1.0 above. Various types of wastes were previously managed by NFS and some, excluding those located in the SDA, are currently managed by the WVDP. Current management includes treatment and storage of wastes as well as maintenance of wastes that were disposed of on-site during NFS and early WVDP operations. Waste types and associated waste units are described in Appendix B and Tables 1-1 and 1-2. Plate 1 is a site map which shows the location of all SSWMUs.

Information gathered on the historical use of facilities to date is summarized below. Appendix B of this document should also be referenced for a detailed historical information on each SWMU.

The main process building and its related support facilities are located in the middle of the north plateau. These facilities were constructed in the early 1960s on land that had been used for farming. During NFS tenure, the main process building was used to reprocess spent nuclear fuel to recover uranium and plutonium.

The spent fuel assemblies were transported to the plant in heavily shielded shipping casks. At the fuel receiving and storage area (FRS), the casks were spray washed to remove road dirt, the spent fuel assemblies were removed from the casks, placed in aluminum storage canisters and moved into the underwater storage area to await processing.

The first step in spent fuel reprocessing consisted of a mechanical portion which separated the fittings and casings from the assemblies and then chopped the metal tubes containing the spent fuel into short pieces, 1.6 to 3.8 cm (.50 to 1.50 inches) long. The spent fuel was then leached out by means of nitric acid, leaving the pieces of metal tubes, which were rinsed and buried in the NDA.

A solvent extraction process using ten pulsed countercurrent extraction columns then recovered the uranium and plutonium leached from the spent fuel. The extractant used was a 30% solution of tributyl phosphate in a hydrocarbon solvent known as dodecane. Chemical and radiolytic decomposition products were removed from the used organic solvent by contacting it with sodium carbonate solution and then with dilute nitric acid so that the solvent could be recycled.

The aqueous waste solutions from the solvent extraction process were partially evaporated to concentrate the wastes and remove most of the nitric acid, which was subsequently recovered for reuse. The wastes were then neutralized and pumped to the waste tank farm (WTF) for storage in an underground carbon steel tank.

The main process building was made up of many cells, ancillary rooms, and facilities. The three main areas included the fuel receiving and storage area (FRS), the mechanical process cells, and the chemical process cells and equipment area where the spent fuel was dissolved and the uranium and plutonium extracted (Fig. 2-4). The following information about the main process building is intended to provide an overview of the potential wastes that eventually became associated with SWMUs.

- The mechanical process cells contained the equipment for trimming, chopping, and general handling of the spent fuel assemblies before chemical dissolution of the fuel material. The area was divided into several cells: the process mechanical cell (PMC), the general purpose cell (GPC), and the scrap removal room (SRR). Maintenance, repair, and decontamination of the cranes and manipulators were in a mechanical crane room (MCR), a manipulator repair room (MRR), and a GPC crane room (GCR).

- Equipment for dissolution of the spent fuel, separation and purification of the uranium and plutonium, cleanup of used solvent, and concentration of the liquid wastes was housed in several process cells: the chemical process cell (CPC), three solvent extraction cells (XC-1, XC-2, and XC-3), the product purification cell (PPC), and the liquid waste cell (LWC).

Materials and chemicals used by NFS during reprocessing are summarized below:

Process/System	Chemical/Material Used
Chop-leach	Mild Steel $Hg(NO_3)_2$ - reported not used after first few runs HNO_3

Process/System	Chemical/Material Used
Solvent Extraction	$Fe(SO_3NH_2)_2$ - Ferrous Sulfomate $NaNO_2$ - Sodium Nitrite H_2SO_4 - Sulfuric Acid NaOH - Sodium Hydroxide

Solvent and Treatment	Tributyl Phosphate (TBP) $NaCO_3$ and HNO_3 - Drum Carbon and Nitric Acid Dodecane, $C_{12}H_{26}$ - Isomers
Decontamination & Decommissioning	HNO_3 + CH_3COOH - Nitric Acid + Acetic Acid NaOH + $H_6C_4O_6$ - Sodium Hydroxide+ $KMnO_4$ - Potassium Permanganate Citric and Tartonic Acids
Zirflex Declad	HF + HNO_3 - Hydrofluorc Acid + Nitric Acid $Al(NO_3)3$ - Aluminum Nitrate
Metal-X Fire System	NaCl + $MgCl_2$ - Sodium Chloride and Magnesium Chloride
Lab Chemicals	Miscellaneous
Maintenance	Molykote (MoSx) Oils and Greases Trichloroethylene (TCE) (degreaser)

Liquid plant wastes came from the acid fractionator condensate, floor drains in various cells and chemical makeup areas, and wash solutions from decontamination operations. Regeneration solutions from past decontamination efforts in the process building were mostly wash water and dilute acid and caustic decontamination solutions.

Between 1966 and 1972 when the facility operated, environmental releases included atmospheric discharges from process off-gas and ventilation systems and boilers, aqueous discharges of process, utility and sanitary wastewaters. Liquid high-level radioactive wastes were transferred to the high-level radioactive waste underground storage tanks.

2.2 Nature and Extent of Contamination

As described in Section 1.0, SWMUs have been identified and data concerning their characteristics have been detailed in Appendix B. Table 1-1 in Section 3.0 lists the SSWMU groups and possible source areas of contamination. The locations of the SSWMUs are shown in plan view in Plate 1. Details of the currently known nature and extent of hazardous waste and hazardous constituents can be found in Appendix B in the discussions of each SSWMU group.

The general approach in the RFI to identifying and characterizing the extent of migration and degree of contamination will include reviewing historical operational and environmental records and obtaining data from groundwater and soil/sediment investigations. Records dating back to the start of operations will be reviewed for information pertaining to design, location, type and quantities of material handled, and detailed operating histories for individual SWMUs. Field investigations will focus on detection of releases to groundwater and indications of the magnitude and extent. Air, soil, surface water, and sediment data, as applicable, will be reviewed as part of the historical data review since these media have been and are being monitored through ongoing programs.

2.3 Description of Current Monitoring and Permit Requirements

The current environmental monitoring program is comprised of effluent monitoring, off-site environmental surveillance, and on-site monitoring. The WVDP Environmental Monitoring Program is an ongoing program designed to monitor environmental releases of radioactive and non-radioactive substances from past and current site operations. The program meets the requirements of DOE Order 5400.1 and the Memorandum of Understanding (MOU) between DOE and NRC. The program is designed to provide data on effluent air, effluent water, surface and groundwater, soils, sediments, and foods, that could be pathways for movement primarily of radionuclides from the facility to humans and the environment. This program initiated in 1982 when DOE assumed control of the site and it has been updated over time as directed by DOE orders and directives. The program also includes monitoring performance for other regulatory purposes (i.e., SPDES, NESHAP, and RCRA).

It includes both continuous recording of data and collection of soil, sediment, water, air and other samples at various times. WVDP operations are permitted by various agencies. Other than for the groundwater program, the parameters analyzed under this ongoing program are primarily radiological and chemical indicator parameters. Table 2-1 is a current list of environmental program sample points. Table 2-2 is a current listing of 1992 environmental permits.

2.4 Implementation of Past Interim Measures

Actions have been taken at various times during the site's history to mitigate potential releases and to close or line lagoons. These actions were typically in response to radiological concerns, however, the trench interceptor project (TIP), is listed as an IM in the 3008(h) Order on Consent.

The following is a description of events leading to the construction of the interceptor trench, a brief description of the TIP, and a summary of other actions.

■ N-dodecane Tributylphosphate Mitigation Program

The migration of spent extractant wastes, was first observed in a U.S.G.S. monitoring well within the northeast perimeter of the NDA on November 30, 1983. On that date, four feet of non-aqueous phase liquid was detected floating on the water in the well. Subsequent analysis determined its composition to be 98% kerosene like solvent and 2% tributylphosphate (TBP). To date, there is no evidence of hazardous contaminants at the NDA interceptor trench or the down gradient monitoring wells. The solvent and the radioisotopes contained in the original detection wells, indicated that it was spent extractant from the spent fuel reprocessing operations conducted by NFS from 1966 to 1972. The reprocessing process employed as an extractant a solution of tributylphosphate (TBP) in a normal paraffin hydrocarbon (NPH), N-dodecane. Because NPH [a 12-chain carbon radical] has characteristics similar to kerosene, the term "kerosene" has been used in past historical documents. However, in fact the solvent was not kerosene.

A detailed investigation between December 1, 1983 and February 28, 1984 to determine the source and location of the solvent migration indicated that the source was eight 3,785-liter (1,000-gal.) tanks containing absorbed solvent previously disposed in NDA special holes #10 and #11. The plan to isolate and remove the solvent source proposed five work phases. Phase I (feasibility and preliminary activities) included preparing a safety analysis report (SAR) and environmental evaluation (EE), procedures, and specifications. Phase II (site preparation) included road upgrade, terrain leveling, sheet piling installation, and installing a weather shelter and a supply of temporary electric power. Phase III (investigation and liquid removal) included the removal of overburden, exhumation of tanks, and identification of the

accepted technique for solidification of the contaminated solvent into a waste form for disposal. Phase IV included the solidification of the solvent. Phase V included the trench backfill, cap construction, and closure.

Preliminary activities were under way in late 1985 and full-scale stabilization operations began in early 1986 and concluded in the same year with the following accomplishments:

- Excavation of special holes #10 and #11
- Exhumation of eight 3,785-liter (1,000-gal.) tanks containing solvent-impregnated absorbent
- Removal and packaging of the contaminated absorbent and soils
- Size-reduction and packaging of all tanks for disposal
- Solidification of the contaminated solvent into a qualified waste form suitable for Class A LLW disposal (Portland cement with proprietary components)
- Backfilling and final closure of special holes #10 and #11
- Stopping the spread of the solvent plume in the NDA and, in some locations, reversing the spread
- Installation of ten new monitoring wells in other special holes suspected of containing solvent.

The entire solvent stabilization program generated approximately 272 m^3 (9,600 ft^3) of packaged solid radioactive waste. These quantities, packaged in 2.5-m^3 (90-ft^3) steel containers included 227 m^3 (8,016 ft^3) of contaminated soil, 25 m^3 (800 ft^3) of contaminated absorbent, and 20 m^3 (706 ft^3) of size-reduced tanks. All containers are stored for eventual class A LLW disposal.

The solvent collected in the NDA during these operations totaled 1,624 liters (429 gal.) solidified in twenty-six 208-liter (55-gal.) drums. In addition, contaminated solvent, generated from former reprocessing operations and stored in a tank on the plant's solvent storage terrace (SST), was also solidified. This quantity amounted to 8,433 liters (2,228 gal.) in 135 108-liter (29 gal.) drums. Approximately 568,000 liters (150,066 gal.) of water were either treated in the low-level waste treatment

facility (LLWTF) or discharged in full compliance with the New York State Pollutant Discharge Elimination System (SPDES) permit.

As a result of this operation, close monitoring of wells suspected of containing solvent has continued pursuant to the NDA Data Management Plan submitted March 5, 1993. The solvent mitigation program is described in detail in the topical report "Implementation of the Kerosene Mitigation Plan," May 1984, DOE/NE/44139-38.

Since these mitigatory actions the trench interceptor project (TIP) has been initiated.

■ Trench Interceptor Project (TIP)

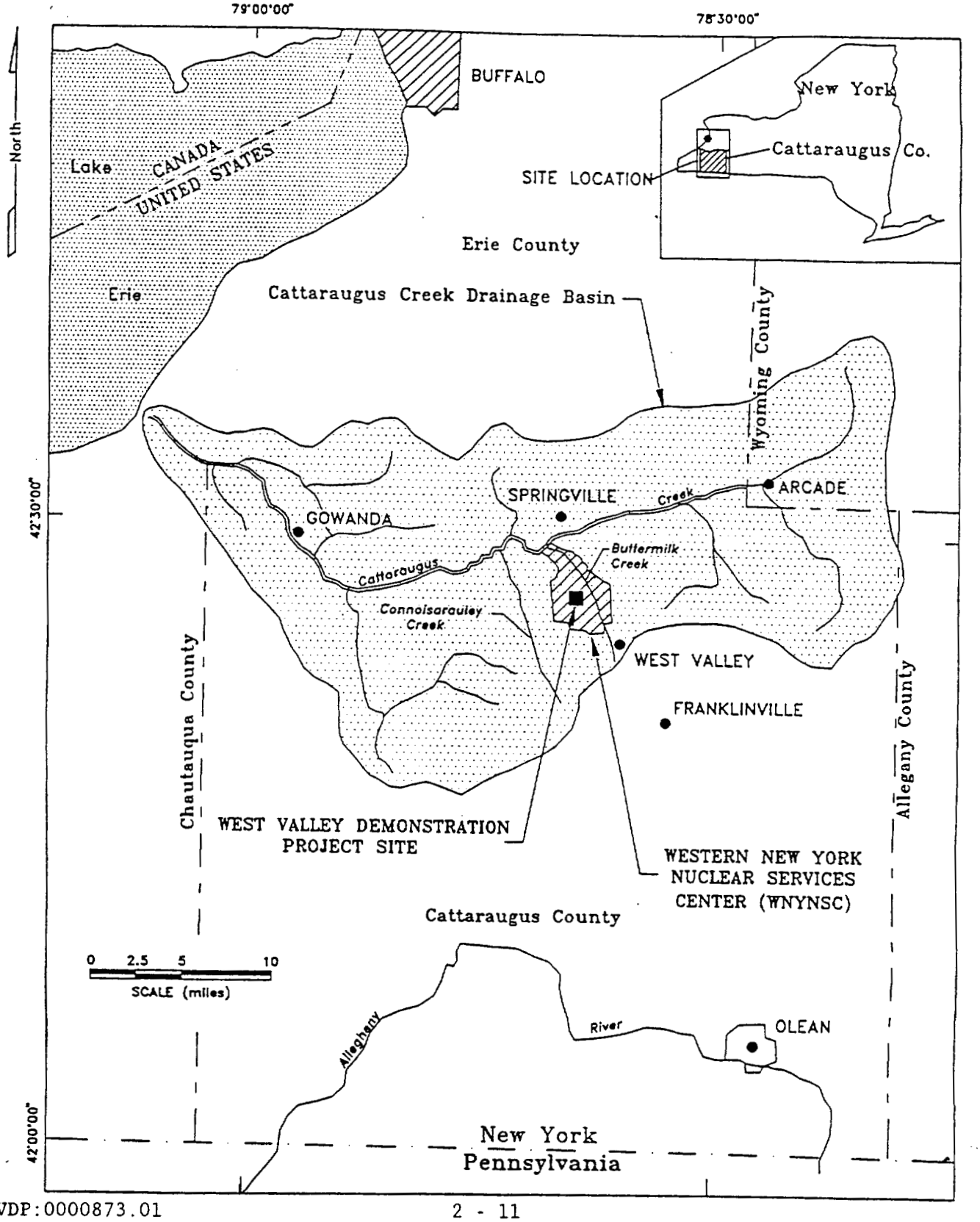
The TIP includes a trench 274 meters (975 ft) long, 4-6 meters (12-20 ft) deep, and 1 meter (3.28 ft) wide. Construction of the trench began in January of 1990 and it was completed in December,1990. The trench was designed to intercept potentially contaminated groundwater. Should contamination be encountered, a pretreatment system is available to treat the groundwater. The trench surrounds the downgradient corner of the NDA and is further described in Appendix B.

Other Mitigating Actions

Other actions that were taken at the WNYNSC include the removal from service and backfilling of Lagoon 1 and the lining of Lagoons 4 and 5 with liners to reduce the potential for radiological contamination of groundwater. Lagoons 4 and 5 were retrofitted with liners in the fall of 1974. Lagoon 1 was backfilled in November 1984. Both measures were adopted in response to elevated tritium levels in on-site monitoring wells and effluent from the french drain system. Past activities at the lagoons are further described in Appendix B.

Figure 2-1.

Location of the WVDP and the WNYNSC in the Cattaraugus Creek Drainage Basin



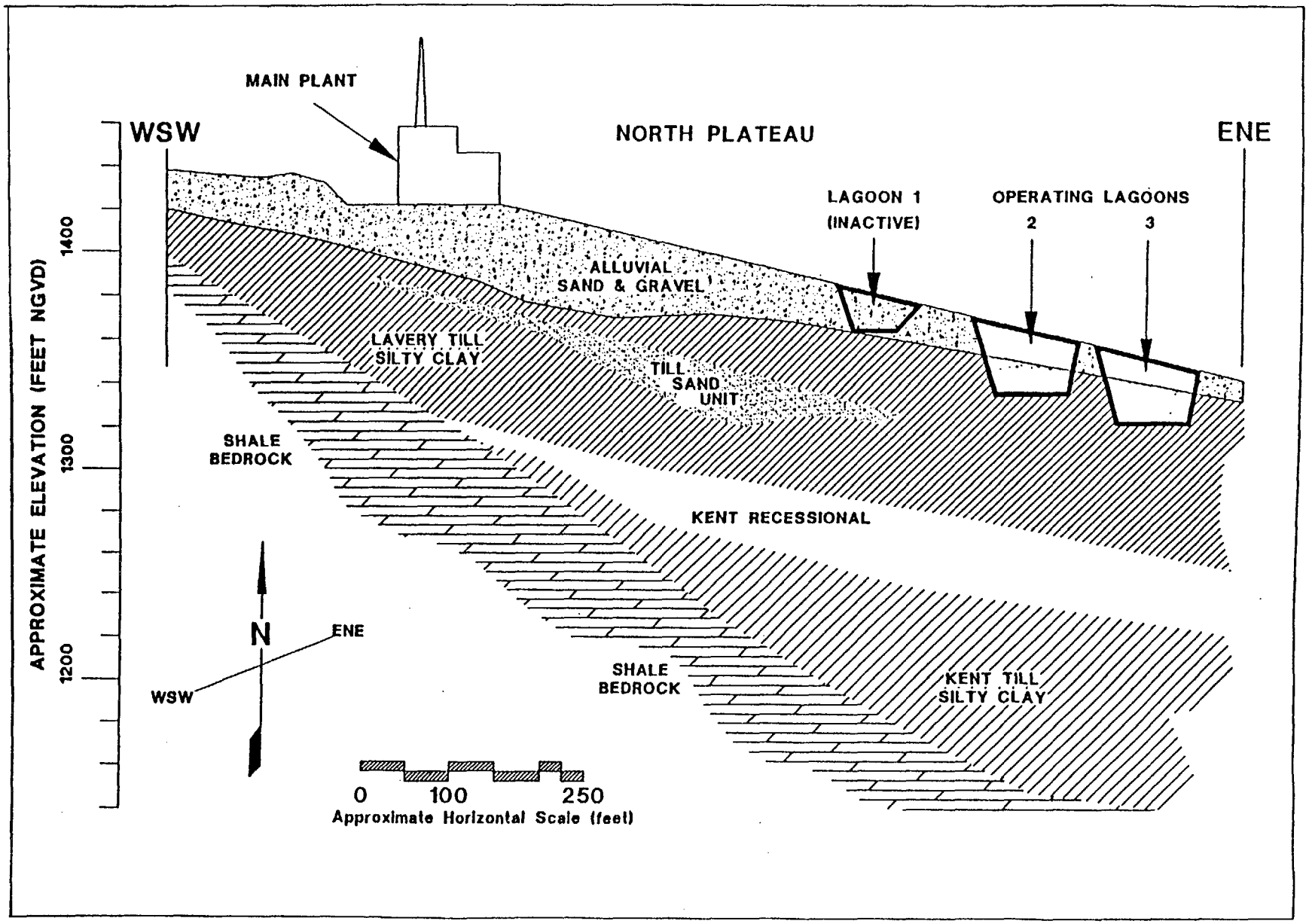


Figure 2–2. Schematic Geologic Cross Section of the North Plateau

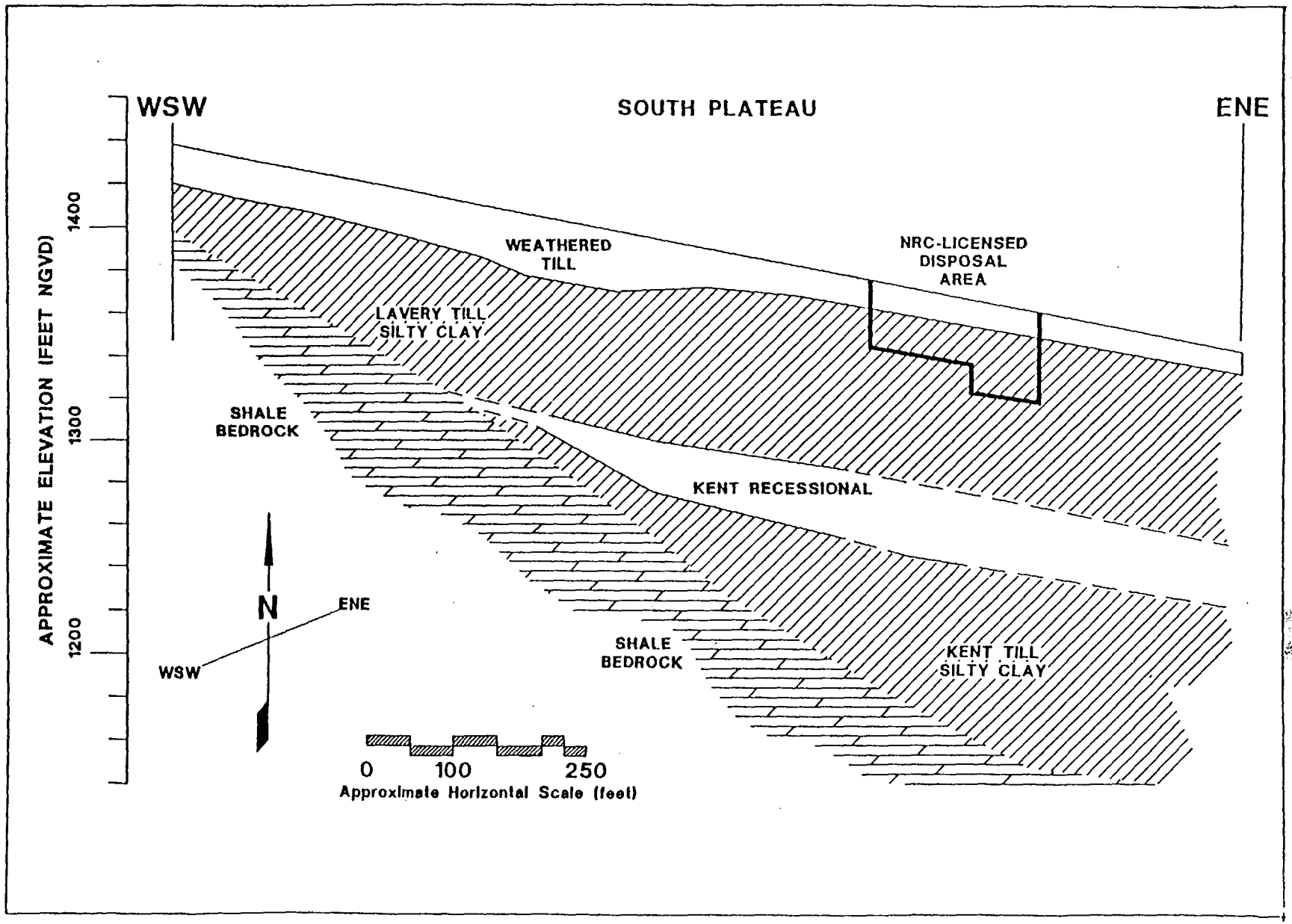


Figure 2–3. Schematic Geologic Cross Section of the South Plateau

Figure 2-4

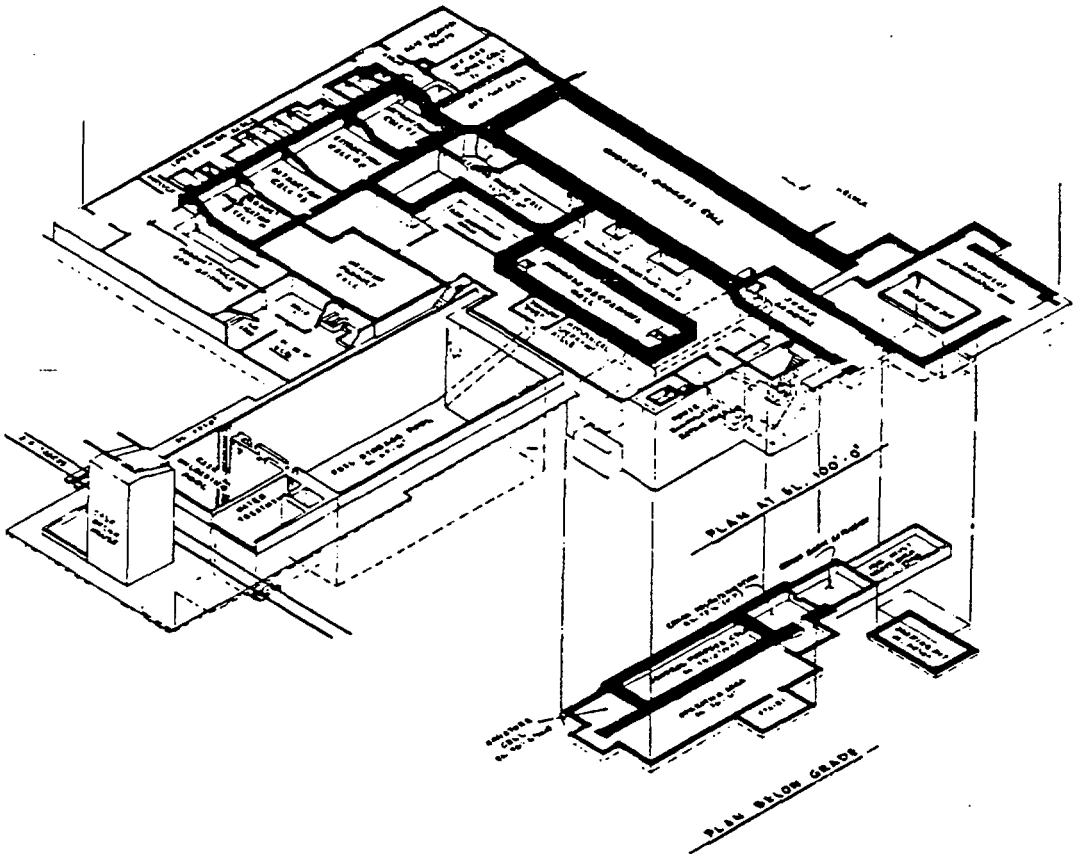


Table 2-1

Environmental Monitoring Program Sampling Points

On-Site Effluent - Air (NESHAP and DOE Orders)

ANSTACK - Main Plant
ANSTSTK - Supernatant Treatment
ANCSSTK - Cement Solidification
ANCSRFK - Size Reduction Facility
ANSUPCV - Supercompactor

On-Site Liquid Effluent - Water and Surface Water (SPDES and DOE Orders)

WNSP001 - Lagoon 3 Weir Point
WNSP006 - Facility Main Drainage
WNSP007 - Sanitary Waste Discharge
WNSTPBS - Sanitary Waste Sludge
WNSWAMP - Swamp Drainage Point
WNSW74A - Swamp Drainage Point
WN8D1DR - Waste Farm Underdrain
WNSP008 - French Drain LLWT Area
WNSP005 - South Facility Drainage
WNCOOLW - Cooling Tower
WNDNK Series - Potable Water
WNFRC67 - Frank's Creek East
WNERB53 - Erdman Brook
WNNDADR - Disposal Area Drainage
WNDCELD - Drum Cell Drainage
WNSTAW Series - Standing Water

On-Site Groundwater and Seeps (RCRA, RFI, and DOE Orders) - See Table B-1 and Plate 9 for locations and descriptions.

Off-Site Surface Water (DOE Orders)

WFFELBR - Cattaraugus Creek at Felton Bridge
WFBCTCB - Buttermilk Creek at Thomas Corners
WFBCBKG - Buttermilk Creek Background
WFBIGBR - Restricted Surface Water Background

Off-Site Drinking Water (DOE Orders)

WFWEL Series - Private Local Wells

Off-Site Ambient Air (DOE Orders)

AFFXVRD - Fox Valley Sampler
AFTCORD - Thomas Corners Sampler
AFRT240 - Route 240 Sampler

Table 2-1 (continued)

AFRSPRD - Rock Springs Road Sampler
AFGRVAL - Great Valley (background)
AFSPRVL - Springville Sampler
AFWEVAL - West Valley Sampler
AFDNKRK - Dunkirk (background)
AFBOEHN - Dutch Hill Road Sampler
AFDHFOP - Dutch Hill Fallout*
AFFXFOP - Fox Valley Fallout*
AFTCFOP - Thomas Corners Fallout*
AF24FOP - Route 240 Fallout*
ANRGFOP - Rain Gage Fallout

Soil/Sediment, On and Off-Site (DOE Orders and Directives)

SF Soil Series - Air Sampler Area Soil
SFTCSED - Thomas Corners Sediment
SFBCSED - Buttermilk Creek Background Sediment
SFSDSED - Cattaraugus Creek at Springville Dam
SFBISED - Cattaraugus Creek Background Sediment
SFCCSED - Cattaraugus Creek at Felton Bridge
On-Site Soil (limited)
SNSW74A
SNSWAMP
SNSP006

Off-Site Biological (DOE Orders)

BFFCATC - Cattaraugus Creek Fish Downstream
BFFCTRL - Cattaraugus Creek Fish Background
BFFCATD - Cattaraugus Creek Fish Downstream of Dam
BFMREED - NNW Milk
BFMCOBO - WNW Milk
BFMWIDR - SE Milk
BFMHAUR - SSW Milk
BFMCTLS - Milk, South, Background
BFMCTLN - Milk, North, Background
BFVNEAR - Produce Nearsite
BFVCTRL - Produce Background
BFHNEAR - Forage Nearsite
BFHCTLS - Forage, South, Background
BFHCTLN - Forage, North, Background
BFBNEAR - Beef, Nearsite
BFBCTRL - Beef, Background
BFDNEAR - Venison, Nearsite
BFDCTRL - Venison, Background

Direct Measurement Dosimetry (DOE Orders)

DFTLD Series - Off-Site Dosimetry
DNTLD Series - On-Site Dosimetry

Table 2-2

1992 WVDP Environmental Permits

Summary of Permits for Calendar Year 1992

Permit Number	Issued by	Expiration	Type of Permit
042200-0114-00002	NYSDEC	6/94	Certificate to Operate Air Contamination Source: Boiler
042200-0114-00003	NYSDEC	6/94	Certificate to Operate Air Contamination Source: Boiler
042200-0114-0010	NYSDEC	6/94	Certificate to Operate Air Contamination Source: Low-level Waste Treatment Facility Nitric Acid Storage Tank
042200-0114-CSS01	NYSDEC	6/94	Certificate to Operate Air Contamination Source: Cement Storage Silo Ventilation System
042200-0114-15F-1	NYSDEC	6/94[3]	Certificate to Operate Air Contamination Source; Analytical & Process Chemistry Laboratory Equipment
042200-0114-33157	NYSDEC	6/94	Certificate to Operate Air Contamination Source: Tank #33157 Vent
042200-0114-33154	NYSDEC	6/94	Certificate to operate air contamination source Tank # 33154 vent
042200-0114-14D-2	NYSDEC	6/94	Certificate to Operate Air Contamination Source: Tank #14D-2 Vent
042200-0114-MS001	NYSDEC	6/94	Certificate to Operate Air Contaminant Source Source Capture Welding System
042200-0114-MBD07	NYSDEC	6/94	Certificate to Operate Air Contaminant Source Nitric Acid Tank Vent
042200-0114-0012	NYSDEC	6/94	Certificate to Operate Air Contaminant Source Blueprint Machine Ammonia Emmissions
042200-0114-14D2A	NYSDEC	6/94	Certificate to Operate Air Contamination Source: Tank #14D-2A Vent
NY-0000973	NYSDEC	Pending	State Pollutant Discharge Elimination System (SPDES) Permit
WVDP-187091	EPA		Certificate to Operate Radioactive Air Source: Building 01-14 Ventilation System[5]
WVDP-287-01	EPA		Certificate to Operate Radioactive Air Source: Contact Size-Reduction & Decontamination Facility[5]
WVDP-387-01	EPA		Certificate to Operate Radioactive Air Source: Supernatant Treatment Ventilation System
WVDP-487-01	EPA		Certificate to Operate Radioactive Air Source: Low-level Waste Supercompactor Ventilation System[5]
WVDP-587-01	EPA		Certificate to Operate Radioactive Air Source: Outdoor Ventilation System[5]
WVDP-687-01	EPA		Certificate to Operate Radioactive Air Source: Process Building Ventilation System[5]

Table 2-2 (continued)

042200-0114-CTS02	NYSDEC	6/94	Cold Chem Solids Transfer System
042200-0114-CTS03	NYSDEC	6/94	Cold Chem Vessel Vent System
042200-0114-CTS04	NYSDEC	6/94	Cold Chem Vessel Dust Collection Hood
042200-0114-SVS01	NYSDEC	6/94	SVS Solids Transfer System
042200-0114-SVS02	NYSDEC	6/94	SVS Vessel Vent System
042200-0114-SVS04	NYSDEC	6/94	SVS Mini-Melter Off-gas System]
pending (7/92 submission)	NYSDEC	N/A	Vitrification Off-gas Treatment system
pending (12/92 submission)	NYSDEC	N/A	Painting Exhaust Blowers
pending (12/92 submission)	NYSDEC	N/A	Welding Exhaust Blowers
pending (12/92 submission)	NYSDEC	N/A	NPDES Stormwater Permit
1225	NYSDEC	12/92	Restricted Burning Permit
PRT-74595	U.S. DOI Fish & Wildlife Service, NYSDEC	12/31/90[2]	Depredation Permit
NYD980779540[3]	NYSDEC	N/A[3]	Hazardous Waste Treatment and Storage Interim Status Application (RCRA Part A)

1 National Emission Standards for Hazardous Air Pollutants (NESHAP) temporary permits are valid until the final permits are issued.

2 Permit renewal request submitted to Fish and Wildlife Service in January 1991.

3 Will operate under interim status until NYSDEC requests Part B of RCRA application.

3.0 TECHNICAL APPROACH SUMMARY

Task III (RFI Workplan Requirements) of the scope of work outlined in Attachment I of the consent order identifies five plans required to conduct the RFI. These plans are appendixes to this RFI workplan as follows:

Appendix A Project Management Plan
Appendix B Data Collection Quality Assurance Plan
Appendix C Data Management Plan
Appendix D Health and Safety Plan
Appendix E Community Relations Plan

The following technical approach summary identifies the overall approach to conducting the investigation pursuant to the task IV (Facility Investigation) of the consent order. The specific activity to be conducted at each SSWMU and constituent SWMU is presented in Appendix B (Data Collection Quality Assurance Plan).

The WVDP plans to conduct the RFI in a phased approach. Phase I is identified in this workplan. The results of Phase I will be detailed in RFI reports. Based on the results of Phase I, a Phase II investigation may be identified, if necessary, and detailed in the Phase I RFI reports. The Phase I RFI for each SSWMU will include the following:

- a detailed description of the environmental setting for each SSWMU
- a description of the unit and source characterization including process knowledge and waste information as available
- an assessment of the degree and extent of contamination based on unit specific sampling and analysis of environmental media (unit specific groundwater, soil or sediment sampling as applicable to individual SSWMUs)
- an identification of actual or potential receptors.

Based on the results of this Phase I investigation, the WVDP will recommend (in consultation with the DEC/EPA) one of the following:

- additional Phase II investigations focused on media or areas of concern
- interim measures
- corrective actions
- no further corrective action.

The WVDP will use a combination of existing information, as well as soil and groundwater sampling and analysis data to define and assess the environmental setting, potential sources of hazardous waste and hazardous constituents and the degree and extent of contamination, if any, and to identify actual or potential receptors associated with SSWMUs and constituent SWMUs. The technical approach to defining the environmental setting, found in Sections 3.1.1 through 3.1.4, includes a description of the site's hydrology, soils, surface water, and sediment and air. The approach to defining source and contamination characterization as well as identifying potential receptors is in Sections 3.2 through 3.5. The goal of the RFI activities will be to identify or recommend further actions to identify:

- the constituents of concern
- releases that have occurred or that may have the potential to occur
- constituent release characteristics
- the affected environmental receptors
- rate of migration of any releases discovered
- the extent of the release.

3.1 Environmental Setting

Existing information on the regional environmental setting at the WVDP has been well defined and is summarized below. A series of reports have been produced and describe the environment on a site wide basis (refer to Appendix F references). For the RFI, we will use this information to help describe each SSWMU's environmental setting in the RFI reports.

3.1.1 Groundwater Hydrology Summary

The objective of the hydrogeologic evaluation is to identify potential subsurface migration pathways from the SSWMUs and to assess whether releases to the environment are occurring.

In general, there are five geologic units on the site with varying capacities for transmitting water. These are, in descending order, the surficial sand and gravel unit, the Lavery till, the till-sand unit, the Kent Recessional, and bedrock (Refer to Plates 1 thru 8).

The surficial sand and gravel unit covers most of the North Plateau. Groundwater within it flows mainly northward and northeastward and discharges to streams, seepage faces, and springs along the edge of the plateau. Recharge is mainly from precipitation and bedrock underflow (Plate 11). Discharge to the underlying till is minimal. The hydraulic conductivity (K_h) of the surficial sand unit is 5.5×10^{-5} cm/s as determined on the basis of recently completed in situ well testing.

The silty and clayey Lavery till immediately underlies the surficial sand on the North Plateau and occurs at grade to the south of Erdman Brook. The Lavery is the host medium for radiological wastes at the burial sites on the South Plateau and is commonly referred to as the "burial till". This till has an hydraulic conductivity of 2×10^{-8} cm/s to 6×10^{-8} cm/s, an effective porosity of 0.30, and is hydraulically isotropic. Linear groundwater velocities within the Lavery, based on these values, are 1.5 cm/yr to 6.5 cm/yr. These, in turn, translate to groundwater travel times of 50 to 200 years for every 10-foot interval along a groundwater flow path in the unfractured till, and to a travel time across a nominal 50-foot thickness of till of from 250 to 1000 years. Contaminant transport velocities will vary according to the affinity of each solution species for the Lavery groundmass but will invariably be less than the groundwater velocities.

The upper portion of the Lavery till on the South Plateau is weathered and fractured to an approximate depth of 2 meters (10 feet). This upper zone constitutes a discrete hydrologic regime dominated by fracture flow, evapotranspiration, higher

groundwater velocities, rapid response to precipitation events, and a close association with the surface water system.

The till-sand unit, which occurs within the Lavery till in the north plateau, represents a potential pathway for the transport of contaminants to the surface water system. The geometry and location of this unit are defined in detail on the attached geologic plates.

The Kent Recessional directly underlies the Lavery till beneath most of the WVDP. The lower part of the sequence consisting of fine-grained clastics of lacustrine origin is saturated; the upper part of the sequence consisting typically of sands and gravels is unsaturated. Groundwater migration within this unit is eastward and northeastward toward discharge zones along Buttermilk Creek where the unit has been breached by erosion.

The lacustrine water bearing unit has been described as having an hydraulic conductivity of 1×10^{-4} cm/s, an hydraulic gradient of 0.013, and a nominal effective porosity of 0.30 (Prudic, 1986). Groundwater travel-time within this unit, from points beneath the main plant to Buttermilk Creek, a distance of about one-half mile, has been calculated to be 550 years.

Bedrock in the area is Devonian-age gray shale with some interbedded siltstone. Groundwater flow in the unit is slow, although the upper 3 m (10 ft)is fractured, allowing somewhat faster flow. Prudic (1986) has cited hydraulic conductivity values of 1×10^{-5} cm/s and 1×10^{-7} cm/s for weathered and unweathered bedrock, respectively. Flow paths in shallowest bedrock throughout the Buttermilk Creek drainage basin are assumed to converge on the axis of the bedrock valley. Within this context, groundwater in bedrock moves eastward and northeastward beneath the WVDP.

An in-depth discussion of potential contaminant sources, subsurface units, and the rationale for selecting sampling locations can be found in Appendix B.

Approach

The WVDP will use information from past and recent site studies as well as information obtained during installation of the groundwater monitoring wells to further evaluate specific hydrogeologic conditions at each SWMU including:

- A description of the facility-specific geologic and hydrogeologic characteristics affecting groundwater flow beneath the SWMUs, including:

  1) Facility-specific stratigraphy: description of strata, including strike and dip, and identification of stratigraphic contacts
  2) Structural geology: description of local structural features (e.g., folding, faulting, tilting, and jointing)
  3) Depositional history
  4) Identification and characterization of areas of recharge and discharge
  5) Facility-specific groundwater flow patterns
  6) Seasonal variations in the groundwater flow regime.

- An analysis of any topographic features that might influence the groundwater flow system. Stereographic analysis of aerial photographs will be reviewed.

- A classification and description of the hydrogeologic units that may be part of the migration pathways at the facility (i.e., the water bearing units and any intervening saturated and unsaturated units) based on previous field data, testing, and cores extracted during well installation will be made that will include:

  1) Hydraulic conductivity and porosity (total and effective)
  2) Lithology, grain size, sorting, degree of cementation
  3) An interpretation of hydraulic interconnections between saturated zones
  4) The attenuation capacity and mechanisms of the natural earth materials (e.g., ion exchange capacity, organic carbon content, and mineral content).

- Based on previous field studies, ongoing groundwater monitoring, cores from existing monitoring wells, structural geology,and hydrogeologic cross sections showing the extent (depth, thickness, lateral extent) of hydrogeologic units that may be part of the migration pathways, the following will be identified:

  1) Sand and gravel deposits in unconsolidated deposits
  2) Zones of fracturing or channeling in consolidated or unconsolidated deposits
  3) Zones of higher permeability or lower permeability that might direct and restrict the flow of contaminants
  4) The uppermost aquifer: geologic formation, group of formations, or part of a formation capable of yielding a significant amount of groundwater to wells or springs
  5) Water-bearing zones above the first confining layer that may serve as a pathway for contaminant migration, including perched zones of saturation.

- Based on data obtained from groundwater monitoring wells and piezometers installed upgradient and downgradient of the SSWMUs, a representative description of water level or fluid pressure monitoring will include:

  1) Water level contour and/or potentiometric maps
  2) Hydrologic cross sections showing vertical gradients
  3) The flow system, including the vertical and horizontal components of flow
  4) Any temporal changes in hydraulic gradients due to seasonal influences.

- A description of manmade influences that may affect the hydrogeology of the SSWMU areas and in general identifying:

  1) Active and inactive local water supply and production wells with an approximate schedule of pumping
  2) Manmade hydraulic structures (pipelines, french drains, ditches, unlined ponds, septic tanks, SPDES outfalls, land retention areas).

3.1.2 Soils Summary

Previous work has characterized the soil on-site as a dense mixture of silt and clay with minor amounts of fine to coarse sand and fine gravel (Fickies et al. 1979). The glacial till and its varied, facies-dependent composition generally exhibit hydraulic conductivities on the order of 10^{-7} cm/sec (10^{-4} ft/day) horizontally and 10^{-8} cm/sec (10^{-5} ft/day) vertically. The upper several meters are typically fractured, which facilitates infiltration and downward percolation. The clayey soils in the fractured zone are stiff, but shear strength tends to be lower than in the unfractured zone because fractures are commonly filled with silt and sand. The plasticity of the silty clay has been described by others as low to medium.

Approach

The WVDP will evaluate the available data for soil and rock units above the water table as it relates to any contaminant release(s) associated with SWMUs. Evaluation will include as much information as is available in each of the following categories:

- Soil Conservation Service (SCS) soil classification and mapping including soil distribution
- ASTM classification of soils
- Transects of soil stratigraphy
- Bulk density
- Porosity
- Moisture content
- Hydraulic conductivity (unsaturated)
- Hydraulic conductivity (saturated)
- Storage capacity
- Depth to water table
- Particle size distribution
- Soil sorptive capacity
- Cation exchange capacity
- Soil organic content
- Soil pH

- Mineral content
- Effect of stratification on unsaturated flow vadose zone
- Infiltration vadose zone
- Estimates on evapotranspiration vadose zone
- Vertical Flow Rate

3.1.3 Surface Water and Sediment Summary

The entire watershed that includes the WVDP consists of approximately 486 hectares (1200 acres) of predominantly wooded and grassed terrain. The dominant hydrologic soil groups are "C" and "D" (relatively low infiltration rates), and overland slopes tend to be steep, except for the plateau area containing the site. Drainage is conveyed by three main creeks on which gradients average approximately 5%. The three creeks, Frank's Creek, Quarry Creek, and Erdman Brook, flow generally north-northeast (Fig. 3-1) to their confluence with Buttermilk Creek.

Figure 3-1 shows the proximity of plant operations and low-level radioactive waste disposal areas to the drainage pattern and also illustrates the steep slopes resulting from aggressive downcutting through glacial sediments. Impervious areas associated with site development have resulted in increased peak discharges, which exacerbate existing high flow velocities. Based on downgradient surface water monitoring (See Figure 3-2) there is no evidence of releases to surface waters from underground radioactive waste disposal areas. However, this will be investigated in more detail as part of the RFI for confirmation.

The on-site low-level radioactive waste treatment facility includes four lagoons, the largest of which controls release to Erdman Brook. The capacity of this largest basin is approximately 12,335 cu meters (10 acre-feet).

Surface water recharges the upper aquifer in interstream areas while groundwater seeps provide baseflow to streams in downcut areas. Neither surface water nor groundwater are used for human consumption anywhere within the 80 hectare (220-acre) area of the Project. There are, however, several shallow domestic drinking water wells upgradient of the Project but beyond the WNYNSC boundary. Water from

reservoirs that are on the 1335-hectare (3,300-acre) WNYNSC but outside the 80 hectare (220-acre) Project area is used as the site's potable water source.

Approach

During SSWMU characterization, the WVDP will use historical information and stream and drainage area sediment sampling to characterize the surface water bodies in the vicinity of the facility as part of the description of the environmental setting as it relates to contaminant releases from the SWMUs. This will include the following:

- Description of the temporal and permanent surface water bodies in the immediate vicinity of the 80-hectare (220-acre) WVDP site area including:

  1) Location, elevation, surface area, depth, volume, freeboard, and purpose of any impoundments
  2) Location, elevation, flow and velocity estimates, depth, width, seasonal fluctuations, and flooding tendencies (e.g., 100-year event) of streams ditches, drains, swamps and channels
  3) Drainage patterns
  4) Estimates of evapotranspiration.

- Description of the chemistry of the natural surface water and sediments based on existing historical information. Specific additional sampling of surface water will be recommended as a Phase II task, if necessary, in individual SSWMU RFI Reports.

- Description of sediment characteristics based on historical data and sampling specified in Appendix B. This may also include:
  1) Deposition
  2) Thickness profile
  3) Physical and chemical parameters (e.g., grain size, density, organic carbon content, ion exchange capacity, and pH).

3.1.4 Air Summary

3.1.4.1 Nonradiological Monitoring

Nonradiological emission and plant effluents are controlled and permitted under New York State and U. S. Environmental Protection Agency regulations. The permits are for minor sources of regulated pollutants including particulates, nitric acid mist, oxides of nitrogen, and sulfur. However, because of their low concentrations and small mass discharge, monitoring of these parameters is not required. The focus will therefore be on assessing the environmental setting through a review of climate and atmospheric conditions.

Approach

The WVDP will provide information characterizing the climate in the vicinity of the facility as part of the description of the environmental setting to help assess release from SWMUs. Such information will include:

- A description of the following parameters:

  1) Annual and monthly rainfall averages
  2) Monthly temperature averages and extremes
  3) Wind speed and direction
  4) Atmospheric pressure
  5) Climate extremes that have been known to occur in the vicinity of the facility, including frequency of occurrence.

- A description of topographic and manmade features that affect air flow and emission patterns, including:
  1) Ridges, hills
  2) Valleys
  3) Surface water bodies (e.g., rivers and lakes)
  4) Buildings.

3.2 Source Characterization

In order to identify characteristics that may affect release properties and pathways, information on source units (i.e., SSWMUs) has been gathered and will continue to be gathered. Various activities are currently under way or are scheduled during the investigation that will characterize the wastes and the areas where they have been placed, collected, or removed. These current and future activities include:

- Review of historical data for each SWMU: Existing sources of information will be used when this information can supply data of the quality and type needed.
- Collection of additional soil/sediment and groundwater data in accordance with the SSWMU Data Collection/Quality Assurance Plan (Appendix B)
- Gathering physical information as described above about the environment surrounding the source units that will affect the migration and fate of a release.

The WVDP will use historical information about past and ongoing process operations to characterize the hazardous waste and hazardous constituents and the areas where wastes have been placed, collected, or removed. The documentation will include estimates of type, quality, physical form, disposition (containment or nature of deposits), and facility characteristics affecting release (e.g., facility security and engineered barriers).

As part of the source characterization process, a process/historical evaluation of the sealed rooms in the main process building will be conducted to determine the presence or absence of hazardous wastes or hazardous waste constituents. These rooms will be addressed as part of SSWMU #3. (Refer to the Appendix B for further discussion on the rooms).

3.2.1 Unit Characterization

Characterization of each SSWMU will be used to evaluate the probable degree of contamination from the units and, consequently, the probable type and severity of a release. Data being reviewed include the following:

- Location of unit/disposal area
- Type of unit/disposal area
- Design features
- Operating practices (past and present)
- Period of operation
- Age of unit/disposal area
- General physical conditions
- Method used to close the unit/disposal area.

Some of this general information has already been compiled and is summarized in Appendix B of this plan.

3.2.2 Waste Characterization

Waste characterization for each SSWMU and for individual SWMUs will be reviewed to identify constituents in order to differentiate releases from different units and ensure that constituents of concern are monitored during groundwater monitoring or future phases of release investigation.

The strategy for waste characterization is detailed in this section of this plan. The following characteristics will be examined:

Type of waste placed in the unit, including:

- Hazardous classification (e.g., flammable, reactive, corrosive, oxidizing, or reducing agent)
- Quantity
- Chemical composition.

Physical and chemical characteristics, as applicable, including:

- Physical form (solid, liquid, gas)
- Physical description (e.g., powder, oily sludge)
- Temperature

- pH
- General chemical class (e.g., acid, base, solvent)
- Molecular weight
- Density
- Boiling point
- Viscosity
- Solubility in water
- Cohesiveness of the waste
- Vapor pressure
- Flash point.

Migration and dispersal characteristics of the waste as applicable and appropriate to the initial assessment, including:

- Sorption
- Biodegradability, bioconcentration, biotransformation
- Photodegradation rates
- Hydrolysis rates
- Chemical transformations.

3.3 Contamination Characterization

Both historical and newly acquired analytical data, coupled with information on the contamination source, will be compiled on groundwater, soils, and other environmental media in and adjacent to the SSWMUs in order to assess the extent, origin, direction, and rate of movement of any contaminant plumes, if present.

The spatial extent and the concentration of contamination will be examined. The evaluation will rely on historical data, operational histories, and ongoing DOE environmental monitoring programs, especially groundwater, surface water, sediment, soil, and air monitoring programs. Groundwater will be monitored around all SSWMUs as presented in Appendix B to supplement the historical data. Soil and sediment sampling at specific units as described in Appendix B will also be conducted. At this time, however, we do not believe based on our knowledge of SWMUs that specific

air or subsurface gas sampling is necessary. Based on the results of this first phase of the RFI, we will recommend (in consultation with the EPA/DEC) this type of investigation, if warranted. Data will be collected through a variety of methods that will include:

- review of historical operational data and historical sampling data
- review of historical and ongoing geologic and hydrogeologic investigations
- past and ongoing ambient air monitoring (mostly radiological in nature)
- groundwater sampling.
- unit specific soil/sediment sampling

Ongoing sampling is done in accordance with approved standard operating procedures (SOPs) and additional procedures described in Appendix B (Data Collection/Quality Assurance Plan).

3.3.1 Groundwater Contamination Investigation

A RCRA groundwater contamination investigation has been conducted and will continue to identify and characterize hazardous waste or hazardous constituent releases from the SSWMUs by reviewing existing data and by sampling in accordance with the data collection plan described in Appendix B. As appropriate, radiological indicator parameters will be reviewed to help establish the potential release of hazardous waste or hazardous constituents. In order to characterize any plumes of contamination at the facility, if encountered, the groundwater investigation will assess the following information:

- The horizontal and vertical extent of any immiscible or dissolved plumes originating from the SWMUs
- The horizontal and vertical direction of contaminant movement
- An estimate of the velocity of contaminant movement
- The horizontal and vertical concentration profiles of known constituents in the plume(s)
- An evaluation of factors influencing the plume movement
- An extrapolation of future contaminant movement.

The procedures used in making the above determinations are found in the Data Collection and Quality Assurance Plan (Appendix B) and relevant environmental monitoring (EM) procedures (e.g., EM-6 "Groundwater Sampling"). The RFI Report will document additional assessment techniques used.

3.3.2 Soil Contamination

The WVDP will review available historical information and existing environmental monitoring data and perform SWMU specific soil/sediment sampling to assess potential contamination from releases to the soil in the vicinity of the SSWMUs. The unit specific soil sampling is described in Appendix B. In order to assess the contamination of the soil at specific units, the following information will be reviewed, as applicable:

- A description of the potential extent of contamination
- A description of contaminants and soil chemical properties within the contaminant source area for specific units
- Specific contaminant concentrations based on the parameters sampled
- An extrapolation of future contaminant movement.

If, based on the results of the soil sampling program, additional sampling is warranted it will be recommended as Phase II sampling.

3.3.3 Surface Water and Sediment Contamination

The existing surface water contamination investigation monitoring program established in accordance with DOE Orders, SPDES permits, and the WVDP stormwater program will be reviewed to characterize contamination in surface water bodies, based on existing data. In addition, a near site stream and drainageway sediment sampling program will be implemented. This is described in Appendix B. An assessment of contaminant releases at the facility and individual units will be made. This characterization will rely on the review of existing data and sediment sample results. Information to be obtained will include:

- An evaluation of the physical, biological, and chemical factors influencing contaminant movement in surface water bodies
- An extrapolation of contamination movement if present
- A description of the chemistry of the contaminated surface waters and sediments.

At this time, we do not believe it is necessary to conduct additional surface water and sediment investigations other than that described above and in Appendix B.

3.3.4 Air Contamination

Based on our current knowledge of the SMWUs, we do not believe that specific air contamination or subsurface gas contamination investigations are warranted. We will review existing site air sampling results (both perimeter and unit specific) for radiological parameters combined with process knowledge and environmental setting to characterize the potential for air contaminant release. In consultation with the EPA/DEC, we will determine if future phase II air characterization activities are necessary at specific units.

3.4 Potential Receptors

Transport Pathways

If hazardous wastes or constituents exist or are released from SWMUs, the possible exposure of the human population to contaminants from the WVDP could occur as a result of transport via surface and subsurface waters, atmospheric distribution, and operational activities (i.e., waste removal). At the WVDP site the significant surface and subsurface pathways are groundwater movement to surface streams or erosion at waste sites with subsequent movement of contaminants to surface streams.

In order to assess the impact of waste constituents on human health and the environment, it is necessary to assess the magnitude, frequency and duration of exposure of potential receptors to specific waste constituents. Thus, an exposure assessment includes not only the identification of potential human and environmental receptors, but also the delineation of contaminant transport pathways that lead to

exposure, the characterization of the exposure setting, and ultimately the quantification of exposure. Contaminant-specific data is necessary to determine a quantitative statement regarding the exposure to chemicals of concern.

For each SSWMU we will develop information to determine contaminant transport pathways, potential human receptors and potential ecological receptors based on contaminants of concern for each SSWMU. In the event that a release of RCRA hazardous waste or hazardous constituents from a SSWMU is identified, computer modeling may be utilized to quantitatively analyze exposure pathways.

Computer Modeling

The methods used to analyze these pathways require appropriate site and contaminant data for modeling. Based on these data the transport of contaminants can be simulated by EPA-approved computer modeling programs from the source through the various pathways to important environmental receptors.

The transport of contaminants to potential receptor sites through various pathways from release at a SSWMU will be evaluated. The basic information that will be needed to characterize the transport of contaminants to receptors includes the following:

- Waste inventory and characteristics
- Physical characteristics and measurements of disposal units
- Disposal practices
- Unusual events that may influence contaminant migration
- Biotic processes that can affect the integrity of a waste contaminant and/or the mobilization of contaminants
- Meteorological data for calculating the effects of the atmospheric transport processes
- Geohydrology and geochemistry of the site (Extent of current contamination including subsurface movement characteristics of site-specific contaminants)
- Geologic characteristics of the site
- Demographic and agricultural information.

Evaluation

Much of the information about potential pathways has been collected and will be compiled and used if a release of hazardous waste or hazardous constituents is detected. This information is currently being updated as necessary through ongoing monitoring. If a release hazardous waste or hazardous constituents is indicated from a SSWMU, the WVDP will assess existing data describing the human populations and environmental systems that may be susceptible to contaminant exposure from the unit. The following will be identified:

- Local uses and possible future uses of groundwater and surface waters associated with or affected by the unit
- Human use of or access to the unit and adjacent lands
- Biota in surface water bodies on, adjacent to, or affected by the unit
- A description of ecology and any endangered or threatened species near or affected by the unit.

3.5 SWMU Identification and RFI Activities

The individual SWMUs have been grouped into SSWMUs in a manner consistent with previous site documentation to facilitate characterization. As described in Appendix B, contiguous units were combined for the purpose of groundwater monitoring and management purposes. Table 1-1 lists the SSWMUs and Table 1-2 contain the original list of SWMUs. Since the development of this original listing of SWMUs, several notifications of additional SWMUs have been made at the site which constitute SWMU #s 26 through 40 on Table 1-2. SWMU Assessment Plans were required and have been prepared for 3 of these SWMUs based on known or suspected releases. The scope of work for these 3 new SWMUs requiring investigation will remain the same as reported in the SWMU Assessment Plans submitted previously for these units. The schedule of investigation for each SSWMU is presented in Appendix A (Project Management Plan).

Primary tasks and activities in the SSWMU investigation will be:

a) Data, Records, and Operational History Review
b) Environmental Setting, Unit, and Waste Description
c) Well Installation/Groundwater Sampling
d) Soil and Sediment Sampling
e) Data Management, Review, and Analysis (includes data validation and QA/QC requirements)
f) Draft and Final Reports

Note that data validation will be performed on groundwater and soil/sediment data newly acquired from the characterization activities listed in Appendix B.

FIGURE 3-1.

SITE PLAN AND ASSOCIATED SURFACE WATER DRAINAGE

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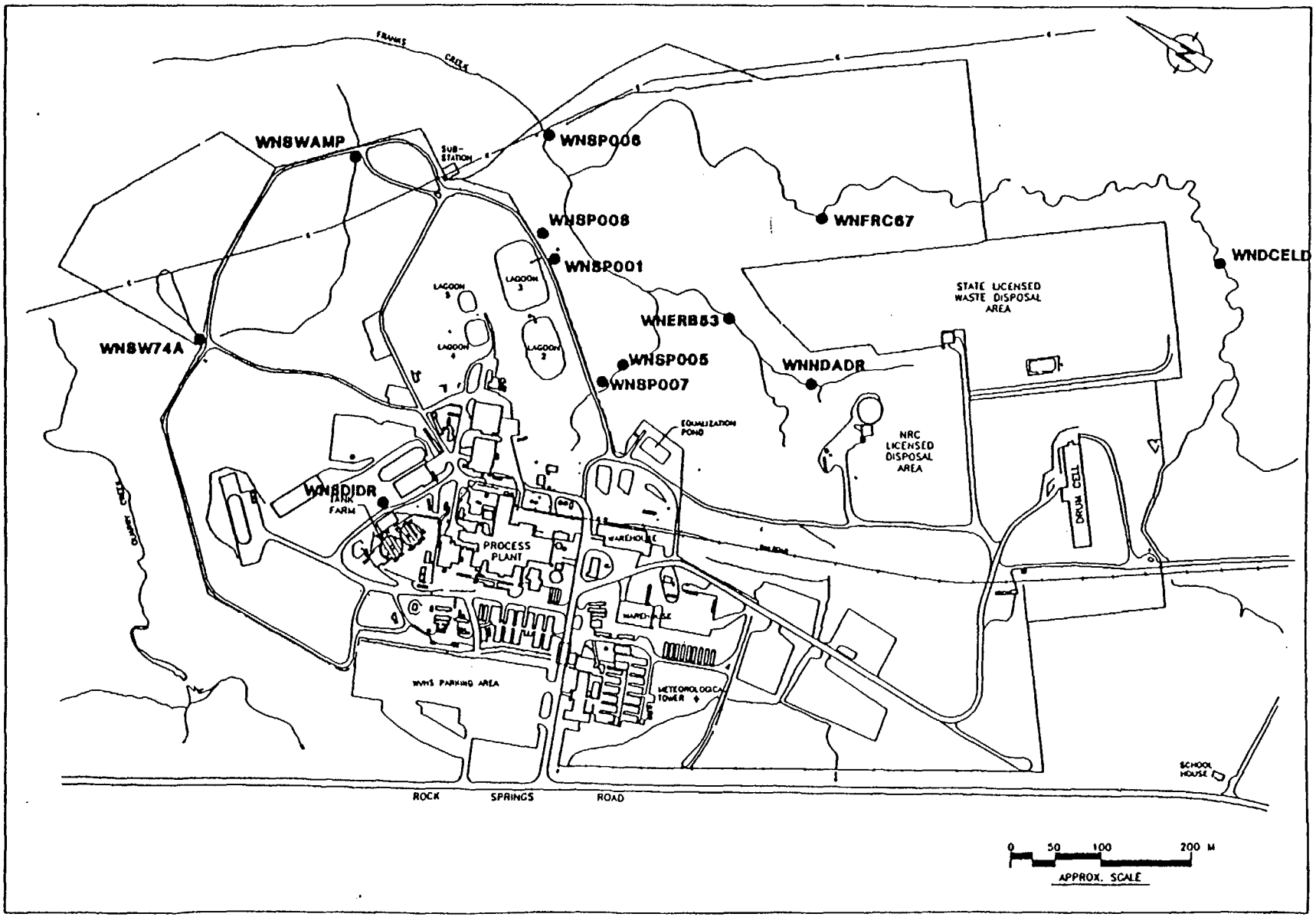


Figure 3.2 On-Site Surface Water Sampling Locations.

APPENDIX A

PROJECT MANAGEMENT PLAN

OVERALL MANAGEMENT APPROACH

The work for this investigation will be conducted by DOE through its contractor West Valley Nuclear Services Company, Inc. (WVNS) and its subcontractors. The project organization shown in Figure A-1 identifies those organizational elements that correspond to key managerial and technical staff positions. Coordination of activities related to quality assurance, health and safety, and community relations will be provided for the project through a matrix assignment of qualified individuals from various departments.

Technical management of the program is provided through five functional support areas on-site: 1.) Facility Assessment which includes RCRA waste characterization, assessment of groundwater data and soil sampling and analysis; 2.) Environmental Monitoring and Program Management which includes groundwater sampling and analysis and data validation; 3.) Community relations; and 4.) Health and Safety. The respective managers are responsible for completing the tasks associated with their area of responsibility and for interacting with other staff in the organization to ensure consistency and integration of activities. The Technical Managers will provide input to the WVNS RFI manager/project coordinator who are responsible for integrating the overall work and interacting directly with the DOE RFI Coordinator.

General Authorities and Responsibilities by Level: General authorities and responsibilities for the WVNS RFI Manager, and Technical Managers are provided in Table A-1:

	TABLE A-1	
TITLE	AUTHORITY TO	RESPONSIBLE FOR
WVNS RFI MANAGER	• Provide oversight coordination for day-to-day project activities • Allocate project resources with appropriate cost and schedule • Interact with Technical Managers and Coordinators • Provide regulatory compliance oversight and guidance	• Ensuring completion of the approved scope of work • Interfacing with Technical Managers, Coordinators to provide an integrated approach • Assure that work products are prepared in accordance with cost, schedule, and quality requirements • Interfacing with DOE RFI Coordinator, EPA/DEC, and NYSERDA where appropriate • Identifying regulatory requirements
HEALTH AND SAFETY COORDINATOR	• Provide oversight coordination of field activities related to safety • Issue Stop Work Orders for safety reasons • Identify and report on potential health and safety problems • Interact with all technical managers	• Assuring the safe conduct of field operations • Interfacing with appropriate Technical Managers, Coordinators and project management staff to provide an integrated approach

	TABLE A-1	
TITLE	AUTHORITY TO	RESPONSIBLE FOR
COMMUNITY RELATIONS MANAGER	• Coordinate all activities relevant to community relations • Identify and report on any potential community relations problems	• Identifying requirements for ensuring adequate community relations • Oversee preparation of documents and organization of appropriate meetings • Interface with appropriate Technical Managers, Coordinators, and project management staff to provide an integrated approach
FACILITY ASSESSMENT MANAGER	• Provide oversight management in the production, editing, and review of RFI documents including facility assessments	• Preparing RFI documents • Provide for technical editing • Tracking review process • Producing task work products on time, within budgets, and in accordance with quality requirements
	• Make specific work assignments to support staff to ensure acceptable completion of tasks	
	• Mobilize resources required to assess data collected in the characterization studies • Modify the field sampling program to meet new data requirements	• Review and summarize operating history of units • Assess and evaluate groundwater data • Interfacing with appropriate Technical Managers, Coordinators, and project management staff to provide an integrated approach • Documenting results

	TABLE A-1	
TITLE	AUTHORITY TO	RESPONSIBLE FOR
ENVIRONMENTAL MONITORING PROGRAM MANAGER	• Oversee the conduct of groundwater sampling and monitoring program • Make specific work assignments to support staff to ensure acceptable completion of tasks • Data validation	• Integrating task activities for purposes of interaction with DOE and NYSERDA • Interfacing with appropriate Technical Managers, Coordinators, and project management staff to provide an integrated approach • Sampling groundwater • Shipping samples to analytical laboratory • Verifying and recording records • Data Validation

Project Personnel Qualifications: Resumes of key WVDP personnel identified in Figure A-1 and Table A-1 are provided in Appendix H.

The expertise required for each assignment was identified and individuals selected according to their technical training and experience to conduct the work. Where possible backup staff have also been identified for critical assignments to ensure continuity during unexpected absence of the individual with key responsibility.

TECHNICAL APPROACH

The overall approach for conducting the RFI is to direct nine super solid waste management units (SSWMU) investigations. It should be noted that SSWMU #11, the State Low Level Waste Disposal Area (SDA) is the responsibility of NYSERDA and is therefore not included in the DOE RFI Work Plan. In addition, RFI investigations are not proposed for the Hazardous Waste Storage Lockers and RTS Drum Cell in that no known or suspected release of hazardous waste or hazardous constituents has occurred from these units.

SCHEDULE

The 3008(h) Order was effective March 15, 1992. A schedule for the RCRA Facility Investigation and corrective action activities has been prepared and attached to this appendix. The planning in the schedule reflects EPA/DEC's desire to revise the Groundwater Monitoring parameter list. Due to the compressed time table for revision of the Work Plan, the schedule reflects the preparation and submittal of a data package for 1992 groundwater monitoring. Based on the evaluation of this data, the submittal will include a recommended parameter list for the groundwater monitoring program. It should be noted that the revision of the groundwater monitoring program parameter list will affect Fall 1993 monitoring activities and allows sufficient time for two rounds with the revised parameter list including data analysis, validation, and evaluation. The schedule for preparation of the RFI reports which has been revised to accommodate additional groundwater data is shown in the attached schedule.

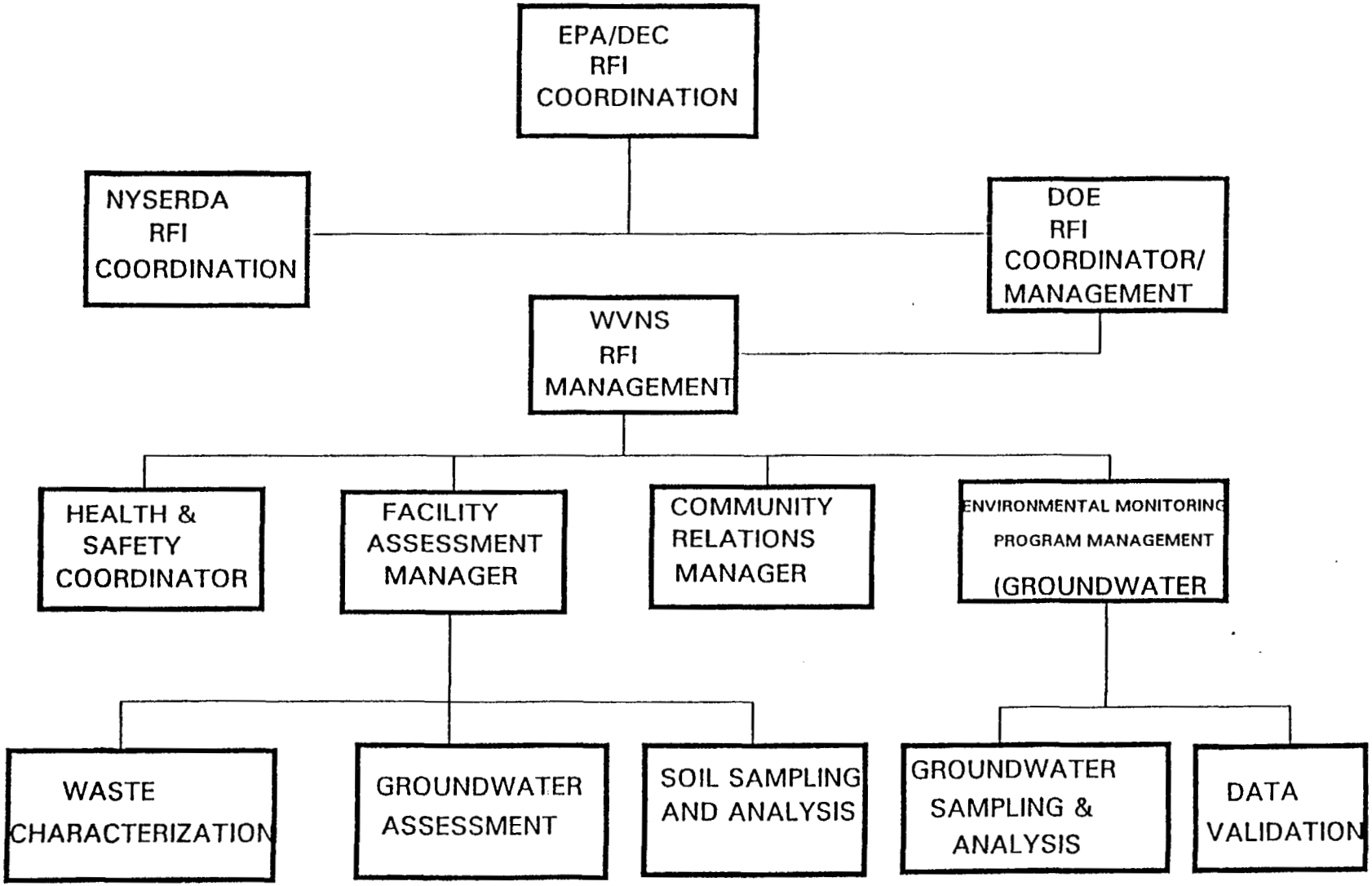
BUDGET

The estimated budget for completing the RFI and preparing the required reports provided in Table A-4.

TABLE A-2
BUDGET FOR RCRA 3008(h) COMPLIANCE
(Dollars in thousands)

FY92	FY93	FY94	FY95	FY96
1300	1500	2000	1500	1200

FIGURE A - 1
RFI FUNCTIONAL RELATIONSHIPS



FIGU -2

Project Management Plan Schedule - RFI Work Plan

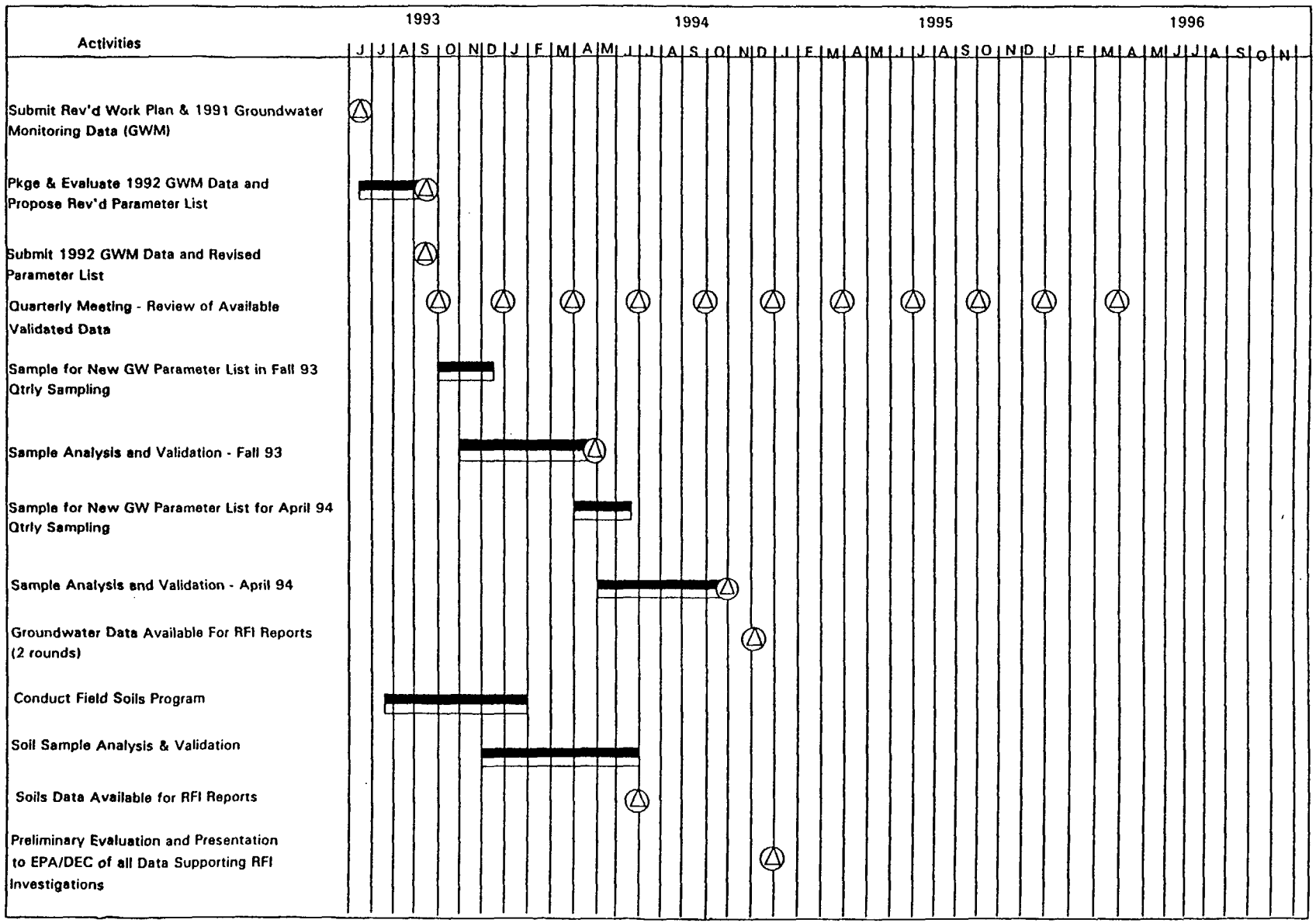


FIGURE A-2

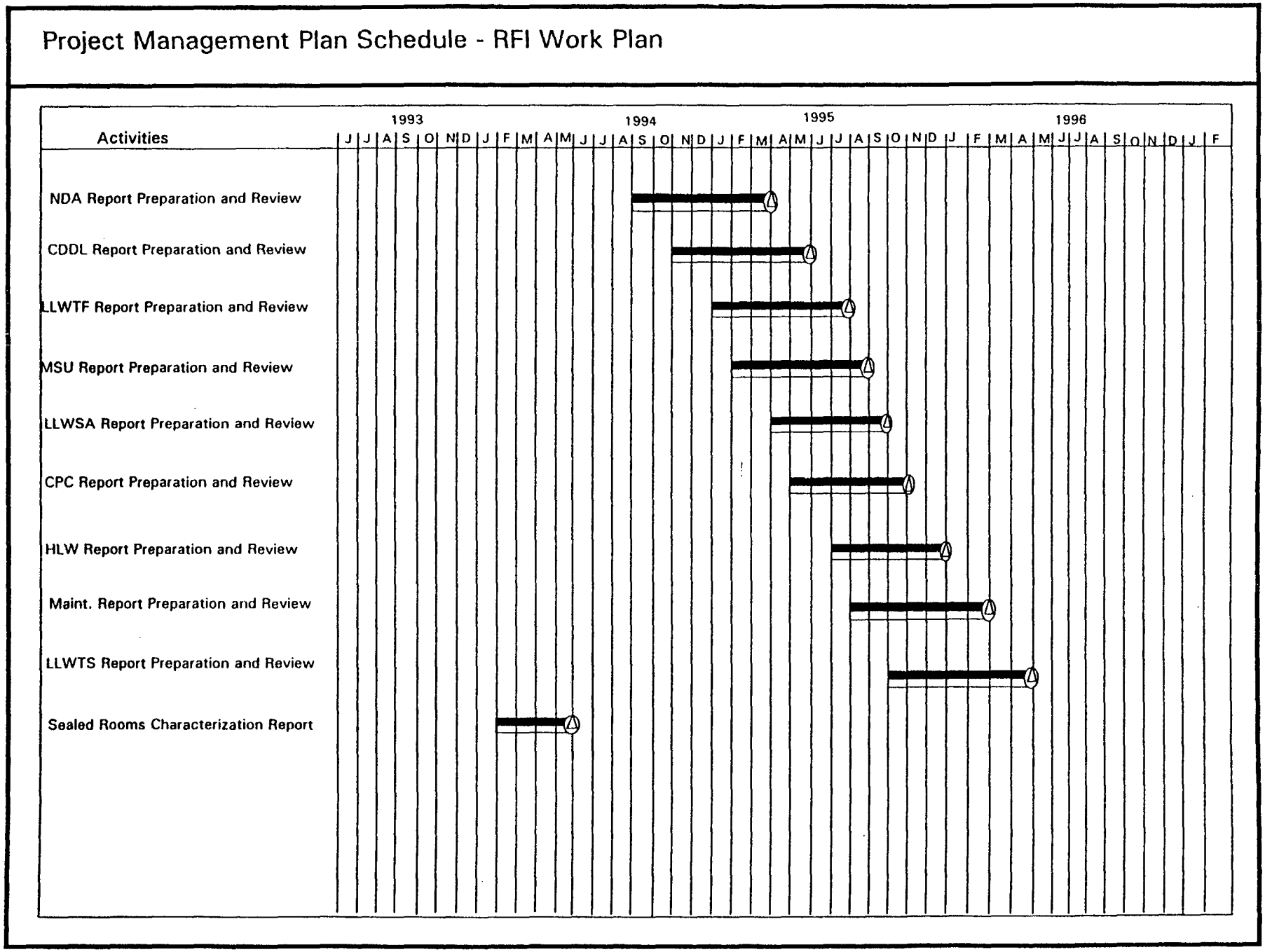

Project Management Plan Schedule - RFI Work Plan
Activities
1993
1994
1995
1996
J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F
NDA Report Preparation and Review
CDDL Report Preparation and Review
LLWTF Report Preparation and Review
MSU Report Preparation and Review
LLWSA Report Preparation and Review
CPC Report Preparation and Review
HLW Report Preparation and Review
Maint. Report Preparation and Review
LLWTS Report Preparation and Review
Sealed Rooms Characterization Report

FIGURE A-2

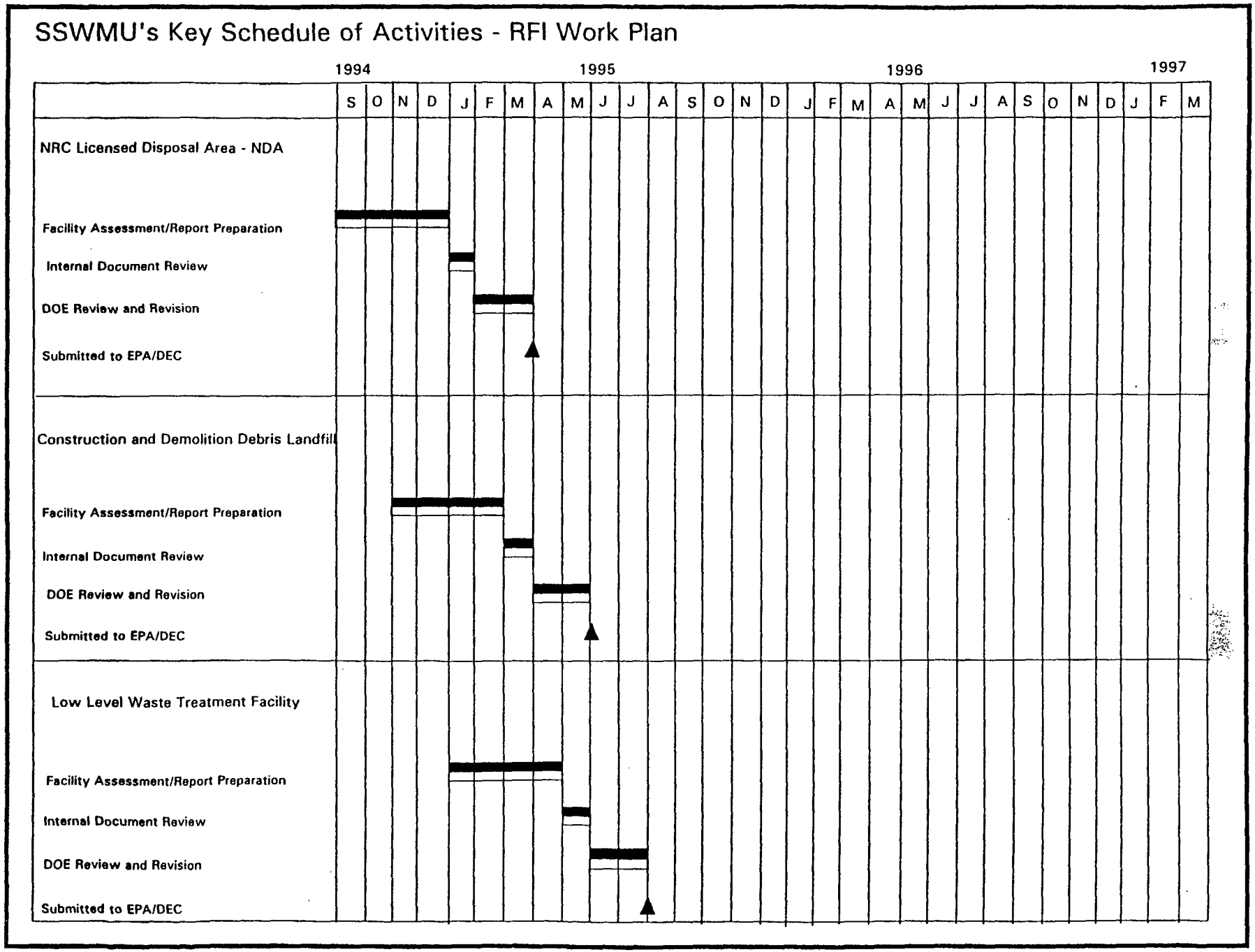
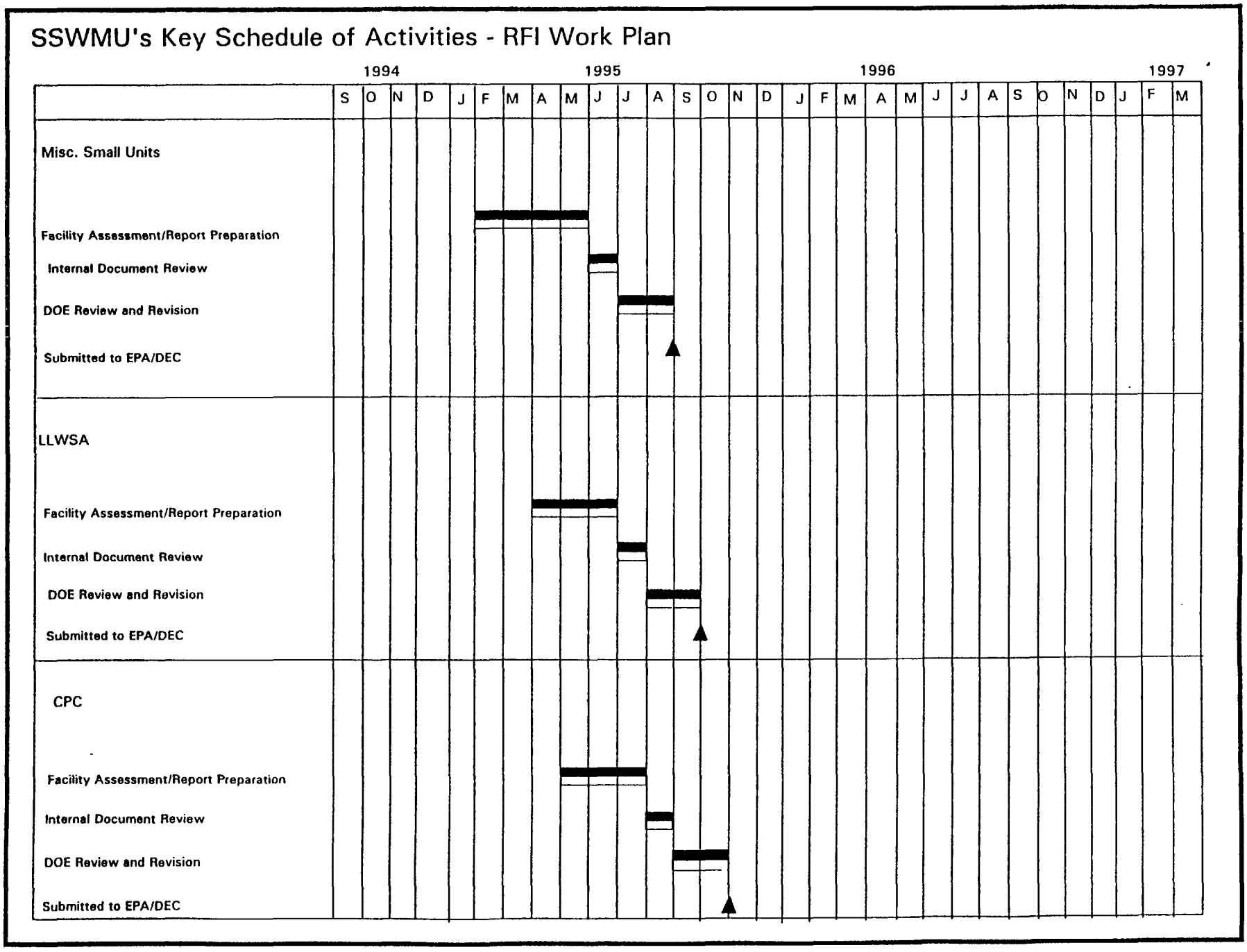

SSWMU's Key Schedule of Activities - RFI Work Plan
1994
1995
1996
1997
S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M
NRC Licensed Disposal Area - NDA
Facility Assessment/Report Preparation
Internal Document Review
DOE Review and Revision
Submitted to EPA/DEC
Construction and Demolition Debris Landfill
Facility Assessment/Report Preparation
Internal Document Review
DOE Review and Revision
Submitted to EPA/DEC
Low Level Waste Treatment Facility
Facility Assessment/Report Preparation
Internal Document Review
DOE Review and Revision
Submitted to EPA/DEC

FIGURE A-2



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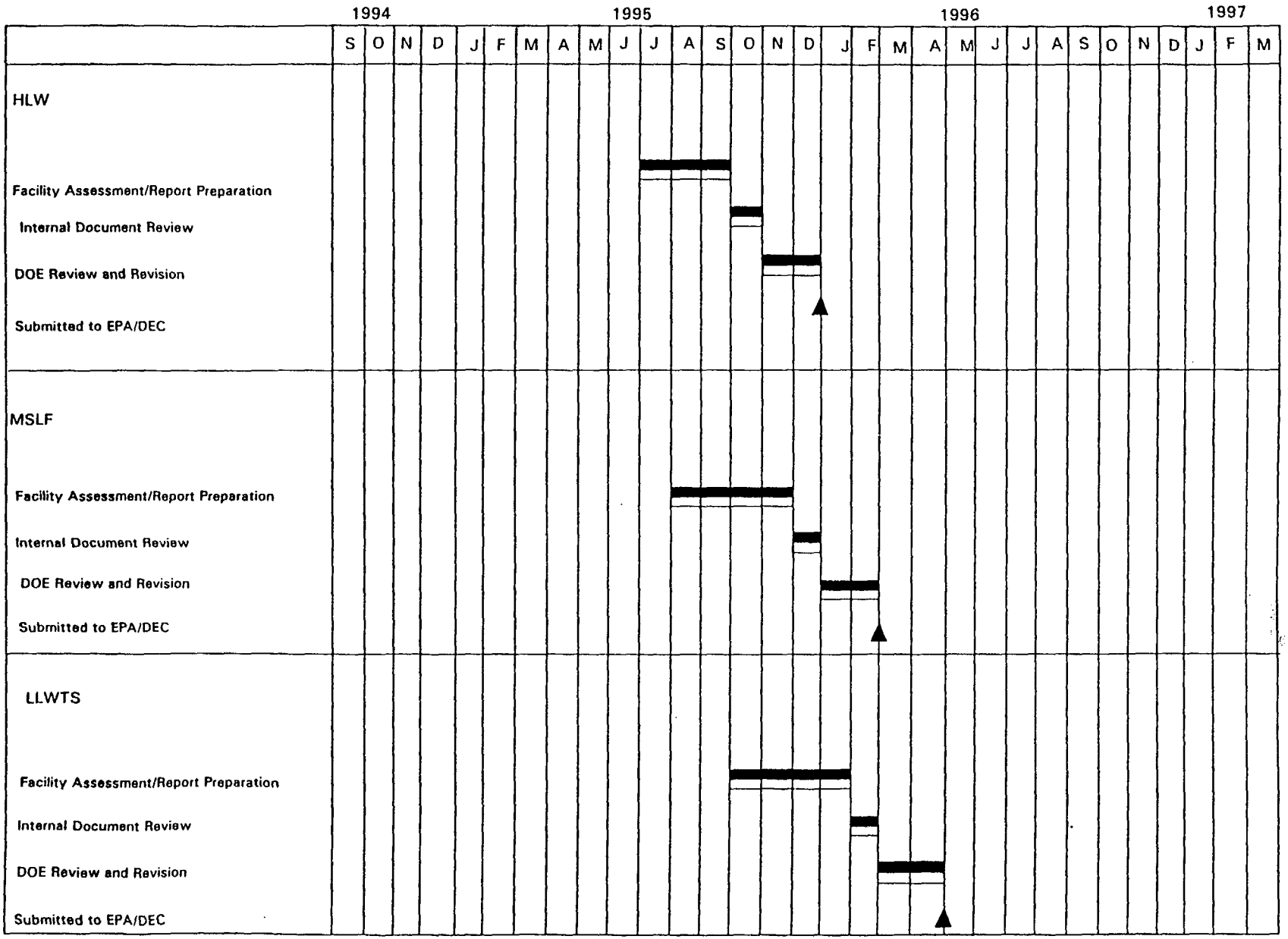
SSWMU's Key Schedule of Activities - RFI Work Plan



APPENDIX B

WVDP RFI Data Collection and Quality Assurance Plan (DCQAP)

Fall 1993

1.0 DATA COLLECTION and QUALITY ASSURANCE PLAN (DCQAP)

1.1 INTRODUCTION: PROGRAM DESCRIPTION

This DCQAP identifies the specific field studies, sampling strategies, analytical methods, and quality assurance/quality control procedures and historical review to be used to assess releases from SWMUs at the WVDP facility area for RCRA purposes.

As defined in Section 1 and 3, the technical approach for the RFI will include an assessment of SSWMUs including constituent SWMUs. For each SSWMU, the following will be considered in determining if hazardous waste or constituents are present and if so assessing the nature and extent of contamination, if any:

- Operational History
- Environmental Setting
- Source Characterization
- Contamination Characterization
- Groundwater Monitoring Results
- Soil and Sediment Sampling and Analysis
- Potential Receptors

Presented in this appendix is the data collection and quality assurance program. The RCRA Facility Investigation will consist primarily of an operational/historical review of data for each SSWMU supplemented by groundwater monitoring data and the sampling and analysis of soil and sediments. The current groundwater monitoring well regime at the site was upgraded during 1989-91 time frame with the addition of approximately 100 wells to an existing groundwater program. These wells were installed for compliance with DOE Orders prior to execution of the RCRA 3008(h)

Consent Order. Wells were placed to obtain data for use in developing facility closure plans.

This plan outlines the SWMU assessment and characterization activities under the RCRA 3008(h) Consent Order. The plan contains procedures and plans for quality assurance, specific field activities and refers to existing procedures for field sampling. The basis for this plan is the NYSDEC RCRA Quality Assurance Project Plan Guidance and the scope of work under Attachment I of the 3008(h) Consent Order.

1.2 Objectives

General Objectives

The WVDP originally identified twenty-four SWMUs (see Section 3.0, Table 1-2 and Plate 1). Because some of those SWMUs were so close together as to make the groundwater monitoring of separate units impractical, the SWMUs were combined into "super" SWMUs (SSWMUs). The SSWMU to which each SWMU was assigned is shown in Table 1-1. The location and design of each groundwater monitoring well network for each SSWMU was selected on the basis of criteria provided in the September 1986 Groundwater Monitoring Technical Enforcement Guidance Document (TEGD). The siting of the wells therefore involved evaluation of available subsurface data to establish the nature, geometry, and hydraulic properties of each subsurface unit. The soil/sediment sampling program was developed for individual SWMUs based on site operational knowledge and historical groundwater results.

The initial objective of the investigation at each SSWMU is to determine whether one or both of the following had occurred:

- Hazardous wastes and/or hazardous constituents were placed in the unit
- Release of hazardous waste or hazardous constituents had occurred.

Based on the results of the initial objective, the final objective is to assess the nature and extent of a release or the potential for release of hazardous wastes and/or hazardous constituents, if any, from the unit. The primary goal of the

workplan is to collect and evaluate information to determine which of the following RCRA actions are appropriate for a specific SWMU:

- no further action;
- interim corrective measures;
- corrective measure study; or
- additional investigations (Phase II) aimed at supporting one of the actions above.

The groundwater data, soil and sediment collection and analysis program is designed to provide reliable data on the presence of hazardous constituents beneath and around these units.

Data Quality Objectives

The data obtained during characterization will be used to identify releases of contamination and to assess the nature and extent of the resulting contamination. Groundwater analytical parameters are listed in Table B-1. Groundwater, soil and sediment parameters and quantitation limits are presented in Table B-3.

The statistical procedures or process for evaluation of groundwater data is still undergoing development for the site. Since the installation of the expanded groundwater monitoring network in 1989/1990, an extensive monitoring program has been conducted to support DOE Orders, permitting and EIS closure data needs. The data developed focused on both indicator parameters and a comprehensive analysis of volatile organic compounds due to their known mobility in groundwater. Statistical analysis of groundwater data has been performed using the GRITS/STAT software developed by E.P.A. Based on preliminary statistical analyses of the data, Analysis of Variance (ANOVA) and trending procedures appear to be most applicable based on the statistical distributions present at the site.

To reduce reliance on statistical methods (at least initially), the RFI Work Plan also commits to two rounds of groundwater sampling for expanded parameters to cover the full range of contaminants potentially present at the site. The two expanded rounds of groundwater monitoring will represent a basis for the absence or presence

of contaminants (a full documentation concept). Following the evaluation of the data results from the two expanded rounds combined with the prior groundwater monitoring results, a revised groundwater parameter list will be developed for future monitoring using new indicators. A statistical process will be refined for the continued evaluation of groundwater monitoring results and NYSDEC/EPA approval will be sought.

The soil/sediment data will be compared to established criteria and, after verification and validation, will be evaluated to determine if past and current Project activities are having significant effects on the environment. Background values will be compared to up gradient and downgradient levels to isolate impact by specific units.

The groundwater, soil and sediment data and SWMU assessment information will be used in determining the need for further studies to assess exposure and risk and to select corrective actions or future sampling, if necessary.

The following presents a summary of background information and general strategy used to develop the specific sample locations presented in Section 1.6 of this appendix.

1.3. Location of Facility Operations

The WVDP has been divided into two discrete areas based on geologic settings - the north plateau and the south plateau.

North Plateau

The north plateau is that area bounded by Quarry Creek, Frank's Creek, Erdman Brook, and Rock Springs Road. A relatively permeable sand and gravel unit overlies a dense saturated lavery till comprised of silt and clay. Most Project operations and facilities such as the high-level waste storage tank farm, the process building, low-level waste treatment facility, and administrative and other support facilities are located on the north plateau.

Process operations conducted in this area include or included nuclear fuel storage and reprocessing, high-level radioactive waste storage and treatment, low-level radioactive waste volume reduction, low-level waste storage and treatment, maintenance/machine shop, and water and wastewater treatment. Waste management units in this area include surface impoundments, landfills, tank and container storage areas, a sanitary leach field, and the paper-waste incinerator. There are no known hazardous waste disposals associated with these activities.

South Plateau

The south plateau is south of the main process areas and is bounded by Erdman Brook on the north and Frank's Creek on the south and east.

The sand and gravel unit is essentially absent on the south plateau and, as such, the weathered till is exposed in this area. The glacial sequence is divided into several zones, the uppermost being a weathered zone characterized by desiccation cracks and fractures. Below several meters the weathered till changes to unweathered till, which is a dense, gray, saturated, silty clay containing isolated sand lenses. Beneath this layer is a sequence of periglacial and lacustrine deposits extending to Buttermilk Creek on the east and intersecting weathered bedrock on the west. Beneath the periglacial and lacustrine sequence is an interval of older till that is underlain, in turn, by shale bedrock.

The south plateau is the location of the NRC-licensed disposal area; the state-licensed low-level radioactive waste disposal area (the SDA); and the drum cell area.

Stratigraphic Review

The WNYNSC is located on a drift-filled valley carved into the Devonian shale bedrock. The valley fill is a sequence of glacial tills and interglacial lacustrine, alluvial, and fluvial deposits. Locally, the glacial materials are capped by Holocene deposits. A schematic cross section (Figs. 2-2 and 2-3) illustrates the basic glacial stratigraphy of the site. It should be noted that not all of the units shown are encountered at all parts of the WNYNSC.

Use of Stratigraphic Data

PC2> To design the groundwater monitoring networks, borehole logs compiled at the WNYNSC from 1961 through 1986 were reviewed. The sources for these logs include Dames & Moore (1986), Bergeron et al. (1984), and Bergeron et al. (1985). To evaluate the data, the WVDP was divided into the north plateau, the south plateau, and the low-level waste burial area (SDA). The borehole data were then compiled to form a stratigraphic database. The stratigraphic database is a table that provides the map coordinates of the well, the elevation at grade at the well site, the depth and elevation at the top of each successive hydrostratigraphic unit, and the total depth of the borehole.

Only those stratigraphic units considered as hydrostratigraphically significant on the scale of the site were entered in the database. The stratigraphic data subsequently were used to construct structure contour and thickness maps for the layers of imputed hydrologic significance.

In addition to reducing and analyzing the stratigraphic data, groundwater levels recorded at the site between 1981 and 1989 were tabulated and used to construct potentiometric maps of the surficial water bearing unit on the north plateau and to confirm the direction of flow in the lacustrine-kame delta sequence that underlies the Lavery till beneath the site.

1.3.1 Stratigraphy Relative to the Groundwater Monitoring Objective

Hydrology of the North and South Plateaus

The WVDP site area is underlain by an alternating sequence of clayey and silty glacial tills and interglacial deposits that are typically granular in nature. The tills have extremely low hydraulic conductivity (typically less than 10^{-7} cm/sec). Near the surface, where weathering and desiccation have created fractures within the till, the permeability of the till mass is significantly higher. Figure B-1 is a conceptual model of the hydrogeology of the north and south plateaus.

North Plateau

On the north plateau, precipitation not diverted as runoff or evapotranspiration infiltrates the sand and gravel and percolates downward to the water table, which declines generally northeastward. This water bearing unit also is recharged by inflow from the bedrock aquifer where it abuts bedrock west of the site. This water bearing unit discharges into Frank's Creek, Quarry Creek, and Erdman Brook; it is underlain everywhere by the Lavery till. A very small fraction of the water in the sand and gravel unit permeates the Lavery till. At depth, the underlying Kent Recessional Sequence also receives some recharge from fractured bedrock where it contacts the unit. Flow in this unit is primarily horizontal toward the northeast, where it discharges to Buttermilk Creek, about 1/2 mile from the site. The sand and gravel unit represents the primary pathway of concern for the North Plateau.

South Plateau

On the south plateau, the Lavery till is the dominant hydrostratigraphic unit. A considerable percentage of precipitation onto the south plateau leaves as runoff and evapotranspiration. The remainder infiltrates the fractures in the weathered till and percolates downward to the unweathered till. As documented in the TBP-N-dodecane plume project, horizontal flow within the weathered till presents the pathway of primary concern.

Sandy Units

Three permeable units with hydraulic conductivities significantly higher than the Lavery tills exist at the site:

1) A surficial sand and gravel unit (an alluvial fan and glacial fluvial deposit) that blankets the north plateau and overlies the Lavery till.

2) A layer of sand of relatively limited areal extent (the till-sand) that occurs within the Lavery till on the North Plateau.

3) The lacustrine-kame-delta sandy unit (facies interpretations of the Kent Recessional Sequence) which immediately underlies the Lavery till.

Units (1) and (3) were identified by LaFleur (1979), whose nomenclature has been used by other investigators at the WNYNSC. A more detailed description of these units is presented below:

- The Surficial Sand and Gravel Unit

North of Erdman Brook, as far as Quarry Creek, and eastward to Frank's Creek, the Lavery till is immediately overlain by an alluvial-fluvial complex up to 10-m thick. The areal extent and thickness distribution of this unit are shown on Plate 5 and the shape of the till surface upon which the alluvium was deposited is shown on Plate 3.

Consistent with alluvial depositional processes, the alluvial fan has complex internal geometry and lithologic variations both laterally and vertically probably are characteristic of the unit.

The results of textural analyses conducted on alluvial and fluvial samples from North Plateau boreholes are described and plotted in Section 3.3.11 of the Geology EID (WVDP-EIS-004). The materials are predominantly muddy gravels (mG) and muddy sandy gravels (msG). A limited number of mineralogical and chemical analyses of North Plateau alluvium or its equivalent also are contained in the Geology EID (Part IV - Geochemical Characterization).

Hydrologically, the alluvial sequence typically is more permeable than the Lavery till by about two orders of magnitude ($K = 10^{-5}$ cm/s vs. $K = 10^{-8}$ cm/s) and is, as a stratified sequence, hydraulically anisotropic (flow paths are lateral and somewhat radial). A full discussion of the hydrology of the alluvial fan complex is contained in the Hydrology EID (WVDP-EIS-009).

Thickness contours of this unit overlying the Lavery till on the north plateau (Plate 5) describe the depth to the top of Lavery till. The alluvium is

thickest in a northeast trending zone in the central part of the north plateau where depths to the Lavery range from 4.5 to 10 meters (15 to 35 ft). Near the margins of this band, the thickness of this unit decreases abruptly (Plate 5).

Contours of water-level data taken on May, 1991 (revised Plate 10) indicate that groundwater in the surficial alluvium migrates northeastward toward Frank's Creek and east-northeastward toward Erdman Brook.

At least thirty-two measurements of hydraulic conductivity of the surficial alluvium have been analyzed using Cooper's (1967) method. According to Bergeron et al. (1989) the unit has an average hydraulic conductivity of 6×10^{-4} cm/sec (2 ft/day). Updated information by the WVDP (1992), using the methods of analysis presented by Bower and Rice (1976), has yielded a mean hydraulic conductivity of 1.5×10^{-4} cm/s for the 23 wells tested. Thickness mapping (Plate 5) and structural mapping of the base of the unit illustrate distribution and structural features. Plate 5 also shows the areal extent of the unit along the edge of the plateau.

The Till-sand Unit within the Lavery Till

The Lavery till-sand is an informal designation for a major lens of silt, sand, and very fine-grained gravel that occurs within the main mass of the Lavery till.

The distribution of the till-sand is shown in Plates 6 and 7. It occupies roughly 15 to 20 acres in the north plateau area of the site. The till-sand has an east-trending axis and a concave-upward lenticular geometry. The unit is everywhere directly underlain by Lavery clay-silt till, and for the most part is directly overlain by up to 30 feet or more of the same till. Locally, and particularly on the west, the till-sand has been stripped of clay-silt till by post-Lavery erosion (stippled areas on the Plates). In these areas, the till-sand is in contact with the post-Lavery alluvial sequence, both stratigraphically and hydraulically.

Beneath the till cover, the till-sand comprises a confined water bearing unit; hydraulic gradient has persistently been eastward toward Erdman Brook. The gradient requires that the unit has discharge zones beneath the alluvial cover at its easternmost limits and these also are indicated on the Plates (stippled zones).

- Kent Recessional Sequence

Plate 2 illustrates the structural configuration of the base of the Lavery till/top of Kent Recessional Sequence contact. This sequence is believed to consist of interbedded sands, silts and clays representing the inter-fingering of various lake-margin depositional facies during retreat of the Kent ice lobe; so called lacustrine deposits being dominant in deeper portions of the paleo-basin. Fewer than five measurements of the lacustrine unit (using the constant head lab permeameter method) have been made. Prudic (1986) determined that the unit has a hydraulic conductivity of 1×10^{-4} cm/sec (0.25 ft/day). The top of the lacustrine-kame delta sequence slopes northeastward and the sequence ranges from is 5 to 40 feet thick beneath most of the area.

1.4 Selection of Monitoring-Well Sites

1.4.1 General

Initial planning for an upgrade of groundwater monitoring at the WVDP began in 1987-88. The mission of this program was three-fold as follows:

- Update the existing environmental monitoring program being conducted on-site pursuant to DOE orders.
- Obtain additional information to support the EIS for site closure.
- Design the program to be consistent with monitoring potential releases of hazardous constituents from SWMUs pursuant to RCRA.

The monitoring well program presented in this workplan is specific to conducting the RFI at the WVDP and has been integrated with the ongoing WVDP environmental monitoring activities.

Table 1-2 lists the original SWMUs and the locations and boundaries of the SSWMUs (Table 1-1) are shown on Plate 1. Upgradient and downgradient wells at each SSWMU are shown on Figures B-2 and B-3, and Table B-4 lists the monitoring wells by SSWMU and indicates the upgradient or downgradient function of the well, the lithologic unit monitored, the depth of the well, the thickness of the target water bearing unit and the dimensions of the intake portion of the well. Also refer to Plate 11 which shows the groundwater monitoring well locations on a site wide basis.

The spacing of downgradient monitoring wells was designed to intercept potential paths of contaminant migration. Data from the pre-1990 monitoring well network and from specific operations pertaining to a SWMU or a SSWMU were used in determining optimum locations for downgradient wells. Other factors that limited the number of downgradient wells in a particular area or group of areas were the presence of underground utilities and current and planned construction activities. Spacings of wells in the Lavery till (e.g., the south plateau) will be re-evaluated based on the assessment in the RFI report.

The well identification number is a four-digit, two or three-letter number consisting of the SSWMU number (See Table 1-2 of the RFI Work Plan) as the first two digits and a sequential number as the last two digits. The first letter following the digits indicates whether that well is upgradient or downgradient of that SSWMU and the second represents the geologic unit opposite the well screen.

Because several SSWMUs are downgradient of other SSWMUs, upgradient wells may not reflect facility-wide background conditions. To avoid false positive indications of groundwater contamination, separate background wells, which often are quite distant from a SSWMU, have been designated. If a comparison of upgradient and downgradient wells indicates groundwater contamination, the same comparison will be made with the background wells. Please refer to Sections 1.13.5 and 1.17.2 for discussions of the statistical methods used in the evaluation of the groundwater data and the statistical evaluation quality, respectively.

Well screens were positioned opposite permeable zones likely to be affected by potential releases from the SSWMUs as determined by information available at the planning stage and field judgement. The deepest permeable zone presently being monitored is the sub-Lavery lacustrine-kame delta sequence.

A number of wells installed in 1986 will be used in the groundwater monitoring network; these are listed by SSWMU in Table B-5 and plotted on Figures B-2 and B-3. On the north plateau, these are PVC wells and on the south plateau they are stainless steel screened with galvanized steel risers. As such, they do not meet the full technical enforcement guidance (TEG) requirements. Construction details for the 1986 wells are shown on Figure B-4.

During monitoring well construction, soil samples were collected for stratigraphic review. Soil samples were not collected for chemical analysis. This information has been utilized to develop the referenced Environmental Information Documents.

1.4.2 1989 to 1990-Series Well Details

Design details for the 1989-1990 monitoring wells are shown on Figure B-4. The wells were installed in 8-inch diameter boreholes advanced with hollow-stem augers. As each hole was advanced, soil samples were taken at intervals of 5 feet or less and at all prominent stratigraphic changes. Continuous samples were taken in areas where there had been little or no prior subsurface exploration. The samples were logged using both the Burmeister and USGS soils classification systems and representative samples were selected for physical property testing.

The wells are constructed of 2-inch diameter stainless steel and the well screen (Johnston Channel Pack) has a 0.01-inch slot size. The annular space between the screen and the borehole wall is filled with rounded, well-sorted sand to a height of 2 feet above the well screen. Three feet of bentonite is placed over the sand pack. The remainder of the hole is backfilled to grade with cement-bentonite grout. A 6-inch diameter protective galvanized steel casing is placed around the well casing and set in the grout. A concrete apron was poured at the surface and crowned to prevent water from ponding at the well collar. This latter design feature, which is slightly different from the TEGD recommendation, was developed to minimize

frost-heave stress on the inner well casing. The outer protective casing is equipped with a locking cap. A filed notch on the inner casing is marked as the reference point for water-level measurements.

The wells have been developed after the cement grout and concrete used for construction had cured but no sooner than 48 hours after completion.

1.5 Well-Sampling Procedures

Groundwater samples collected since 1990 have been taken with dedicated bladder pumps or with dedicated PTFE bottom-discharge bailers. Bailers are assigned to low-yield wells where bladder pumps have proven ineffective.

Purged groundwater currently is stored in 208 liter (55-gal.) drums labeled for hazardous or radiological constituents. This water is disposed of in accordance with applicable state and federal regulations. A letter describing methods used for the disposition of well development and purge water was submitted to NYSDEC on September 26, 1990. This allows for discharge of waters to the ground 20 feet downgradient of the well if no radiological or hazardous constituents are identified. Otherwise, the waters will be retained until proper disposition has been determined.

Two samples are obtained for metals analysis. One sample is filtered, the other is not. Samples are containerized, packaged, stored, and shipped (if not to be analyzed on-site) in accordance with the protocols identified in Section 1.10.5 of this appendix. Filtering for metals and radiological parameters is done in the field. In the field, new filters are pre-rinsed with an appropriate volume of the sample before sample collection. Although both filtered and unfiltered samples are collected and analyzed, only the unfiltered data will be reported for purposes of the RFI.

Well sampling procedures are provided in WVDP's EM-6 procedure which is attached (Attachment B-7) for reference. Please note, however, that changes are sometimes required to facilitate site implementation and, as such, should not affect the procedural intent of the program. Please refer to Table B-4 for well construction information.

The WVDP uses clean I-Chem bottles or equivalent for all groundwater sampling. I-Chem bottles are cleaned according to EPA protocols A, B, and C, depending on the specific analysis to be completed. Bottles are further specified by a series designation that identifies material and size.

Groundwater Analytical Parameters

Based on the current program, groundwater parameters are being analyzed for "indicator," "groundwater," and drinking water parameters. The indicator parameters are those potentially indicative of a release from a SWMU to the groundwater. The groundwater parameters reflect the basic geochemistry of the groundwater and provide information needed for evaluating potential releases. Indicator, groundwater, and drinking water parameters are listed in Table B-1. As noted in Table B-1, the VOA quantitation limit is analyte-specific. The quantitation limits obtained for analysis are at least as stringent as Method 8240 in SW-846 (See Section 1.12, Analytical Procedures). Method SW-846-8240 or other applicable SW-846 methods are used for VOC analysis. Analytical laboratories have adhered to the specified methods and have provided the detection limits indicated in the method. In addition, laboratory contracts have been adjusted to provide for tentatively identified compound (TIC) reporting for Contractual Level 2 data requests. It should be noted that 1991, 1992 and a portion of 1993 data was generated without these requirements. For groundwater samples, these limits range from 5 μg/L to 100 μg/L; the majority are 5 μg/L. Refer to Table B-1 for constituent specific detection limits and Table B-3 for specific practical quantitation limits.

The priority for original sample collection and analysis was 1) indicator parameters, 2) groundwater parameters, and 3) drinking water standards. The specific collection order and rationale for ordering within each group is detailed below:

Category o Analyte(s)	Rationale
Indicator Parameters	Provide most useful information about groundwater contamination.
o VOA (Appendix IX)	Potential mobility provide excellent indicators of contamination. Require limited sample volume.
o TOC	Screen for organic content.
o TOX	Screen for halogenated organic compounds.
o pH, specific conductance	
Groundwater Quality Parameters	
o Cl, NO_3, SO_4	
o Na, Fe, Mn	
o Phenols	
Drinking Water Standards	
o Metals (As, Ba, Cd, Cr, Pb, Hg, Se, Ag)	
o Pesticides/herbicides	
o Radium	
o Turbidity (in field)	

The planning in the schedule presented in Appendix A reflects EPA/DEC's desire to revise the Groundwater Monitoring parameter list. The schedule reflects the preparation and submittal of a data package for 1992 groundwater monitoring results. Based on the evaluation of this data, the submittal will include a revised parameter list for the groundwater monitoring program. It should be noted that the revision of the groundwater monitoring program parameter list will affect Fall 1993 monitoring activities and the schedule includes sufficient time for two rounds (Quarters) with the revised parameter list including data analysis, validation, and evaluation. The revised RFI Schedule is shown in Appendix A. Consequently, the RFI Reports will utilize data from 1991, 1992, 1993 and two revised parameter rounds (Fall 1993 quarterly sampling and spring 1993/1994 quarterly round) as the basis for groundwater monitoring for the RFI Reports.

1.6 Soil/Sediment Strategy

The soil/sediment program for the RFI includes the selection of locations in a judgmental fashion based on knowledge of the site geology, hydrology, and operational history of the process plant and associated facilities. The sampling approach is focused at facility-specific areas so that nature and extent of contamination (if found) can be assessed.

This soils investigation, comprises three elements: (1) a drilling program intended to explore the full thickness of the uppermost contaminant-transport pathways (surficial alluvium and fractured till); (2) a shallow soil sampling program keyed to the 1990 site-wide overland-gamma survey and to information acquired during the recent past on plant operations; and (3) a stream and ditch sampling program designed to provide information of the impacts of discrete facilities and site sectors on the on-site and off-site surface water system. Borehole locations were judgementally selected based on the following criteria:

- Operational knowledge
- SSWMU locations
- Data from the 1991 groundwater sampling as presented in the Water Quality EID
- Data from site overland gamma surveys
- Knowledge of site geology and hydrogeology

Table B-7 is a compilation of the SWMU specific estimated number of samples that will be selected from each borehole for laboratory analysis. The selection of samples to be sent for analysis will be based on the following criteria:

1) Volatile organic and radiological screening information from each splitspoon
2) Significant reference horizon for each borehole and stratigraphy (Table B-6)
3) Visual observations
4) Textural criteria; and
5) Process knowledge, i.e., bottom depth of operational or waste-disposal unit

The attached flow chart will be used in the sample selection process as depicted in Figure B-9. Sample selection will be documented in the field log book and boring log. Tables B-6 and B-7 indicate the projected sample interval and analysis for each borehole. However, as stated above, the sample criteria will be used during actual field activities so that field judgement can be used in sample selection.

The WVDP proposes a phased approach to conducting the RFI. The first phase represents an evaluation of process knowledge, groundwater monitoring results, and analytical results from the Soil Sampling Program. If the data do not indicate a release of hazardous waste and/or hazardous constituents and the evaluation supports a complete review of potential pathways, the RFI Report will present the facts and seek to disposition the unit. If a potential problem is indicated, a second phase will be conducted which will likely involve the submittal of an interim RFI evaluation in combination with a proposed program for completing the investigation. In this case, the final RFI Report would document all results associated the characterization of the unit (results for both the original work plan scope and the subsequent phases of investigation). The third phase focuses on the development of indicator program for long term monitoring of the affected unit. It should be noted that historical records do not indicate or support widespread chemical contamination exists at this site. Our phased program is a SWMU specific program comprising the following elements:

- Groundwater sampling and analysis for indicator parameters for 1991, 1992 and 1993 sample rounds and an expanded parameter list for 2 additional rounds (October, 1993 and April, 1994).

- Soil sampling and analysis for a list of indicator parameters as specified on our revised Table B-7 (see below).

- Continued evaluation of historical records and process knowledge; and

- Definition of the complexity of the hydrostratigraphic setting.

A study of the information gathered for the tasks above for individual SSWMUs will allow the Project to plan for additional media/location specific sampling, if necessary, in a focused effective manner.

For the proposed soil sampling program, the Project has chosen a comprehensive list of parameters which will indicate if chemical contamination exists and that coupled with the groundwater, historical information, and environmental setting information will allow us to assess nature and extent. Our list of parameters is summarized in

Table B-7 which has been revised to add clarity and to add additional TCL parameters at the SWMU locations discussed in meetings with DEC\EPA on July 15 and 16, 1993 to discuss the draft of this document.

The Project believes that the parameters identified on Table B-7 including radiological parameters will indicate if soils are or are not contaminated. At locations where contamination is found, additional sampling may be required and would be performed in consultation with the USEPA/DEC using all the information gathered on a given SSWMU. Additional sampling requirements, if necessary, will be scheduled into the RFI process in consultation with the USEPA/DEC based on the specific information generated during Phase I.

Metals

All samples will be analyzed for metals because they can be attributed to site operation and they cannot be detected by any of the field screening criteria used to indicate the presence of organic compounds. In other words, there are no clues to their presence and no means to map their distribution short of laboratory analysis.

VOAs

All wet samples will be analyzed for VOAs because these samples may contain a dissolved fraction which is relatively mobile in groundwater. VOAs will not be analyzed for in the stream system or the shallow soil zone because the VOAs volatilize rapidly upon release to the environment and the likelihood for detecting them under these conditions are remote. Soil samples from the fire brigade training areas, the subcontractor maintenance area, the sludge pond sediments, the maintenance shop leachfield sediments, and the leachate seep at the construction landfill will be analyzed for VOAs, however, as they represent potential sources.

Semi-Volatile

All samples will not be analyzed for semi-volatile because site historical knowledge does not indicate the presence of semi-volatile. The following exceptions have been added/clarified in Table B-7:

(1) SSWMU 1 where naphthalene and phenols were detected in the leachate transferred from the SDA burial trenches,

(2) SSWMU(s) 3, 4, 5, 8, 9 where unknown inventory of wastes presents the possibility of semi-volatiles,

Therefore, the following boreholes will have semi-volatile analyzed:

SSWMU 1 Lagoons	Nos. 1, 2, 3, 4, 5a, 8a, 9, 10A, 13, 14, 33A
SSWMU 3 Process Bldg.	Nos. 19A, 21A, 23A, 31, 32
SSWMU 4 HLW Tanks	No. 40
SSWMU 5 Leachfield	No. 36
SSWMU 8 Const. Landfill	Nos. 25, 26, 27, 28
SSWMU 9 NDA	Nos. 41, 42

Refer to Table B-7 for the number of samples and analysis. The sampling program has been revised to enhance the analysis of semi-VOAs including soil/sediment samples for the incinerator location, fire brigade training area, subcontractor maintenance area, sludge ponds, maintenance shop leachfield distribution box/tanks, and the construction landfill leachate seep.

The objective and design of each study and the rationale behind it as described as follows:

Deep Soil (Drilling) Program

In conjunction with the data presently being provided by the groundwater monitoring program, this drilling and sampling program is intended to assess the impact on soil matrices of such releases as might have occurred at solid waste management units (SWMU's) of concern. Most of these facilities cannot be drilled directly owing to constraints that include worker safety, inaccessibility to drilling equipment, subsurface obstructions, and the need to avoid procedures likely to compromise the integrity of the facilities or likely to carry contaminants to uncontaminated zones.

The following actions will be taken in the event that higher than expected contamination or obstructions are encountered during borehole completion:

- Obstruction Encountered - Halt boring and proceed as indicated under the drilling and sampling procedure discussed further in Section B.1.6.

- Higher than expected contamination encountered or contamination encountered immediately above a confining unit or borehole completion depth:
  a) halt boring
  b) review stratigraphy
  c) evaluate alternate drilling techniques such as casing or consider relocation of borehole and weigh importance of obtaining data
  d) determine new completion depth
  e) document actions in field log books, boring log, and report.

Decisions will be discussed with appropriate site personnel and the NYSDEC on-site monitor as available.

The 43 soil borings are all scheduled for completion in the 1993 sampling program. The details regarding the estimated borehole depths are shown in Table B-6. Most of the boreholes in this program have been positioned hydraulically downgradient of the facilities considered as potential contaminant sources. This strategy is based on the fact that the saturated soils commensurate with their affinity for contaminants, both radioactive and non-radioactive, will provide analytical data suitable to evaluate the nature and extent of soil contamination relatable to the various units.

The distribution of boreholes (Plate 12) include six explorations of the weathered and unweathered Lavery till - Nos. 22, 23A, 24, 41, 42, and background borehole No. 39. The remaining boreholes are located on the North Plateau and are intended to characterize contamination in the surficial sand and gravel unit. The depth of sampling for the program is 6 feet to 36 feet and each borehole will be advanced approximately two feet into the underlying Lavery till in the case of the sand and gravel boreholes and approximately five feet into the unweathered Lavery till in

Boreholes 22, 23A, 24, 41, 42, and 39. In this manner, the shallow migration pathway for each hydrostratigraphic setting will be fully penetrated and sampled.

The unweathered-unfractured Lavery till has the characteristics of an aquitard - very low hydraulic conductivity, low effective permeability, near-vertical hydraulic gradient. As such, and due to its appreciable thickness and its high sorptive capacity for nuclides and organic compounds, the unweathered/unfractured Lavery is not considered a principal migration pathway for groundwater-borne contaminants to off-site environments. Refer to the Environmental Information Document - Volume 1 (WVDP-EIS-004, Rev. 0) in Section 4.0 Geochemical Characterization for additional information on the property of the site geology. It is anticipated that the unweathered Lavery till will typically be uncontaminated. Nonetheless, the sample selection criteria will be applied to all recovered materials in a consistent manner. Should the uppermost sample of the unweathered Lavery till in any one of the "North Plateau-type" boreholes be identified as "weak till" and/or clearly contaminated in any sense, the appropriate decisions having to do with additional sampling of the till and the submittal of samples for analyses will be made in the field in consultation with the WVPO and DEC/EPA site monitors.

The deep-soil (drilling) coverage is presented in detail on Plate 12 and in Table B-6. Borehole design and sampling projections are based on the best topographic coverage presently available (Figs. B-7 and B-8), the latest subsurface interpretations of the alluvium-till boundary and the thickness of the post-glacial alluvium (Plates 3 and 5), and a recently generated representative potentiometric map of the surficial (alluvial) water bearing unit.

As indicated, the majority of the proposed boreholes are located hydraulically downgradient of the units identified as potential contributors to groundwater deterioration as suggested by the analytical results of the on-going groundwater monitoring program. The impacts have been characterized as radiologic in nature but these same regions are those most probable to have been impacted by non-radiologic contamination as well.

For solid waste management units where drilling is prohibitive either due to physical constraints or high radiation levels (health and safety concerns), an attempt was

made to locate the drilling location as close as possible to the source. In many cases, information already exists for the site from a process knowledge standpoint to address the question of source characterization. For several units, direct source sampling has been recommended to characterize the units. For those units where direct source characterization is not possible, the proposed program reflects sampling immediate downgradient of the unit and recognizing that these units are primarily located on the north plateau (underlain by a sand and gravel geologic unit), have operated or been in existence for 25 plus years, and considering geologic time, contaminants, if present, has most probably reached the immediate downgradient sampling location.

Proposed boreholes are located mainly downgradient and as near as is operationally feasible to the individual units; i.e. high-level waste storage tanks (Borehole 40), the old hardstand (Borehole 29), the FRS/CUP (Boreholes 19A, 21A, and 31), Lagoons 4 and 5 (Boreholes 3 and 4 and Boreholes 1 and 2, respectively), the southwest corner of the main plant building (Boreholes 18 and 20), Lagoon 1 (Boreholes 8 and 9), the interceptors (Boreholes 13 and 14), the solvent dike (Borehole 12), the demineralizer sludge ponds (Borehole 15), SSWMU 5 (Boreholes 35 and 36), and the northeast corner of the NDA (Borehole 42).

Additional boreholes are located between and among these same facilities and are intended to provide the means to discriminate among potential sources of contaminants detected in analyzing soil matrices; these boreholes include Nos. 10, 16, 17, 30, 32, 33, 34, and 37.

Boreholes 22, 23A, and 24 are intended to characterize contamination in the shallow (fractured) Lavery till along the impounded drainageway opposite Bldg OB-1, and Borehole 41 is a shallow till exploration intended to provide a basis for interpreting soil analytical results obtained from Borehole 42. Boreholes 25, 26, 27, and 28 are intended to characterize contamination downgradient of and relatable to SSWMU 8 and to explore and characterize backfill in the large trench that formerly existed immediately north of SSWMU 8. Background soils characterization for the alluvial sequence and for the weathered till will be provided by analyses of samples taken from Boreholes 38 and 39, respectively.

Borehole 11 will be drilled within the boundary of the closed solvent dike. This former catchment was emptied of its liquid waste inventory prior to closure; the proposed borehole is intended to test the validity of reports. The solvent dike rainwater received runoff from the solvent storage terrace and likely contained residual solvent.

Drilling and Sampling Procedure

The drilling will be conducted with truck or ATV mounted drilling equipment and a crew fully trained and medically qualified to perform the tasks specified.

Boreholes will be advanced to completion depth using 4.25-I.D. hollow-stem augers and with bits and center-plugs provided by the subcontractor. Sampling will be continuous and samples will be recovered with 3-inch split-spoon devices fitted with sand springs, as appropriate. Sampling procedures will conform to those contained in ASTM-D 1586 (Attachment B-1) and the information provided for on standard borehole completion forms including description of geologic materials, depths, recovery, penetration resistance will be recorded. The inspecting geologist will have the authority to by-pass intervals where mechanical problems are encountered. Mechanical problems might include malfunctions of the auger drive assembly, cathead-hammer assembly or any other top-side equipment (mechanisms). Loss of a sampling device or part of a sampling device also falls in this category.

Poor sample recovery in itself will not be considered a basis for abandoning a borehole; however, in instances of lost tools or subsurface obstructions, the inspecting geologist also will be authorized to translocate a given borehole within a reasonably limited radius of its initial location. In the first instance, the decontaminated tool will be left in the borehole and the borehole will be backfilled or back-grouted upon completion of drilling and sampling activities at that site. In the second instance, notation will be made on the borehole completion form as to the probable nature of the subsurface obstruction. Obstructions (and tool loss) are most likely to occur in areas underlain by fill; conceivably, a drilling location will have to be abandoned entirely in such a setting. Proposed boreholes situated in backfilled areas include Nos. 3, 19A, 21A, 25, 26, 29, and 30. Sampling of a replacement borehole will resume at the depth at which the initial borehole was

terminated and the samples from both holes will then be treated a though they had been retrieved from a single borehole.

Particular attention will be given to sample textural properties in that grain-size distribution and clay content is the single most important determinant of a soil's capacity for sorbing contaminants. The samples to be sent for analysis will be selected on the following criteria.

1) Field instrumentation will assist in sample selection particularly where noticeable instrument changes are observed for volatile organic and/or radiological screening from each split spoon. The selection of samples for chemical analysis will be formalized in the field following a review of the instrument readings for the entire borehole. The above selection of samples will be done in consultation with the on-site NYSDEC monitor and planned sample frequency according to Table B-7.

2) Significant reference horizons for each borehole (Table B-6) have been developed based on knowledge of the site stratigraphic units and expected elevations for horizon changes. These reference horizons include stratigraphic changes such as the interface of the sand & gravel unit and the unweathered till in the north plateau and the interface at the water table horizon. These are presented in Table B-6 and will be reviewed by the field team prior to conducting the borehole drilling.

3) Visual observations will focus on soil staining or unusual color changes/transitions. Visual observation will also focus on textural criteria as discussed in item 4 below.

4) Textural criteria focuses on selection of samples in zones where the subsurface soil conditions indicate permeable subsurface pathways with soil conditions which exhibit some retentive qualities for capturing potential contaminants. This would include zones where clayey silt or silty clay are encountered; and

5) Process knowledge focuses on a review of SWMU specific information related to potential preferential pathways at a particular depth or review of potential contaminants and associated characteristics which could be utilized to discern their presence. This background information would be reviewed just prior to conducting the borehole program for a given SWMU to familiarize the drilling team with SWMU specific characteristics.

The revised flow chart (Figure B-13) has been developed which depicts the criteria which will be used in the sample selection process. Sample selection will be documented in the field log book and boring log. Selection will be performed in consultation with the NYSDEC on-site monitor as available.

Table B-6 is a statement of program scope comprising estimated numbers of samples for each borehole, and Table B-7 outlines the parameter groups (e.g., B-list parameters; TCL metals) that is considered appropriate for each borehole based on historical knowledge and/or analytical data. In Table B-6, columns 1 through 4 list the significant reference horizons for each proposed borehole, columns 5 through 7 provide hydrostratigraphic thickness data, and columns 8 through 11 list the number of samples that will be selected from each borehole for analysis. Table B-7 reflects the proposed sampling program under the RFI Work Plan. For the SWMU areas where the presence of semi-VOAs are not anticipated but there is an interest in confirming their presence or absence, the sample selection process will follow the criteria outlined above and one sample will be sent for chemical analysis following a review of the entire borehole field log to select the appropriate sample horizon for analysis. This would be done in consultation with the on-site NYSDEC monitor and, if for these areas, an additional sample is warranted, based on the sampling flow chart screening, for chemical analysis, a second sample would be forwarded for analysis. Since these areas are the Process Building, HLW Tanks and the Maintenance Shop Leachfield, the first criteria identified above relating to radiological releases potentially containing hazardous constituents would be judged most critical for the Process Building and HLW Tanks. The planned characterization of the Maintenance Shop Leachfield tanks and distribution box for semi-VOAs will provide adequate first order coverage of this unit prior to field sample selection and decision making for these

borehole locations. It should be noted that the Consent Order does not require isotopic radiologic analysis and therefore, while presented here, does not imply or commit that this part of the program be legally mandated as part of the Consent Order.

Figure B-9 indicates three potential hydrostratigraphic scenarios and the sampling strategy that might be applied in each of these. As stated above, multiple criteria apply in the process of sample selection for analysis and, in the final analysis, these decisions can only be made in the field.

Table B-7 identifies the number of samples from each borehole that will be analyzed for the parameters contained in each of three radiological parameter lists and four chemical parameter lists. Column headings are explained in the footnote at the end of the Table and the parameter lists themselves are included in Table B-3.

As indicated, all listed primary borehole samples, duplicates, and equipment blanks, with the exception of samples from the two background locations, will be analyzed for parameters on the marker ß List. Background borehole samples will be analyzed for both Alpha List and Norm List parameters. The assignment of parameter lists to borehole samples is based on information currently available on the process and waste management history of the site. It reflects the inferred likelihood that alpha-emitting nuclides will be found to characterize the main process plant and its immediate surroundings and that the outlying facilities will be relatively "clean".

For purposes of this program, all samples analyzed for chemical parameters also will be analyzed for radioactivity; however, many of the samples selected for radiological analysis will not be chemically analyzed. Accordingly, for a borehole in which field screening indicates the presence of chemical contaminants at several depths, the number of samples selected and submitted for chemical analyses will be relatively high for that particular footage and, additionally, a portion of each selected sample also will have to be submitted for radiological analysis. On the other hand, for boreholes in which field screening provides no indication of the presence of chemical contaminants, a minimal number of samples will be submitted for chemical analyses even should sample screening indicate elevated levels of radioactivity throughout the borehole. For each borehole, the minimum number of samples and associated chemical

radiological analysis is presented in Table B-7. Numerous additional scenarios also will have to be considered and these will be addressed as they are encountered and interpreted in the field. Field decisions as to the identification of samples for analysis will be made in conjunction with the NYSDEC site representation. However, WVNS will remain prepared to make said identifications, consistent with the criteria described in the revised Work Plan, should the NYSDEC site representative not be available.

Shallow Soil Sampling

A limited shallow soil sampling program based largely on the results of the 1990 site-wide overland gamma survey and on anecdotal information will be conducted to assess the significance of the radiometric data and to determine whether a correlation exists between the radiometric values and overall soil quality. Approximately 21 samples will be taken at various locations corresponding to intersections on the 10-meter gamma survey grid at which the meter reading at a height of one centimeter exceeded the meter reading at a height of one meter by 5 or more millirem per hour ($\geq$ 5 mrem/hr). In each such instance, the uppermost 6 inches of soil will be taken at the intersection itself and at a distance of one meter to the north, east, south, and west of the primary sampling point. Representative portions of these five samples, adequate to ensure that laboratory volume requirements are met, will be composited and aliquots of the composite will be submitted to the contracted laboratories for radiological and chemical analyses. Samples to be analyzed for TCL volatiles will not be composited.

Additional information for shallow soils characterization will be afforded by considering the surficial sample at each borehole location as a shallow soil sample. Borehole surficial samples consisting of blacktop, pea-gravel fill, or landfill cap material of indeterminable origin will not be employed in this application. All borehole locations were selected without reference to the overland gamma survey and these surficial borehole samples therefore might be considered as having been selected according to the criteria used to site the boreholes themselves. In any event, the drilling program will provide an estimated 35 additional judgementally selected samples to supplement the shallow soil sampling program.

Shallow Soil Sampling Procedures

All shallow soil samples except those taken at the drilling sites will be collected according to procedures contained in RCRA Facility Investigation Guidance, Volume II, 1983.

Analysis of Shallow Soil Samples

Background samples will be analyzed for Norm List parameters, Marker B parameters, TCL VOAs, TCL Metals, and TCL Semi-Volatile Compounds; all other samples will be analyzed for Marker B parameters, TCL metals, and TCL Semi-Volatile Compounds at specific locations as indicated in Table B-7.

It is not believed that volatile organic parameter analysis is appropriate for surface soils since these compounds would likely have volatilized within very short time periods after release. However, if the field screening with the PID indicates this type of contamination, VOA analysis will also be performed.

Stream Sediment Sampling

Thirty-eight sediment sampling locations have been identified, most of them on the stream system that forms the natural boundaries of the WVDP; these are indicated on Plate 12. A limited number of additional locations might be selected in the field, either prior to or during the sampling program, to include sediment sinks not apparent in the topographic contour pattern or points that are radiation "hot spots". These additional locations most likely will be within the fenced area on either the North Plateau or the South Plateau.

The distribution of the sampling locations provides a means to approximate the locations at which contaminants are being or have been introduced to the surface water system. Each station shown on the map encompasses about 65 feet of the channel. However, the dynamic nature of this depositional regime in general, and downstream migration of fine-grained deposits in response to variation in stream energy levels in particular, indicate probable departures from the pattern of sampling locations as mapped. Precise sampling locations will not be determinable in

advance of the actual sampling effort at which time each will be prominently flagged, positioned as precisely as possible on the map, and subsequently located by typical surveying procedures. Sediment sample locations will be surveyed using swing-tie methodology whereas bore hole and surface soil locations will be located employing survey instrumentation such as theodolite and electronic distance measurement (EDM).

Deposits of gravel or sand and stream invert swept free of recent sediment will not be sampled due to the limited proclivity of contaminants for these materials. Deposits of silt and mud will be considered the most likely sinks for both radioactive and non-radioactive contaminants.

All sediment samples except those designated as background samples will be analyzed for radioactivity in terms of the Marker (β) List parameters while samples taken from locations opposite and downstream of site facilities will also be analyzed for Alpha List parameters. The sampling scheme is shown on Plate 12.

Metals are removed from the aqueous environment mainly through sorption to solid particles and generally have particularly strong affinities for the organic matter commonly contained in fine-grained sediments. All samples therefore will be analyzed for the full list of TCL metals. Sorption to sediments also is the principal mechanism by which polyaromatic hydrocarbons and polychlorinated biphenyls (PAH's and PCB's) are removed from aqueous environments. The volatile organic compounds (VOC's) including all of the halogenated aliphatic hydrocarbons, halo-ethers, and many of the monoaromatic hydrocarbons on the TCL List are transported from the aqueous environment through volatilization. These groups of compounds are not likely to occur in any of the sediments associated with this particular stream system and will not be systematically analyzed for in this program.

All sediment samples will be collected according to the methods and protocols presented in Section 1.9.5 (Stream Sediment Sampling). Results will be applied to site-wide characterization in the Soils Environmental Information Document and to the environmental impact of discrete facilities in the RCRA Facilities Investigation Reports.

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Sample Screening, Shipment and Quality Assurance

Samples will be screened for gross alpha activity and gross beta-gamma activity in accordance with DOE site radiologic procedures. If the samples are determined to be radioactive, the screening results will be used for shipment classification. Based on radioactivity levels, the shipment will be classified as either Limited Quantity or Type A and the samples will be packaged in accordance with DOT procedures.

Because of chemical parameter holding times, the samples must be screened as quickly as possible to permit shipment to the appropriate contract laboratory on the next day after collection. Since the classification will be based on gross values and not on isotopic-specific analysis, a greater number of samples might have to be shipped by the more restrictive Type A method. The samples will be transported to either a radioactive or mixed-waste lab based on whether they are being shipped for radioactive or chemical parameters.

Field duplicates and equipment rinse blanks will be collected and submitted to the appropriate lab along with the investigatory samples in order to assess the quality of the data resulting from the field sampling program. Because this program involves only soil and sediment sampling, NYSDEC guidelines do not require collection of field blanks or trip blanks. Trip blanks will, however, be prepared on days that samples to be analyzed for VOAs are collected.

All data provided by the radiological or mixed-waste labs will be in a Level-2 contractually-defined format for vendor lab services. Data validation will also be Level-2. Level-2 validation will be in accordance with SW-846 and is further described in Section 1.13.5. In addition the present laboratory contracts have been adjusted to allow for tentatively identified compound (TIC) reporting, however, the 1991 and 1992 data was generated without this requirement.

Drilling and Sampling Procedures

Drilling and sampling procedures are as follows:

Safety Related Procedures

1. All personnel directly involved in drilling and sampling operations will wear the protective equipment in accordance with the Health and Safety Plan. All other personnel will stay back from the drilling rig and the sampling are.

2. All personnel directly involved in drilling and sampling will have received hazardous and radiation-worker training and be respirator qualified. Training requirements will have been met before the program is initiated.

3. All equipment needed for the day's activities will be staged at the drilling location outside of the controlled area.

4. Efforts will be made to minimize volumes of solid and liquid waste produced during drilling and sampling. The use of 2.25-I.D. augers throughout is intended to minimize the volume of solid requiring top-side waste management.

5. All instruments will be calibrated and in good working order prior to the start of drilling and re-calibrated throughout the program on a weekly basis or more frequently, as required.

Controlled Area

Appropriate measures will be taken to facilitate top-side management of borehole materials and minimize the number of personnel directly involved in these operations. After the drilling rig is positioned to begin a borehole, a work area will be defined to control contamination that might be produced during sampling operations. This

controlled area will be roped off and labeled with appropriate signs by the R&S technician. The work area will be large enough to accommodate:

- Standard drilling procedures
- A laydown area for tools removed from the hole.
- A raised work table positioned on the outer edge of the controlled area.
- An equipment decontamination station consisting of one (1) ten-gallon trash pail and five (5) five-gallon buckets positioned on the outer edge of the controlled area downwind of the work table.
- A dress-down area at the aisle to the controlled area.
- One or more 55-gallon drums for spent disposable supplies such as towels, wipes, gloves, plastic, and other solid trash.
- Lined 55-gallon drums designated "cuttings" and "water" to contain materials removed from the borehole. The two drums will be positioned as close as is practicable to the borehole.

Within the controlled area, plastic will be place on the ground around the work table, cleaning station, and laydown area, and at any other locations where borehole spoils or fluids might be dropped. The edge of the plastic will be raised all around to contain such spillage. The plastic sheeting will be overlain by herculite sheeting or plywood sheeting in areas of heavy traffic such as at the borehole, around the work table, and at the cleaning station. The back of the drilling rig, including the lower part of the mast, will be masked with plastic to expedite decontamination procedures upon completion of the borehole. A waste container will be placed at the entrance/egress aisle.

Only that equipment necessary to drill and sample the borehole and, spray bottles of decontamination solutions, will be taken into the controlled area. Back-up equipment

and supplies will be staged outside the controlled area at an easily accessible location. Sample jars and other containers also will be kept outside the controlled area and covered with plastic in accordance with QAPJP, Section 4.3.2.

Containment of Borehole Materials

To avoid digging pits at the drilling sites, a portable mud pan will be used to contain the spoils generated during drilling. The mud pan will be fabricated of steel, fitted with baffles, be clean and water-tight, and have a circular hole in its base wide enough to accommodate the augers. The mud pan will be emplaced on the borehole according to generally accepted drilling procedures including emplacement of bentonite as a seal around the collar to minimize the loss of borehole water. Cuttings collected in the mud pan will be shoveled into a lined 55-gallon drum designated "cuttings", and water that collects in the mud pan will be transferred to a second lined 55-gallon drum. The drummed cuttings will be staged at the drilling site and handled in accordance with the site media policy.

As the drilling rods are retracted from the hole during sample retrieval, paper towels will be wrapped around them at the north of the augers and excess water will be diverted back down the auger bore. As the sample is withdrawn the rods and sampler will be monitored for radioactivity. If the count rate is greater than 10K cpm/probe-beta-gamma, the drill string will be lowered back into the augers. The Project Manager will then determine whether to continue operations or abandon and close the borehole. If the count rate is less than 10K cpm per probe-beta-gamma, the sampler will be uncoupled from the rods over the 55-gallon drum designated "water" and taken to the work table in a plastic bag. The rods then will be thoroughly cleaned of mud and wiped dry and all spent paper towels and gloves will be placed in yellow plastic bags. The drill string probably will not have to be broken down on this project because of the limited drilling depths but the driller should provide a stand-off device on the lower part of the mast to preclude contamination of the drilling rig. If the drilling rods take on water during sampling, split-spoons will be uncoupled from the rods inside a line 55-gallon drum. To minimize water take-up by the rods, a weep hole will be drilled in the lower end of the lead drill rod, above the threaded portion. Split spoon samples will be drained over a lined

55-gallon drum before being opened. The spoons will be opened on a sheet of yellow plastic with raised edges.

Decontamination of Augers

The augers will be withdrawn slowly to minimize the volume of cuttings coming to ground surface. Cuttings on the auger blades will be removed and transferred to a lined 55-gallon drum designated "cut-tings". The augers will be broken down into their shortest lengths, placed on a layer of yellow plastic, and covered with another layer of yellow plastic to await decontamination. Center plugs and drilling bits will be similarly treated and an attempt will be made by the drilling crew to radiologically decontaminate the auger assemblies at the drilling location.

Should this attempt be unsuccessful, and if the equipment cannot be released, a decision will be made as to whether the equipment should be taken to a controlled area where a second attempt will be made to decontaminate it. Equipment that cannot be radiologically decontaminated will be packaged as radioactive waste. Augers that are successfully decontaminated for radiation will be chemically decontaminated as described below under Decontamination of Sampling Devices.

Samples of rinsate and smear samples of the equipment will be collected. If the results indicate radiological contamination above release limits, the rinsate will be contained in an appropriate 55-gallon drum, classified and stored. Should it be necessary to steam clean the drilling rig, it will be conducted at a designated equipment decontamination area and all rinsate will be contained, classified, and stored. Tools that cannot be decontaminated will be containerized until their status as waste is determined.

Decontamination of Sampling Devices

All equipment used in drilling and sampling (downhole tools, samplers, and back of rig) will be decontaminated before and between use and between boreholes by using the following techniques:

- An alconox wash and tap water rinse

- Radioactivity screening and possible repeat of wash and rinse
- Steam cleaning

Chemical and acid rinses will not be used.

Sample Collection, Documentation, and Custody

The sampling device will be opened and the contents surveyed for organic vapors with a photoionization detector, and for beta-gamma radiation; the sample will then be photographed and its description entered in a field notebook. The sample will be split as required using decontaminated hand tools and placed into appropriate containers. The containerized and appropriately labelled sample will be surveyed for radiation and placed in a shipping cooler inside the controlled area in accordance with QAPJP Section 4.3.4.

The sample number will be recorded and chain-of-custody forms completed. Other associated paperwork will also be completed. This sampling sequence will be repeated until the required number of samples for the borehole have been taken in accordance with QAPJP Table 4-1. Samples will be retained overnight on site in a secure containment consistent with the chain-of-custody procedures. The storage facility on site will be appropriately designated as a radiologically controlled area.

Closure of Boreholes and Drilling Locations

After all required samples have been collected, logged, and placed in coolers, the Soils Project Manager will give his approval of the adequacy of the sampling effort and will direct closure of the borehole. An adequate volume of cement-bentonite grout will be mixed and introduced slowly, through the augers, to ensure a complete seal and minimize displacement of fluids from the borehole. The augers will be gradually retracted as the grout is emplaced. The borehole will be grouted to grade and then flagged. The flagging will remain in place until the borehole location is surveyed and plotted on the site map. The borehole then will be covered with a few inches of soil. Spent cleaning solutions and rinsate will be place in appropriately labeled and lined 55-gallon drums and taken to permitted storage for waste classification. Buckets and brushes will be stored in plastic bags for re-use. When

the program is complete, the buckets and brushes will be discarded as waste. Used herculite and plastic will be wiped and surveyed for radioactive contamination and all other contaminated solid material (rags, plastic, paper) will be drummed or wrapped and inventoried. Drummed waste will be placed in storage for waste classification. Liquid borehole wastes will be stored until all appropriate waste status determinations have been completed. All contaminated liquids will be sent to the IWSF. The drilling rig and sampling equipment will be surveyed for radiation prior to being released from the controlled area.

Records Distribution

All records, logs, and data will be managed in accordance with the Data Management Plan.

Selection of Borehole Samples for Laboratory Analysis

Each borehole drilled during this program will be profiled at the drilling site in terms of radioactivity and organic vapors content and on the basis of additional perceptible characteristics such as stains, sheens, and color. Samples will be screened for presence of beta-gamma and organic vapors.

1.7 Individual SSWMU and Constituent SWMU Characterization Activity Description

The following sections describe the technical approach for characterization of SSWMUs. Each SSWMU is listed, followed by a description of the operational history and source characterization, environmental setting and contamination characterization. Subsections of contamination characterization present sampling and analysis strategies for groundwater and soils.

1.7.1 SSWMU #1 - LOW-LEVEL WASTE TREATMENT FACILITIES

1.7.1.1 Operational History and Source Characterization

SSWMU #1 is made up of the active LLWTF lagoons (2, 3, 4, and 5), a closed lagoon (no. 1), and the LLWTF building, interceptors, and neutralization pit (refer to

Plate 1). Lagoons 2, 3, 4, and 5 are suspected of containing radioactive mixed waste (RMW) and nonhazardous waste. Former Lagoon 1 is known to contain radioactive waste. Lagoons 1, 4, and 5 bottom in the surficial sand and gravel unit at elevation 1385' NGVD. Lagoons 2 and 3 penetrate the underlying Lavery till. Lagoons 4 and 5 have membrane liners. Bottom elevations for Lagoons 1 through 5, respectively are: 1385', 1360', 1353', 1385', 1385'.

Lagoon 1, located 183 meters (600 ft) east of the process building, was excavated into the alluvium of the north plateau as an unlined impoundment for liquid low-level wastes from the main process building. The lagoon measured 100' x 100 'x 5' and was designed to hold 1.1 million liters (300,000 gal.) of liquid waste.

Lagoon 1 was operated as a surface impoundment from the start of reprocessing operations in 1966. It was removed from service in 1984 because it was a suspected source of tritium in nearby groundwater.

The lagoon originally received wastewaters from the fuel reprocessing plant via a neutralization pit and interceptor basin. The neutralization pit was used to adjust the pH of plant effluents and to test effluents before transfer to the lagoon system. The criterion for transfer to Lagoon 1 was gross alpha activity of less than 5×10^{-3} μCi/mL. The process building effluent contained a varied waste stream that will be identified through process records.

When it was decided to close Lagoon 1, the liquid and bottom sediments were transferred to Lagoon 2, the next basin downstream in the LLWTF system. Process lines and drain lines were rerouted or cut and sealed and the basin was backfilled with asphalt, soil, and vegetation excavated from the hardstand on which radiologically contaminated equipment from the process building had been stored. About 1300 cubic meters (1,700 cubic yards) of radiologically contaminated material, containing less than 10,000 dpm/g beta-gamma and 2,000 dpm/g alpha radioactivity were transferred to Lagoon 1. Lagoon #1 subsequently was capped with topsoil and seeded to establish vegetative cover.

The location and structural integrity of the cut and sealed process lines was established based on information provided in a work order describing the tasks for

closure of Lagoon 1. The work order also contained a drawing with the locations of the piping shown. This information will be made available in the RFI report regarding the lagoon system lines. Additional work may be performed to define the routes of potential contaminant migration, if contaminants are identified during the the sampling efforts. Process line drawings, as available, were reviewed prior to sampling to avoid drilling into these lines and to assist in selection of sample locations (downgradient of lines). This work was reviewed with the on-site NYSDEC monitor to confirm appropriateness of selected sampling locations.

The LLWTF presently comprises four surface impoundments (Lagoons 2, 3, 4 and 5) in the SPDES-permitted treatment process for liquid low-level radioactive wastes. Lagoons 1, 2, and 3 were put into service in 1966 and Lagoons 4 and 5 came on-line in 1971. Lagoon 1 was removed from service in 1984.

The lagoon system is east of the process building and south and east of the LLWTF building. Unlined Lagoons 2 and 3 bottom in the lavery till although the top 10 - 15 ft of soil is within the sand and gravel unit. These lagoons have volumes of 9.5×10^6 liters (2,500,000 gal.) and 1.2×10^7 liters (3,300,000 gal.) respectively.

Originally, process LLW liquid effluents were pH-adjusted and routed in series from Lagoon 1 to Lagoon 2 and on to Lagoon 3 before being discharged to Erdman Brook. The effluent remains in the lagoon for approximately 100 days, allowing for decay of the short-lived nuclides and dilution of the wastes with precipitation. The water level of Lagoon 3 fluctuates over time, however, the maximum water surface elevation reportedly corresponds to the lowest elevation of the till-sand and gravel interface - estimated to be 1367' NGVD.

In 1971 the LLWTF was completed, providing physical and chemical treatment of the lagoon wastewaters. At that time Lagoons 4 and 5, each with a capacity of 200,000 gal., were put into service. The sediments in Lagoon 3 were removed (and reportedly buried at the NDA) to provide a radiologically clean storage basin for treated effluent at the same time. The NDA facility investigation RFI report will address known information regarding waste disposal activities, including what is known about the Lagoon 3 soils placed in the area. Generally speaking, however, there were approximately 261 loads of radioactively contaminated soils placed in the NDA in

June, 1972. This date coincides with the approximate time that Lagoon 3 was cleaned out. The SSWMU 1 and SSWMU 9 RFI reports will address the removal process and the disposal location. Also, SPDES analytical results for this time period will be examined. This work and associated results will be added to the RFI reports.

The contents of Lagoon 2 are routed through the LLWTF to reduce radioactivity by flocculation, clarification, and ion exchange. Effluent from the LLWTF is routed to either Lagoon 4 or 5 where it is tested for pH and radioactivity. If the pH is between 6 and 9 and the radioactivity is less than DOE derived concentration guides for uncontrolled release (per DOE Order 5400.5), the effluent is routed to Lagoon 3 for storage before discharge into Erdman Brook via a SPDES-permitted outfall. Lagoon 3 is typically discharged five to six times per year at about 7.5 million liters (2 million gal.) per discharge.

PC2> Several radiological investigations of Lagoon 2 have been undertaken. The first investigation in March, 1977 was initiated to assess the quantity of sludge in the lagoon and also to determine the extent of radioactivity in the lagoon. (Memorandum from J. P. Duckworth to W.A. Oldham, March 23, 1977, Re: Bottom Samples from Lagoons 2 and 3. 9-77-23). The results of the 1977 study indicated that the bottom sediments in Lagoon 2 contained 100% more radioactivity than Lagoon 3. In addition, there was an approximated depth of sediments in Lagoon 2 of between 6 - 10 inches based upon the extent of penetration accomplished by the sample tube with 20 - 40 pounds of pressure. In 1982, as part of the site characterization report, Lagoon 2 was again sampled for radiological parameters. The results of that investigation state that the sediment in Lagoon 2 "indicated a generally uniform deposition of radionuclides". (Picazo, Marchetti, and Wilcox 1984.)

In 1988, Lagoon 2 was sampled for gross radiological parameters and Extraction Procedure Toxicity (EPTox) parameters. The EPTox analytical results do not indicate that the sludge samples exceed the regulatory action levels for metal constituents.

In 1990, the lagoon was again sampled to assess immediate mixed waste concerns regarding the unit. Four sediment samples were taken from three locations accessible

from the lagoon banks. The sediment samples were taken (upper 24 - 48 inches). The increase in depth of bottom sediments is due primarily to the transfer of Lagoon 1 sediments to Lagoon 2. The sediment samples were analyzed for RCRA Toxicity Characteristic Leaching Procedure (TCLP) analytes and the complete Target Compound List (TCL). All TCLP results were below regulatory limits or MCLs. One unidentified organic C_4H_8O compound was detected from the TCL parameter list in all samples in concentrations ranging from 22 μg/Kg to 40 μg/Kg. Other organic compounds were reported but flagged as possible blank contamination or estimated values. The analytical data generated during these studies was provided to the NYSDEC during a technical exchange meeting on August 12, 1993.

Several investigations of Lagoon 3 were initiated to determine the sludge composition for both SPDES and unit characterization purposes. The most pertinent investigations for this study were performed between 1990 and 1991. The 1990 event provided only radiological results. The analytical data generated for the Lagoon 3 studies was also transferred to NYSDEC during a technical exchange meeting on August 12, 1993.

PC2> The May, 1991 chemical analysis sampling event of Lagoon 3 was a follow-up on the 1990 radiological unit characterization. Three locations of the lagoon were sampled and the cores stratified into top, middle and bottom. Sampling locations were chosen based upon the results of the 1990 characterization which identified areas of the highest radiological contamination. Each layer from the three samples were combined and analyzed for the TCL and TCLP parameters in accordance with existing procedures. Of the TCL parameters analyzed, methylene chloride was detected in the top, middle and bottom and acetone was detected in the top and middle strata. These results were suspect as both compounds were detected at levels close to or below the quantitation limits; were found in the method, field and trip blank; and both compounds are common laboratory contaminants. Samples from the top and bottom strata were analyzed for TCL metals. These results are summarized in Attachment B-3. All metals were detected with the exception of antimony, selenium, silver and thallium. However, due to the high concentration of iron, thallium could not be ruled out due to probable interference with the method. Iron was found in the highest concentration followed by calcium, aluminum, magnesium and potassium.

(Memorandum, T. X. Grasso to G. G. Baker, July 25, 1991, Re: Sampling and Analysis Results for Lagoon 3 Sediment). The presence of these soluble metals is not surprising as all were components of the fuel reprocessing chemicals and iron is also naturally high in the area surface waters. In August 1991, a supplement to the July report was written which provided TCLP metal results for the top sediment layer. These results indicate that all TCLP metals were found below regulatory limits. One should note, however, that the holding time for mercury was exceeded and potentially invalidates those results.

NFS conducted various groundwater studies at the site. The on-site environmental monitoring program indicated increasing tritium activity, which prompted an investigation to discover the source. Studies conducted adjacent to Lagoons 4 and 5, which included subsurface test holes, indicated that these two lagoons contributed to the source of the activity. In the fall of 1974, these lagoons were fitted with liners. There is currently no information available to suggest that Lagoons 4 and 5 were decontaminated prior to being retrofitted with hypalon liners. In addition, there is also no information that suggests that the bottom sediments from these two lagoons were sampled and analyzed prior to being retrofitted in 1974.

The LLWTF is located approximately 150 m (500 ft) east of the process building. The interceptors and neutralization pit are also considered part of the LLWTF building. The LLWTF treats low-level radioactive liquid wastes from the process building and other systems. Liquids generated in the plant and decontamination operations were routed to this system for treatment before being discharged. Wastes originated as condensate from the acid fractionator, floor drains in various cells and chemical makeup areas, wash solutions from the process water demineralizer, and drains from de-misters in the ventilation systems.

Other aqueous wastes processed by the LLWTF have included water collected from the NDA TBP/N-dodecane plume remediation activities, water accumulated in the SDA lagoon, leachate from burial trenches at the SDA (not processed since DOE assumed control of the WVDP), and miscellaneous other sources of radioactive or potentially radioactive water.

The facility is equipped with two ventilation systems and with numerous process pipes and vessels located above-, at-, and belowgrade. The groundwater around the LLWTF building is monitored as part of the monitoring network for the adjacent lagoon system.

1.7.1.2 Environmental Setting

The Lavery is a low permeability unit, nominal K_v through it is 10^{-8} cm/s, and there is a potential for migration for groundwater-borne contaminants through the unit. The Lavery is 90 to 100 feet thick beneath the area in question, and an average of 80 feet beneath the lagoons themselves. These thicknesses are equally as significant in evaluating contaminant release scenarios as any intrinsic attenuative properties of the till, more likely, unit thickness is the single most significant characteristic of the Lavery at this location. Because the weathered Lavery till was largely removed during construction of the lagoons and because a new 3-m-thick weathered zone has not had time to develop, the Lagoon 2-Lagoon 3 area is appropriately characterized as immediately underlain by unweathered Lavery till ($K_v = K_h = 10^{-8}$ cm/s; downgradient is downsection). Two boreholes have been re-located to the east-southeast of lagoon 2 to provide coverage in this area. This is represented on revised tables B-6 and B-7 and Plate 12.

The surficial sand and gravel unit lies in contact with the walls or bottom of the lagoons, except for Lagoons 2 and 3, which bottom in the Lavery till. The sand and gravel unit ranges in thickness from 0 to 13 meters (0 - 40 feet). The top of the till (Plate 3) slopes to the northeast, passing beneath the small lagoons and intersecting the deeper lagoons. The water table map (Plate 10) indicates northeastward and eastward flow directions.

1.7.1.3 Contamination Characterization

1.7.1.3.1 Groundwater Monitoring

NFS, Inc. installed a french drain on the north and west sides of Lagoons 2 and 3 to intercept and reduce groundwater seepage into those lagoons. The drain consisted of a 15-cm (6-inch) diameter perforated metal pipe buried approximately 3 meters (10

feet) below grade. It discharges to Erdman Brook east of Lagoon 3 at a permitted outfall. Water quality data from this outfall is assumed to reflect the character of the sand and gravel unit in the immediate vicinity of these lagoons. A surface water sample will be collected to further characterize the water draining through the conduit. The water will be analyzed for those constituents in Table B-1. A revised list of sampling parameters will be considered during the two rounds of groundwater monitoring identified in the schedule of Appendix A.

The well array at SSWMU #1 is intended to monitor groundwater levels and groundwater quality in the surficial sand and gravel, the uppermost Lavery till, and an intra-lavery till sand lens (See Plate 1). Construction information including as-built drawings as available will be reviewed for the lagoon system and french drain. This information will be evaluated with the geologic and hydrogeologic information to assess potential migration routes.

Wells 104, 116, 305 and 86-04 monitor upgradient sand and gravel groundwater for this SSWMU. Wells 103, 105, 106 and 111 monitor downgradient conditions and background conditions are represented by well NB-1S. Well 115 monitors the upper Lavery till upgradient of this SSWMU; wells 107, 108, 109, 110 and 114 monitor downgradient conditions; and background is provided by well 1008c.

Existing sampling and field measurements of groundwater at this SSWMU consist of data collected during calendar years 1991 and 1992. This data includes water levels taken prior to sampling which will be used to generate water table/ potentiometric maps. Sampling of groundwater quality reflect results for the parameters presented in Table B-1. Additional sampling and analysis of groundwater will be conducted for 1993 based on a revised parameter list as noted earlier in the text.

The routine analytical parameters for SSWMU #1 characterization are detailed in Table B-1. The groundwater monitoring program will be based on 1991, 1992 and 1993 data and the two expanded rounds of groundwater monitoring (October, 1993 and April, 1994). Tentatively identified compounds will also be disclosed in the Contractual Level 2 reporting format for the expanded rounds. Results will be statistically analyzed pursuant to Section 1.13 of this appendix.

1.7.1.3.2 Soils/Sediment Sampling

Soils/sediment sampling at SSWMU #1 is comprised of three elements: (1) A drilling program intended to explore the uppermost groundwater pathway (sand and gravel unit); (2) A shallow soil sampling program based on both the results of the overland gamma survey and recent information on facility operational history/source characterization, and; (3) stream and ditch sampling designed to provide information on impacts to the surface water system. These elements are intended to be applied in a focused and judgmental strategy to supply data necessary to assess the nature and extent of soil contamination attributable to SSWMU #1.

The drilling program consists of the borehole locations (refer to Plate 12 and Table B-7) designed to assess Lagoon 1, Lagoons 2, 3, 4 and 5, and the old interceptor. Auguring and sampling will be advanced into the confining Lavery till beneath the sand and gravel unit. Attempts have been made to position soil sampling locations downgradient of those process piplines identified during a preliminary review of design drawings. Boring locations have been identified based on historical information including groundwater data, process knowledge, and geologic data. The final locations will be reviewed by the NYSDEC site monitor. All drawings and process diagrams reviewed will be documented in the RFI report.

Lagoon 1 poses a unique situation with regards to sampling the unit due to: 1) the presence of high radiation levels (84,000 dpm/gram gross alpha activity and 370,000 dpm/gram gross beta activity); and 2) the increased potential for radiological releases during drilling due to the high concentrations of alpha emitters in the soil (such as plutonium, uranium and americium). As significant health and safety issues, the Project's ability to collect source samples is restricted. Hence the soil sampling program for Lagoon 1 includes placing borehole number 5A immediately adjacent to Lagoon 1 as shown on Plate 12, and placing borehole number 8A immediately adjacent to the east side of Lagoon 1. Borehole 7A is located adjacent to the southeast side of the Lagoon. Borehole 6 has been eliminated due to the worker health and safety concerns described above.

Eight shallow soil samples will be collected in concert with drilling by selecting samples (as appropriate) from the uppermost split spoon of the 11 boring locations.

One has been discounted on the basis of being in fill (one on the berm at Lagoon 4) and is anticipated to be unsaturated.

Stream and ditch sampling will also be conducted at 10 judgmentally chosen locations to evaluate the surface water/sediment contaminant pathway. One sample will be taken at each location. This sampling is proposed because the drainage-ways generally experience flow only in direct response to runoff of precipitation. Actual locations will be marked prior to sampling and verified by the DEC site monitor.

Bottom samples from the two active, unlined, Lagoons 2 and 3 will not be taken based on recent conclusions drawn from historical analysis, and operating history. This determination relies heavily on 1990 results of TCL and TCLP analysis of samples from Lagoon 2 (see Soil Characterization at Specific Waste Storage Areas, West Valley Demonstration Project, December, 1990, S&EA). In 1991 an investigation of Lagoon 3 sediments was conducted for site characterization purposes and a summary of the results of this sampling is provided in Attachment B-4.

The evaluation of Lagoons 2 and 3 will include the following:

- Review of historical sediment data
- review of process knowledge
- review of historical SPDES data
- review of groundwater and soils data for wells and borings adjacent to these lagoons (including Lagoons 1, 4, and 5); and
- stream sediment sample results.

It is believed that the boreholes surrounding the lagoon system will provide sufficient information to draw conclusions for this phase of the RFI. In addition, the field sampling location for Borehole #10 and #33 have been moved to provide downgradient coverage for potential Lagoon 2 releases. Consequently, two downgradient borehole sampling locations to evaluate potential releases from Lagoon 2 have been added. Based on the results of the RFI, additional sampling of Lagoons 2 and 3 may be warranted as part of a Phase II RFI.

As outlined in Table B-7, both radiological and non-radiological analyses will be performed on judgmentally selected samples based on field screening methods (ie. beta/gamma screen, organic vapor analysis). The distribution of samples and analyses according to location are also shown in Table B-7.

Chemical analysis of samples at this SSWMU will follow the convention below; unsaturated samples will undergo analysis for TCL metals; and saturated samples will be analyzed for TCL metals, TCL volatiles and TCL semi-volatiles. In addition to the parameters to be analyzed at this SSWMU, tentatively identified compounds will also be disclosed in the Contractual Level 2 reporting format.

1.7.2 SSWMU #2 - MISCELLANEOUS SMALL UNITS

SSWMU #2 consists of several small facilities east of the reprocessing plant grouped together because of their proximity and the relative homogeneity of subsurface conditions beneath them. This SSWMU consists of the following units; the sludge pond, effluent mixing basin, solvent dike and the paper incinerator.

1.7.2.1 Operational History and Source Characterization

Sludge Ponds

The sludge ponds are two separate, unlined, rectangular basins adjacent to the warehouse building and about 122 meters (400ft) southeast of the process building. Each measures 15 meters x 30 meters (50ft x 100ft) and are several meters deep. There is usually little standing water in either basin, although the bottom sediments are normally wet and support a dense growth of vegetation. Water is collected at the eastern end of each basin in a head wall/drain pipe and is routed to the effluent mixing basin before discharge via a SPDES-permitted outfall.

The basins were constructed as part of the original plant in the mid 1960's. These basins were designed to receive backflush and recharge solutions from the process water demineralizer, water softener, and raw-water clarifier. Originally the north basin was used. Backflush from the clarifier removes the sludge that forms at the inlet of the clarifier. This sludge consists of particulates from the incoming raw

water (from the Project reservoirs) and alum is used as a flocculating agent to settle and clarify the solids in the raw water. The demineralizer is backflushed with 0.4 M sulfuric acid to regenerate the anion exchange resins. The water softener is a zeolite ion exchange system that exchanges sodium for calcium and magnesium. It is regenerated with a brine solution that also is backflushed to the sludge ponds.

The systems draining to the sludge ponds were not intended for radioactive service. However, radioactive solutions backflowed into the demineralizer during the operation of the facility in 1971. Although the demineralizer units were replaced and effluent routed to the low-level waste treatment facility (LLWTF), this episode did contaminate the sludge pond sediments with radioactive elements. Several sediment samples were analyzed by the WVDP and the analyses indicated the presence of fission products.

Samples from the sludge ponds were collected in 1988. At the time of the initial hazardous waste determination in 1988, the extraction procedure toxicity test was the appropriate regulatory procedure used to determine if a waste could be classified as a characteristic hazardous waste. Since that time however, a new testing procedure has been promulgated and therefore would be utilized, if necessary, to make a waste characterization determination prior to treatment, storage or disposal of the sludge from these ponds. All waste characterizations would be consistent with EPA/NYSDEC requirements allowing process knowledge to be utilized in lieu of sampling and analysis. Sludges from both the ponds, however, contain trace amounts of specific hazardous constituents. Specifically, sludge samples from the north pond contain 4,4 DDT and Beta BHC at 0.008 and 0.241 ppm, respectively. Analyses of the south pond sludges indicated the presence of 4,4 DDT and chloroform, at 0.013 ppm and 0.208 ppm, respectively.

Pesticides at these concentrations may be expected from the contents of any retention basin in this area because the surrounding land was previously used for agriculture. For example, 4,4 DDT is a persistent contaminant readily detectable in samples collected long after initial application. Chloroform, might have formed through the exposure of organic material and methane to chlorinated water, the very conditions encountered at the demineralizer sludge ponds. Both process knowledge and previous background sample results in terms of pesticides are being reviewed. Pesticides and

VOA analytical parameters will be analyzed for in these soil samples and backgound samples to verify the original conclusion regarding the source of the constituents.

Effluent Mixing Basin

The effluent mixing basin is part of the WVDP sanitary sewage treatment system. The effluent mixing basin, identified as outfall 007 on the WVDP SPDES permit, is a 15 m x 37 m x 2 m (50 ft x 120 ft x 8 ft) surface impoundment located 150 meters (500 ft) west of the process building. The effluent mixing basin, an active surface impoundment, is the final receiving basin of treated sanitary effluent before it is discharged to Erdman Brook.

The basin has a membrane liner and is underlain by a sand underdrain. Its operating capacity is 625,000 liters (165,000 gal.) and it can be drained either from an overflow standpipe or a bottom drain. The mixing basin has been in operation since December 1985.

The basin was constructed to receive effluent from a 38,000-liter-per-day (10,000 gpd) extended aeration sanitary sewage treatment plant, excess clarified water from the utility room, water softener backwash, clarifier backwash, sand and screen filters, and blowdown from the two 39.5 million BTU/hr boilers at the WVDP. The purpose of the unit is to collect nonradioactive liquid effluent in a retention basin in which concentrated and dilute waste streams can be mixed to produce effluent that meets the concentration limits identified in the SPDES permit.

About 760,000 liters-per-day (200,000 gpd) of excess clarified water, to which an additional 114,000 liters-per-day (30,000 gpd) of clarifier backflush water is added, comes from the raw water clarifier in the utility room. The sewage treatment plant contributes 38,000 liter-per-day (10,000 gpd) of nonradioactive sanitary wastewater to the basin. Blowdown from the boilers contributes another 9,400 liters-per-day (2500 gpd).

The sand bed beneath the basin is equipped with an underdrain to divert groundwater from beneath the basin to the surface drainage system and prevent the liner from floating.

In July 1988, the basin was drained and sludges transported off-site for disposal. Sludges were sampled and analyzed for radioactivity before the basin was cleaned and were found to be nonradioactive. No other analytical data is known to exist for this unit.

Solvent Dike

The solvent dike was used to temporarily retain runoff from an area known as the solvent storage terrace. The terrace was an area on the roof of the process plant where the n-dodecane/TBP solvent storage tanks were located. Rainwater runoff from this terrace area was directed to the solvent dike to contain any contaminants that might have spilled and subsequently washed from the roof top area. The solvent dike then retained the runoff for evaporation and seepage. The solvent dike was a 9 m x 9 m (30 ft x 30 ft) unlined pond located 60 meters (200 ft) east of the process building. It was installed as part of the original processing facility in 1966. The basin had no outlet and usually contained several feet of water and supported a dense growth of vegetation.

Sediments in this pond were previously sampled and showed radioactive contamination resulting from the radioactively contaminated run-off from the solvent storage terrace. The solvent storage terrace housed tanks of spent tri-butyl phosphate and n-dodecane awaiting disposal. Sediment samples from the solvent dike were also analyzed in 1986 for EP toxicity metals by the WVDP analytical chemistry group; the results were negative. Moreover, review of past operations indicated that listed wastes had never been disposed of in the area. Thus, the sediment was classified as a radioactive Class A nonhazardous waste. The solvent dike was closed in 1986 and 136 cubic meters (4,800 cubic ft) of sediment and soil was removed and packaged in waste boxes. The top wetted surface was packaged into 55-gallon drums and stabilized. The area was then refilled with clean soil and seeded. The sediments were excavated and packaged as low-level waste and stored in the low-level waste container storage areas.

Paper Incinerator

A paper waste and combustible packing material incinerator installed by NFS was used from 1968 until 1985. The unit was never used for the incineration of radioactive or

hazardous material but was used to burn paper, cardboard, and wood. Incinerator ash was buried at the construction and demolition debris landfill (CDDL).

This incinerator is a PLIBRICO Model 1-AGF-260 multiple chamber retort incinerator with a capacity of 118 kg/hr (260 lbs/hr), although when used it was operated at less than one-third of its capacity. This unit, located next to the warehouse building, was installed by NFS in 1968 and was used by both NFS and the WVDP until 1985. The incinerator was taken out of service in 1985 and has since been sealed to prevent further use.

1.7.2.2 Environmental Setting

From a groundwater pathway perspective, the miscellaneous units are all located on the north plateau and, as such, are located within the surficial sand and gravel unit. The sand and gravel unit beneath these processing units is about 15 feet thick and groundwater within it migrates in a northeasterly direction and discharges to streams and seepage faces along the edge of the plateau. The hydraulic conductivity of the unit is approximately 5.5×10^{-5} cm/sec. The impoundment structures for the solvent dike, sludge ponds and effluent mixing basin were excavated into the sand and gravel unit. These units were combined for investigation under SSWMU#2 due to the relative homogeneity of subsurface conditions beneath the units.

1.7.2.3 Contamination Characterization

1.7.2.3.1 Groundwater Monitoring

At SSWMU#2, well 0201 monitors upgradient conditions in the sand and gravel unit and wells 203, 205, 0207, and 86-06 monitor downgradient conditions. (See Plate 11). The sand and gravel unit represents the primary water bearing pathway of concern for these units.

The routine analytical parameters for SSWMU #2 characterization are detailed in Table B-1. The groundwater monitoring program will be based on 1991, 1992 and 1993 data and the two expanded rounds of groundwater monitoring (October, 1993 and April, 1994). Tentatively identified compounds will also be disclosed in the Contractual Level 2 reporting format for the expanded rounds. The groundwater monitoring results will be statistically analyzed pursuant to Sections 1.5 and 1.13 of this appendix.

1.7.2.3.2 Soil/Sediment Sampling

Soil/Sediment sampling at SSWMU#2 involves a combination of source, surface and subsurface borehole sampling to characterize the individual units. Source sampling at each unit is individually addressed below.

Prior sampling results from the sludge ponds indicated trace amounts of a few hazardous constituents, a bottom sediment soil sample will be taken from the eastern end of each pond to compare against the prior sampling results. Bottom sediment soil samples will be analyzed for TCL volatiles, TCL semi-volatiles, TCL metals, and TCL pesticides/PCBs (see Table B-7). Although pesticides were detected during prior sampling, the results were recorded at trace levels and were likely applied for agricultural purposes prior to NFS/WVDP operations.

For the solvent dike, soil samples will be obtained from a borehole location within the unit. Two soil samples will be obtained at this location, one within the fill recognizing prior sediments within the unit were removed and packaged in 1986 (should residues from past operations be encountered, a sample will be obtained at this point) and a second soil sample will be obtained in the native soil beneath the unit. Boring number 11 will continue until the total depth of contamination has been determined. Boreholes downgradient of the solvent dike will be advanced to the top of the Lavery till. These samples will be individually analyzed (no compositing) for the parameters listed in Table B-7 and are focused on characterizing the source. In addition, subsurface soil samples will be obtained immediately downgradient of the unit to assess the potential for contamination migration. At this borehole location, two samples will be collected; one in the shallow-unsaturated zone and one in the saturated zone.

Two other subsurface borehole locations have been strategically selected which are downgradient from the sludge ponds and effluent mixing basin to assess the extent of contamination migration, if any (refer to soil sampling location map (Plate 12) - borehole locations 15 and 16). Borehole location 15 will assist in assessing extent of soil contamination downgradient of the sludge ponds and incinerator. Borehole location 16 will assess extent of soil contamination downgradient of the sludge ponds, incinerator and the effluent mixing basin. Soil samples at these locations include an unsaturated soil sample to be analyzed for TCL metals and a saturated soil sample to be analyzed for TCL metals and TCL volatiles.

One composite surface soil sample will also be analyzed at the incinerator location. Based on field conditions, this sample will likely be a composite of several surface sample locations in the immediate vicinity of the incinerator (within 5 foot radius). To facilitate sampling efforts, the incinerator unit will be surveyed (radiological only) and removed from the site in accordance with applicable disposal/recycling criteria. A rigorous soil/sediment sampling program is not proposed for this unit based on use during service (i.e. no radioactive or hazardous materials were combusted in the unit). In addition, it is extremely unlikely that air emissions from historical use of the incinerator resulted in nearby soil contamination. Two stream/surface sediment samples are also proposed for characterization of SSWMU#2 and focus on natural surface drainage pathways through this unit. One sediment location is proposed in a drainage swale east of the solvent dike and one sediment location for a drainage pathway north of the effluent mixing basin.

The soil and sediment analysis program is detailed in Section 1.6 and outlined in Table B-7. In addition to the parameters to be analyzed for each of the individual units in this SSWMU, tentatively identified compounds will also be disclosed in the Contractual Level 2 reporting format.

1.7.3 SSWMU #3 -LWTS AND SEALED ROOMS

1.7.3.1 Operational History and Source Characterization

SSWMU #3 includes the Liquid Waste Treatment System (LWTS), the Cement Solidification System (CSS), and parts of the main process building including the sealed rooms. The

main process building and its related support facilities are located in the center of the north plateau area of the site. The LWTS treats decontaminated liquid effluent from the supernatant treatment system (SSWMU #4). The liquid effluent from the LWTS goes to the CSS, which solidifies the low-level radioactive waste into a form suitable for disposal. The LWTS is located within several decontaminated extraction cells in the old reprocessing plant. The LWTS and CSS are units installed to accomplish the objectives of the WVDP Act and therefore were constructed in the 1986-1988 time period. The floor and foundations of the cells are located in the sand and gravel unit.

In addition to the LWTS, eleven sealed rooms are also considered part of the SSWMU #3 investigation due to their locale within the main processing plant. Based on historical knowledge, limited testing and plant operations, the sealed rooms were specifically identified as they were either inaccessible or their access is restricted due to very high radiation levels inside the rooms and therefore the rooms could not be initially characterized pursuant to RCRA. Based on a preliminary characterization for the Process Building, several chemicals were used in the reprocessing operations. These chemicals include nitric acid, tributyl phosphate, hydrazine, hydroxylamine, and mercury.

In addition, decontamination solutions containing chemicals were also used during past decontamination efforts. The process cells and equipment were flushed with two types of decontamination solutions. Type #1 decontamination solution consisted of sodium hydroxide, potassium permanganate, and potassium dichromate. Type #2 decontamination solution consisted of oxalic acid, citric acid, tartaric acid and NTA. Other decontamination solutions include sodium tartrate, nitric acid, ammonium fluoride, aluminum nitrate, and potassium dichromate. Process piping and drain diagrams will be evaluated to determine potential pathways and the results will be documented and compared against groundwater monitoring and soil sampling results.

In terms of other chemicals, it is known that lead pigmented paints were used extensively throughout the Process Building. Federal safety orange and yellow paints that were used were pigmented with lead chromate. These were used to paint electrical junction boxes, hand rails, stairwells, visually identifying tripping hazards, and other components in the Process Building. Carbolene coated paint was

also used extensively in the Process Building. Although carbolene coated paint is hazardous in the liquid form, it is not hazardous after is has cured.

As a result of well drilling operations for well 0304DT, it was determined that radioactive contamination exists five below grade to the east of the plant. The well was abandoned and never used. Two subsurface borings 17 and 19a have been positioned to further characterize this contamination. A brief description of the sealed rooms is presented below:

Extraction Cell 1:

Extraction Cell 1 (XC1) measures 16' by 16'8" and is 55' in height. The floor of the cell is located at elevation 100', southeast of the CPC. See Figure 2-4. All equipment in XC1 is fabricated of 304L stainless steel, and the floor and walls of the cell are lined with stainless steel to a height of 18".

XC1 contains the partition cycle extraction columns, feed and waste tanks, and other vessels and piping which was part of the partition cycle (the highest radioactive portion of the solvent extraction system). In this cell, the uranium and plutonium were separated from the bulk of the fission products (>99%), including uranium separation from plutonium. Information to date indicate that there are no hazardous waste and/or constituents specific to XC1.

Extraction Cell 2:

Extraction Cell 2 (XC2) measures 20'9" by 20'3" and 57' in height. The floor of the cell is located at elevation 100'. All equipment in XC2 is fabricated of 304L stainless steel, and a stainless steel lines covers the floor and extends 18" up the walls. The presence of residual organics and acids may exist in this cell.

General Purpose Cell:

The General Purpose Cell (GPC) is located at elevation 75' (below grade) in the Process Building. The GPC measures 45'7" long by 11" wide by 19'6" high, and is lined with stainless steel to an elevation of 90'. The GPC contains pyrophoric

materials such as zircaloy hulls and spilled metallic uranium fuel fines. All hulls were rinsed in dilute caustic to neutralize the pyrophoric nature of fuel hulls.

Hot Acid Cell:

The Hot Acid Cell (HAC) is located on top of the Chemical Process Cell at elevation 148' of the Process Building, north of Ventilation Exhaust Cell. The HAC measures 20'6" in length by 17'3" wide by 15' high. The floor is 5' thick poured concrete and is the roof of the CPC. The HAC may contain small amounts of corrosive chemical contaminants such as acids which may have been spilled or leaked from the acid storage tanks.

Liquid Waste Cell:

The LWC is a reinforced concrete cell which contains nine assorted (500 to 8,500 gallons) tanks which were originally associated with the solvent extraction system. The LWC has an "L" shape with the north-south leg measuring 46'-3" long by 17'-0" wide and the east-west leg measuring 19' -0" long by 15' -9" wide. At the junction of the two legs a 17' -0" x 10' -6" room is partitioned off with an additional 18" thick concrete shield wall around two tanks. The LWC interior height is 19' -6". The wall thicknesses vary from 2' -3" to 3' -0" on the south, east, and north sides except the portion common with XC-1, which is 5' -0" thick. The entire west wall is common with Chemical Process Cell and is 5' -9" thick. The floor is 3' -0" thick and the roof is 3' -0" thick, except over the special inner cell area where it is 3' -6" thick high density concrete (280 lb/cu ft). The LWC is located north of the extraction cells (XC-1 and XC-2), east of the CPC, and south of the Process Mechanical Cell and the Mechanical Operating Aisle. The floor is below grade at elevation 92' -0" (Plant elevation is 100' -0") and the ceiling forms the floor of the Chemical Operating Aisle. The LWC floor is covered with a stainless steel 304L pan which drains to a sump. The sump, also constructed of concrete and lined with 304L stainless steel, can be pumped back to one of the tanks. The equipment and piping is all fabricated of 304L stainless steel, except tank 7D-14 which is Hastelloy C. The tanks were reportedly leak tested prior to being put in service in 1966, however, records have not been located to confirm this. There have been no

indications based on operating practices that there has been a release from this cell or a tank failure.

The nine tanks located in the Liquid Waste Cell along with their capacities and operating status are summarized below:

- Sample Collection Tank (3D-2) - 1,00 gallons, Active
- Rework Evaporator Feed Tank (7D-8) - 3,000 gallons, Inactive
- PMC and GPC Sump Collector (4D-10) - 3,000 gallons, Inactive
- Radioactive Waste Catch Tank (4D-13) - 3,000 gallons, Inactive
- Low Level Waste Collection Tank (7D-2) - 8,500 gallons, Active
- Radioactive Waste Catch Tank (4D-8) - 600 gallons, Active
- Hot Analytical Drain Tank (7D-14) - 500 gallons, Active
- Radioactive Waste Catch Tank (13D-7) - 700 gallons, Active
- Cell Sump Receiver (13D-8) - 660 gallons, Active.

All of the tanks are equipped with level indicators. Any tank overflow would discharge into another tank (6D-3) located outside of the LWC. In addition, any tank leaks would be contained in the cell itself with the liquids collecting in a sump. An eductor is located in the sump to transfer liquids to another tank (4D-10). There are no currently known releases associated with this cell. Information gathering will continue as part of the investigation. The LWC houses some of the tanks from the Integrated Radwaste Treatment System.

The LWC contains nine waste collection tanks associated with the solvent extraction system. The total vessel volume capacity in the LWC is approximately 20,000 gallons. Tanks 3D-2, 7D-2, 7D-14 and 13D-8 are currently still in operation as part of the LWTS processing operation. Of the remaining vessels, 7D-8 is the only one which may still have some standing fluid. No inventory of chemicals has been developed for this room as of this report writing.

The sumps within the plant were generally blind sumps constructed of stainless steel lined concrete, with liquid detectors, level alarms, and the means to jettison collected liquids to holding tanks. The exact construction details of the LWC sump have not yet been established.

Miniature Cell:

The Miniature Cell (MC) is located at elevation 75' (below grade) in the Process Building. The MC measures 13'6" in length by 11' wide by 17'6" high, and its floor is lined with stainless steel. The MC is accessible through a 0.51 m (20") diameter tube in the north end of the PMC and shielding door/airlock. No hazardous waste and/or constituents specific to the MC have been identified to date.

Off-Gas Blower Room:

The Off-Gas Blower Room (OGBR) is a reinforced concrete room used to contain the process off-gas blowers, filters, and scrubber recirculation pumps. The OGBR is located at elevation 101'3" of the Process Building, is 9'9" high, has a north-south dimension of 11'9"; an east-west dimension of 11'10" with an 8'8" eastward extension that houses the off-gas scrubber recirculating pump niche. The niche area is 5'3" x 7'6" with a depth of 5'3". The remainder of the extension area floor is at elevation 100'. Access to this room is via a door in the south wall of the extended area. The OGBR has space for four process off-gas blowers. Two were reserved for dissolved off-gas (DOG) service and two for vessel off-gas service. Each blower is connected, in series, to a HEPA filter mounted in a stainless steel lined, lead and concrete niche imbedded in the floor.

A floor drain, located near the center of the 101'3" area, is open to the off-gas cell. The scrubber pump niche drains to a sump in the off-gas cell. The dissolved off-gas filters and the vessel off-gas filters are housed in steel-lined niches, 2'6" in diameter by 3'8 1/8" deep. There are no drains in these niches. The OGBR may contain corrosive chemical contaminants such as acids which have been spilled or leaked from the Acid Recovery Room located at the elevation above.

Process Mechanical Cell:

The Process Mechanical Cell (PMC) is located at elevation 100' of the Process Building, west of the Fuel Receiving and Storage pool. The PMC measures 52' long by 12' wide by 25' high, and is lined with stainless steel to an elevation of 120'8".

The PMC contains pyrophoric materials such as zircaloy hulls and spilled metallic uranium fuel fines.

Pump Niches, Upper Warm Aisle:

The Upper Warm Aisle (UWA) is located south of the extraction cells at elevation 114'6". It is 90' long, 16' wide, and 18'6" high. There are six niches located in the UWA, three adjacent to XC2, two adjacent to XC3. The niches are constructed of reinforced concrete, and each is lined with stainless steel metal. The niches are each 4' high and are provided with 1' thick concrete covers. Penetrations are provided in the niche covers to allow operation of the valves with reach rods. The UWA is equipped with a 5 ton rated bridge crane for the purpose of lifting the niche covers and moving equipment.

The niches were sealed by installing a 10" sheet metal dike around the edges of the niches, filling the dike area with an expanding plastic foam, and covering that with sheet metal. No hazardous wastes and/or constituents have been identified in the UWA pump niches.

Ventilation Wash Room:

The Ventilation Wash Room (VWR) is a reinforced concrete room 20' wide, 24'11" long and 15'6" high containing an air washer and duct work to handle exhaust air from some of the cells, analytical lab, and other plant areas. The south and east walls, ceiling and floor are 1' thick, and west wall is 2' thick, and the north wall, common with PMC, is over 5' thick, and the north wall, common of the Process Building at plant elevation 114'6" south of the PMC and adjacent to the LXA and COA. No hazardous wastes and/or constituents have been identified in the VWR.

Ram Equipment Room:

The Ram Equipment Room is an L-shaped reinforced concrete room that measures 12 feet wide at the narrow end and 25 feet long. The widest portion of the room measures 16 feet. The room is 14 feet tall. The room originally contained the rams which pushed the fuel hulls into the shears. The rams have been removed and the room

decontaminated. This room is currently used for storage of special nuclear materials as defined by the Atomic Energy Act of 1954 [42 U.S.C. 2011 et seq.].

The sealed rooms will be characterized as part of the overall characterization activities at the Process Building. Due to high radiation and ALARA concerns their current status as "sealed" rooms, sampling within the rooms is not presently proposed, however, a paper investigation will be conducted to determine whether RCRA hazardous waste or constituents are associated with these areas. The potential pathways for contaminant migration will be evaluated as part of the sealed room evaluation. This study will include reviewing existing drawings, P&IDs, etc. to fully assess pathways and to define the next phase of evaluation for this unit. Based on the results of the paper investigation, further actions if necessary will be recommended and submitted to the agencies for consideration.

1.7.3.2 Environmental Setting

The Process Building is located in the north plateau in the sand and gravel unit. The groundwater flow direction in this unit is northeastward. The sand and gravel unit is underlain by the Lavery Till. The top of the sand beneath the process Building is at an elevation of 1380' and is approximately 5-10 feet thick. The sand and gravel unit represents the primary pathway of concern for this unit.

1.7.3.3 Contamination Characterization

1.7.3.3.1 Groundwater Monitoring

The groundwater monitoring at SSWMU #3 is intended to monitor groundwater levels and groundwater quality in the sand and gravel unit. Well 301 monitors upgradient conditions; wells 305, 307, 408 monitor downgradient conditions; and the background conditions are represented by well NB-IS. (See Plate 11). The groundwater in the till-sand is being monitored on a regular basis; to date, there has been no indication of contamination.

Because of the proximity of the main plant to the till sand, cursory evaluation of that unit will be conducted for groundwater quality impacts. Primary focus will be directed at the sand and gravel unit.

The routine analytical parameters for SSWMU #3 characterization are detailed in Table B-1. The groundwater monitoring program will be based on 1991, 1992 and 1993 data and the two expanded rounds of groundwater monitoring (October, 1993 and April, 1994). Tentatively identified compounds will also be reported in the Contractual Level 2 reporting for the expanded rounds. The groundwater monitoring results will be statistically analyzed pursuant to Section 1.13 of Appendix B to characterize this unit.

1.7.3.3.2 Soils/Sediment Sampling

Soils/sediment sampling will be comprised of two elements, (1) a drilling program intended to explore the uppermost groundwater pathway (sand and gravel unit), and, (2) surface soil sampling during drilling by sampling the uppermost split spoon sample. Stream and ditch sampling will not be utilized because of the characteristics of the constituent SWMU's all being located within the Process Building.

The drilling program consists of a total of four borings (refer to Plate 12 and Table B-7) designed to assess the SSWMU. Boring #20 will provide upgradient data while boring locations 17, 18, 19A and 21A are positioned downgradient to evaluate contaminant migraton from the unit. A total of 12 samples (10 saturated and 2 unsaturated) will be selected for analysis.

Chemical analysis of samples at this SSWMU will be as follows: unsaturated samples will be analyzed for TCL metals, and saturated samples will be analyzed for TCL metals, TCL volatiles and TCL semi-volatiles. In addition to the parameters to be analyzed for this SSWMU, tentatively identified compounds will also be disclosed in the Contractual Level 2 reporting format.

1.7.4 SSWMU #4 - HIGH-LEVEL WASTE STORAGE AND PROCESSING AREA

1.7.4.1 Operational History and Source Characterization

SSWMU #4 includes the high-level waste tanks, the supernatant treatment system, and the vitrification facility. The high-level waste presently is stored in carbon steel tanks inside reinforced concrete vaults that extend 12 meters (40 ft) below grade and bottoms within the Lavery till. The processing facilities are located in belowground reinforced concrete structures and above-grade buildings. The belowground structures extend to a depth of 6 meters (20 ft) and bottom within the sand and gravel unit.

The high-level radioactive waste tanks are north of the main process building. There are two types of high-level radioactive waste stored at the WVDP; PUREX and THOREX.

The PUREX waste, nearly 2.3 million liters (600,000 gal.), is in the form of supernatant and sludge. THOREX waste, approximately 45,000 liters (12,000 gal.), from the processing of a high thorium fuel is stored as a nitric acid solution.

PUREX Tanks 8D-1 and 8D-2

The PUREX are the high-level wastes resulting from the extraction of uranium and plutonium from spent nuclear fuel rods. In this process of solvent extraction, nuclear fuel is leached from its cladding with hot nitric acid. The acid then undergoes solvent extraction using a n-dodecane/tributyl phosphate solvent to separate the uranium and plutonium from the fission products. The fission products remain in the nitric acid phase, which is high-level radioactive waste.

The nitric acid solution was neutralized with excess sodium hydroxide to allow storage in a carbon steel tank. Neutralization formed metallic hydroxides that precipitated from solution; these now are present as sludge at the bottom of the storage tank. The remaining supernatant is essentially a saturated solution of sodium nitrate.

The PUREX high-level waste tanks were constructed as part of the reprocessing facility and entered radioactive service in 1966. The neutralized waste is stored in a carbon steel tank (8D2-2) inside a reinforced concrete vault. A duplicate tank

(8D-1) is located in an adjacent vault and is maintained as a spare. 8D-1 was modified to house equipment for treating the supernatant liquid in 8D-2.

Tanks 8D-1 and 8D-2 were identically constructed and have similar instrumentation. Each is 21 meters (70 ft) in diameter and 8 meters (27 ft) high with a capacity of 2.8 million liters (740,000 gal.). The tanks are made of carbon steel plate with a thickness of at least 0.5 inches on the sides and bottom and 0.4 inches for the roof. The tanks were designed for a maximum working volume of 2.3 million liters (600,000 gal.).

Each tank rests on a 12-inch layer of perlite blocks, which in turn rests on a 3-inch layer of pea gravel contained in a carbon steel pan. The pan rests on a second 3-inch layer of pea gravel on the vault floor. The vault pad is 27 inches thick except for a thicker ring under the columns that support the vault roof. The vault pad rests on a 4-inch leveling slab. A 4-foot layer of pea gravel has been placed under the vault for stability purposes.

THOREX Tanks (8D-3 and 8D-4)

The THOREX waste was generated from a single reprocessing campaign of thorium-enriched uranium fuel. The fuel was dissolved in nitric acid with 0.05 M fluoride and 1.0 M boric acid. The resulting high-level waste was stored as unneutralized acid to prevent precipitation of the thorium. As part of the operational, source and waste characterization for the RFI, a detailed review of previous investigations and data will be performed including integrity testing, maintenance records and tanks sampling episodes.

In addition to the high-level waste, several other wastes were routed to the THOREX waste tank, including miscellaneous solutions from the radiochemistry laboratory drains, and liquids from various catch tanks that exceeded the limit for transfer to Lagoon 2 (i.e., $> 5 \times 10^{-3}$ μCi/mL gross radioactivity, excluding tritium). The THOREX waste tanks received high-level waste in late 1968. the high-level wastes are still being stored in these tanks. The acidic waste is stored in one of two identical stainless steel tanks (8D-4 contains acidic waste and 8D-3 is a spare). Both are located in a common vault of reinforced concrete.

As part of the operational source and waste characterization for the RFI, a detailed review of previous investigations and data will be performed including integrity testing, maintenance records, and tank sampling episodes.

In terms of current waste treatment operations under the WVDP, the supernatant treatment system has been installed and operated to treat wastes. The cesium is stripped from the supernatant as it passes through the series of zeolite-filled columns. Following ion exchange, the decontaminated (cesium/barium removed) supernatant is filtered to remove suspended zeolite fines and then collected in a holding tank (8D-3). Following sampling it is transferred to the LWTS via underground tank 35104 to the cement solidification system (CSS) for concentration and solidification in cement as a low-level waste. The spent zeolite then is dumped to the floor of tank 8D-1, where it will remain until it is vitrified along with the PUREX sludge and THOREX waste.

The STS system is totally contained within the existing 8D-1 tank and vault, and as such, no releases have occurred from the unit. The Vitrification system is currently under construction and will be utilized to solidify the high level sludge residues into glass. The process will take place within a shielded vitrification cell which is lined with concrete and then stainless steel. This facility associated support processes will be operated in accordance with RCRA regulatory requirements for interim status TSDFs.

Normal operational practices will be reviewed when evaluating this system during the SWMU investigation. The resulting information will be provided in the RFI report. However, to specifically address the question regarding the water injection system and secondary containment sampling the following information is provided.

The area immediately surrounding the vault has a series of wells that permit monitoring the groundwater level, adding water, and sampling for radioactivity. There is also a dewatering well that allows the removal of groundwater. In recent years it has not been necessary to add water to this area because the surface water infiltrates the area around the vault and keeps the level high enough to require the routine groundwater pumping. The water level outside the vault is maintained at a level higher than the level that the supernatant could rise to in the vault if there

were complete failure of Tank 8D-2, the largest of the HLW tanks. This difference in elevation provides hydrostatic pressure on the outside of the vault so that if liquid leaked from the tank into the vault, this pressure would act to contain it inside.

If 8D-2 were to leak, the pan/vault liquid level monitoring system would detect the leak, and the leak would be contained by the vault until it could be pumped back into 8D-2 for transfer to 8D-1. The water outside the vault would limit the migration of any liquid through the vault wall, and this water would be monitored for radioactivity to detect any migration. The silty till soil outside the vault provides a final barrier to prevent migration.

1.7.4.2 Environmental Setting

The sand and gravel unit is 20 to 25 feet thick beneath SSWMU #4 and groundwater within this water bearing unit migrates in a northeastward direction. The sand and gravel unit represents the primary water bearing pathway of concern for these units. A lower water bearing unit is the Kent Recessional sequence which lies 50-70 feet below the surface.

Background monitoring of the sand and gravel unit is provided by well NB-1S; upgradient wells are 401 and 403; downgradient wells are 405, 406, 408, 86-7, 86-8 and 86-9. (See Plate 11).

For the Kent Recessional monitoring, background conditions are characterized by well 1008B; upgradient wells are 410 and 411; and the downgradient well is 407.

1.7.4.3 Contamination Characterization

1.7.4.3.1 Groundwater Monitoring

The monitoring rationale for SSWMU #4 is discussed above in Section 1.7.4.2. In addition, this task will focus on documenting tank monitoring and inspection data, historical groundwater quality data, other previous investigations conducted in this area, and blueprints showing associated piping for the HLW tanks, vitrification tanks, STS, and vitrification facility. Existing tank monitoring and inspection data

indicate that the HLW tanks are not leaking and tank contaminent/integrity is reliable. Any existing contaminated areas at this SSWMU would therefore be associated with leaking transfer lines or spills.

The routine analytical parameters are detailed in Table B-1. The groundwater monitoring program will be based on 1991, 1992 and 1993 data and the two expanded rounds of groundwater monitoring (October, 1993 and April, 1994). Tentatively identified compounds will also be disclosed in the Contractual Level 2 reporting format for the expanded rounds. Groundwater monitoring results will be statistical analyzed pursuant to Section 1.13 of Appendix B to characterize this unit.

1.7.4.3.2 Soil/Sediment Sampling

One subsurface soil boring (BH-40) is proposed at a location immediately downgradient of the high level waste tanks. A total of twelve samples will be collected and analyzed for TCL volatiles, TCL semi-volatiles and TCL metals. In addition to the parameters to be analyzed for this SSWMU, tentatively identified compounds will also be disclosed in the Contractual Level 2 reporting format. Surface soil samples will be obtained as specified in the soil sampling section. Information from previous borings in this area will also be examined. Additional field activities are not proposed for the Phase I investigation at this SSWMU.

1.7.5 MAINTENANCE SHOP SANITARY LEACH FIELD (MSLF)

1.7.5.1 Operational History and Source Characterization

The MSLF is located approximately 18 meters (60 ft) due north of the northeast corner of the Test and Storage Building, beneath the ground surface currently occupied by office trailers. The MSLF consists of 3 septic tanks, a distribution box and 5 lateral lines each approximately 50 feet long with an approximate distance of 6.5 feet between each line. The leach field occupies approximately 1500 square feet (138 sq. meters) of space below the ground surface (see Figure B-10).

In 1968, a restroom facility was constructed in the northeast corner at the Test and Storage Building, consisting of a sink, a toilet, a urinal, and a floor drain. The MSLF, a distribution box, a septic tank (tank #1), and associated piping were designed and installed to treat this sanitary waste. From 1960 until 1970, the Test and Storage Building also functioned as the maintenance shop/pipe shop for Nuclear Fuel Services (NFS).

In 1970, the current Maintenance Shop was constructed. It is located east of the Test and Storage Building. At the time of construction, a second septic tank (tank #2) was installed on-line with the existing septic system accommodating the Test and Storage Building. The sanitary lines from the "new" maintenance shop were routed directly into tank #2, located further north than tank #1, just prior to the distribution box. The sanitary waste water originally associated with the new maintenance shop was generated from a toilet, urinal, shower, sink, and floor drain.

Sometime in 1972, a third tank (tank #3) was installed on line to this system. Other than the tank's relative location, there is no information currently available regarding the tank's installation or pipe routing scheme.

From 1986 - 1989, Trailer P, northwest of the Maintenance Shop served as an instrument shop. Calibration, repair, and maintenance of measuring equipment (flow meters, etc.) was conducted in this shop. A sink within the Instrument Shop was on line to the existing septic system associated with the MSLF. The instrument shop was relocated from Trailer P to the second floor of the existing Maintenance Shop in 1989.

Construction of an addition to the Maintenance Shop was completed in 1987. The addition included the installation of a women's shower, sink, and toilet, and doubled the size of the existing men's shower facilities. In 1988, two more sanitary sinks were added to the Maintenance Shop. Sanitary waste water from these facilities were processed via the existing septic system, which includes the leach field.

The septic tanks collectd settleable solids and may have required periodic cleaning depending on the loading. The septic tank closest to the leach field was cleaned out and filled with sand in 1988; however, the remaining tanks were presumably never

cleaned and are believed to be still full of water and sludges. This septic system is no longer is use.

The MSLF and associated tanks and pipes were designed and constructed to process sanitary waste waters from the above mentioned facilities.

There have been no major spills (i.e. greater than 10-gallons) in or around the Maintenance Shop reported to the New York State Department of Environmental Conservation (NYSDEC), nor any current knowledge of any historical spills in this area which may impact the characterization of the MSLF. Maintenance Shop wastes are also not known to have been disposed in the leach field.

1.7.5.2 Environmental Setting

SSWMU #5 is situated on the north plateau atop the sand and gravel unit which is approximately 7.5 meters (25 feet) thick beneath the unit. The groundwater flow direction in the sand and gravel is northeast. Discharge downgradient occurs via seepage along the edge of the plateau.

1.7.5.3 Contamination Characterization

1.7.5.3.1 Groundwater Monitoring

Due to the location of the Maintenance Shop Leach Field in the sand and gravel unit, all of the monitoring wells are also similarly located. Wells 408 and 501 are the upgradient wells in the sand and gravel unit. While wells 104, 502, 602, and 8604 monitor down gradient conditions in the sand and gravel unit. Well NB1S is the background well for the sand and gravel unit. (See Plate 11).

The routine analytical parameters for SSWMU #5 characterization are detailed in Table B-1. The groundwater monitoring program will be based on 1991, 1992 and 1993 data and the two expanded rounds of groundwater monitoring (October, 1993 and April, 1994). Tentatively identified compounds will also be reported in the Contractual Level 2 reporting for the expanded rounds. Groundwater monitoring results for will be

statistically analyzed pursuant to Section 1.13 of Appendix B to characterize this unit.

1.7.5.3.2 Soil/Sediment Sampling

Based upon the information known to date regarding the operation of the Maintenance Shop Leach Field the soil and sediment characterization program will proceed using the following methodology:

- Using available drawings and historical knowledge, the location of the distribution box of the leach field will be identified.

- The leach field distribution box will be uncovered and the contents examined to (1) determine if any sludge remains and (2) inspect alignment of laterals to confirm the lateral configuration.

- If there is sludge present in the distribution box, a sample will be collected and analyzed for TCL volatiles, TCL semi-volatiles, and TCL metals. Samples will be collected in accordance with protocols established in Appendix B.

- If sludge is not present in the distribution box, a subsurface boring in the main lateral will be performed. Samples will be collected based on field screening methods ie. radiological surveys or organic vapor analysis.

In addition to the methodology proposed above, five borings (two upgradient: 32 and 33; and three downgradient: 34, 36 and 37), will be utilized in the characterization of the MSLF (see Plate 12). The depths of the boreholes are shown in Table B-6.

Shallow soil sampling will be accomplished in concert with drilling by selecting samples (as appropriate) from the uppermost split spoon at the five boring locations. Analysis will be performed on judgmentally selected samples based on field screening methods (i.e. beta/gamma screen, organic vapor analysis).

Stream and sediment sampling is not appropriate for this unit as there is no reason to believe such a pathway currently exists.

Chemical analyses of samples at this SSWMU are as follows; unsaturated samples will be analyzed for TCL metals, and saturated samples will be analyzed for TCL metals, and TCL volatiles. One saturated sample will be analyzed for TCL volatiles, TCL semi-volatiles and TCL metals. In addition to the parameters to be analyzed for this SSWMU, tentatively identified compounds will also be disclosed in the Contractual Level 2 reporting format.

1.7.6 SSWMU #6 - LOW-LEVEL WASTE STORAGE AREA

1.7.6.1 Operation History and Source Characterization

SSWMU #6 includes the old and new hardstand, lag storage, and lag storage extensions, and additions.

The hardstand area was asphalt-paved storage pad about 150 meters (500 ft) north of the process building. It is a unit in the north plateau where historical operations practices contributed to surface radiological contamination. The purpose in characterizing this unit will be to determine whether the area has also contributed to a release of hazardous constituents to the groundwater. The 38 m X 53 m (125 ft X 175 ft) hardstand area was used by NFS to store radioactive equipment removed from the process building. This equipment consisted primarily of mild steel and stainless steel materials too large or cumbersome to be packaged in standard containers and equipment scheduled for reuse in the plant. Most of the hardstand wastes were removed by NFS before the start of the WVDP; however, residual contamination was present on the asphalt, soil, and vegetation around the hardstand area. This area was decontaminated in November 1984 via the removal of asphalt and shallow surface soils. These contaminated waste materials were used as fill during closure of Lagoon 1.

In 1986, this area was again used to store low-level radioactive materials. The material was stored on a compacted gravel pad and consisted largely of packaged radioactive steel, stainless steel, concrete rubble, and miscellaneous low-level radioactive wastes.

The lag storage building, about 122 meters (400 ft) north of the process building, is a pre-engineered metal structure supported by a clear span frame anchored to a 140-ft X 60-ft concrete slab. The building was constructed in 1984 and will be used until termination of the Project. The inner perimeter, or containment, is a 6-inch high concrete curb 20 inches thick at its highest point and sloping downward, inward, and outward to a thickness of 8 inches.

Since on-site disposal of low-level waste has ceased, additional waste storage facilities are required. The lag storage extensions and additions are metal and fabric structures used to expand the storage capacity for low-level waste. The wastes stored in these facilities are essentially the same as those in the lag storage building. The first of these structures was erected in 1986 and the second in 1988. During construction of the lag storage additions in June 1990, residual radiological contamination from prior NFS use of the old hardstand area was encountered.

The lag storage extensions and additions are pre-engineered metal frame and fabric enclosures with floors of compacted gravel. The lag storage extensions are located next to the lag storage building. The additions are farther east of the extension and occupy a portion of the old hardstand area.

Radioactive wastes stored in the lag storage building must have a surface exposure rate of less than 100 mR/hr. Wastes are packaged in steel drums or boxes. Specific types of waste stored in the lag storage facilities include metal pipes, vessels, and hardware from the process building and support area, and clothing, cloth, paper, rubber, plastic wood, concrete, and soil. These facilities have also stored wastes stabilized in cement, including sludges from the low-level waste treatment facility, uranyl nitrate solution, and contaminated zinc bromide solution.

1.7.6.2 Environmental Setting

SSWMU #6 is immediately underlain by the sand and gravel unit, which is immediately underlain by the Lavery till. The alluvium ranges from 10 to 30 feet in thickness and the direction of groundwater flow in the sand and gravel unit northeastward. As

the constituent SWMUs are all located at grade, a release from this SSWMU would be readily detected in the sand and gravel unit.

1.7.6.3 Contamination Characterization

1.7.6.3.1 Groundwater Monitoring

The groundwater contaminant pathway of concern is the sand and gravel unit. Eight wells are used in the monitoring system for this SSWMU. Wells 0406, 0603US, 408 and 501 monitor the up-gradient conditions of the sand and gravel unit. Wells 601, 605, and 602 and 604 monitor the down-gradient conditions of the sand and gravel unit. Background is represented by NB-1S. (See Plate 11).

The routine analytical parameters for SSWMU #6 characterization are detailed in Table B-1. The groundwater monitoring program will be based on 1991, 1992 and 1993 data and the two expanded rounds of groundwater monitoring (October, 1993 and April, 1994). Tentatively identified compounds will also be reported in the Contractual Level 2 reporting for the expanded rounds. Groundwater monitoring results will be statistically analyzed pursuant to Section 1.13 of Appendix B for characterization of this unit.

1.7.6.3.2 Soils/Sediment Sampling

Soils/sediment sampling at SSWMU #6 comprises these elements:

1) A drilling program intended to explore the uppermost groundwater pathway (sand and gravel unit);
2) A shallow soil sampling program based upon both results of the overland gamma survey and recent information on facility operational history/source characterization, and:
3) Stream and ditch sampling designed to provide information on impacts to the surface water system. These elements are intended to be applied in a focused and judgmental strategy to assess the nature and extent of soil contamination attributable to SSWMU #6.

The drilling program consists of a total of 3 borings: 29, 30 and 25 (refer to Plate 12 and Table B-7) designed to assess the LAG Storage areas. A total of 21 samples (19 saturated and 2 unsaturated) will be selected for analyses. Boring and sampling will be advanced into the Lavery till beneath the sand and gravel unit.

Shallow soil sampling will be accomplished in concert with drilling, by selecting samples (as appropriate) from the uppermost split spoon sample. In addition, there are down-gradient surface soil samples (refer to Plate 12).

Stream and drainage way sampling will be conducted at 9 judgmentally chosen locations to evaluate the surface water/sediment contaminant pathway. One sample will be taken at each location. This sampling is proposed because the drainage-ways generally experience flow only in direct response to runoff of precipitation.

Chemical analyses of samples is as follows; unsaturated samples will undergo analysis for TCL metals, and saturated samples will be analyzed for TCL metals and TCL volatiles. In addition to the parameters to be analyzed for this SSWMU, tentatively identified compounds will also be reported in the Contractual Level 2 reporting format.

1.7.7 SSWMU #7 CHEMICAL PROCESS CELL WASTE STORAGE AREA

1.7.7.1 Operational History And Source Characterization

The Chemical Process Cell Waste Storage Area (CPCWSA) is a compacted gravel storage pad covering a 4,310 m^2 (46,400 ft^2) area, located 275 meters (900 ft) northwest of the process building at the northwestern margin of the WVDP (Plate 1). Radioactively contaminated equipment and low-level radioactive waste removed from the process building has been stored in containers at the CPCWSA since July 1985. The containers in the CPCWSA are stored in an indoor and an outdoor storage area. The indoor storage area is housed within a 15 meters by 57 meters by 7.6 meters high metal and fabric tent structure. The outdoor storage area is located immediately outside and southeast of the tent structure.

The indoor storage area contains 22 sealed storage boxes which contain process vessels, piping, and debris removed from the chemical process cell during its 1985-1987 decommissioning. This material emits a significant radioactive exposure dose rate which requires shielding by 45 hexagonal concrete storage containers. Each of these hexagonal containers is filled with 21 drums containing low dose rate low-level radioactive waste. Another thirteen steel boxes are present inside the tent which contain radioactively contaminated equipment removed from other areas of the plant.

Seven steel storage boxes, 198 polyethylene overpack drums and a radioactivly contaminated motor vehicle are currently stored outside the tent structure. The steel boxes contain radioactively contaminated equipment removed from the process building during decommissioning activities. The polyethylene overpack drums contain cement solidified uranyl nitrate hexahydrate solution.

A more detailed description of CPCWSA source characterization and contents is provided in Attachment B-2. Based on the packaging provided for wastes stored in this unit and the short operating period since initial storage, no known or suspected releases of radioactive/chemical materials have occurred from the unit. However, it is difficult to monitor the unit due to the extremely high radiation levels and therefore environmental monitoring (groundwater) is being conducted for the unit. This investigation is directed at a review of recent groundwater monitoring data in combination with a limited soil sampling program to verify that no releases have occurred from the unit.

1.7.7.2 Environmental Setting

The key pathway of concern for this unit is groundwater via the sand and gravel unit. The stratigraphy in the vicinity of SSWMU #7 comprises, from the surface downward, the surficial sand and gravel and then the Lavery till. This CPCWSA unit is located directly over the surficial sand and gravel unit. In the immediate vicinity of the SSWMU #7, the thickness of the sand and gravel unit ranges from 1.2 m (4 ft) on the northwest side of the CPCWSA to 2.3 m (7.5 ft) southeast of the CPCWSA. The direction of groundwater flow is to the north-northeast.

Of the nine wells located in the general vicinity of this SSWMU, two are screened in the sand and gravel unit (0706, 0707). Of these, 0707 is downgradient, 0706 is upgradient, and NB-1S is background. (Plate 11).

Well 701 is believed to be screened in an intra-Lavery till sand but it is not yet confirmed to be continuous with the main unit mapped on plates 6 and 7, therefore the well is not shown on these plates. Water levels at wells 704, 705, and 707 will be reviewed together with the boring logs to resolve inconsistencies with water levels and the monitoring zones of these wells. The review will be performed in conjunction with the investigation of this unit.

The CPC unit rests on a gravel pad that sheds runoff to the north and east. Surface water flow is intercepted to the southwest by a culvert which diverts runoff from the parking area and north-west portion of the WVDP to the swampy area immediately southeast of the CPCWSA. This swampy area drains to a ditch that empties to the NP-1 gully on Quarry Creek. Surface water flowing along the northeast side of the CPCWSA is directed through a north-east drainage swale that also empties into the NP-1 gully, whose coordinates are N894140/E480700 (site grid).

1.7.7.3 Contamination Characterization

1.7.7.3.1 Groundwater Monitoring

The groundwater monitoring regime for this unit is described in the prior section. The analytical parameters for SSWMU #7 groundwater characterization are detailed in Table B-1. The groundwater monitoring program will be based on 1991, 1992 and 1993 data and the two expanded rounds of groundwater monitoring (October, 1993 and April, 1994). Tentatively identified compounds will also be reported in the Contractual Level 2 reporting for the expanded rounds. Groundwater monitoring results will be statistically evaluated and additional recommendations will be dependent on these results in combination with the soil sampling outlined below. Statistical methodologies are further discussed in Sections 1.13.5 and 1.17.2.

1.7.7.3.2 Soil/Sediment Sampling

A rigorous soil/sediment sampling program is not proposed for this unit at this time. As part of site closure, however, a radiation survey and soil sampling program of the pad will likely be performed after wastes have been removed. There is a projected 3 to 6 feet of alluvium over the Lavery till near this unit and no groundwater above the interface. Therefore, for the RFI investigation at this unit, one soil boring, number 43, will be strategically located immediately downgradient of the CPCWSA as shown on Plate 12. Boring 43 is situated to characterize intermittent groundwater pathway from the CPC to Quarry Creek/NP-1 Gully discharge zone. The boring will be continuously screened using a split spoon. If screening instrumentation detects radioactive contamination above background, one sample will be sent for radiological and chemical analysis. In addition to the parameters to be analyzed for this SSWMU. tentatively identified compounds will be disclosed in the Contractual Level 2 reporting format.

1.7.8 SSWMU #8 - CONSTRUCTION AND DEMOLITION DEBRIS LANDFILL (CDDL)

1.7.8.1 Operational History and Source Characterization

The CDDL was used for disposal of nonradioactive construction, demolition debris, and rubble wastes under NYSDEC approval, the landfill was closed in 1986. The Construction and Demolition Debris Landfill (CDDL), (see SSWMU #8 on Plate 1), is located 305 meters (1,000 ft) northeast of the process building on the north plateau. The CDDL is approximately 0.6 hectares (1.5 acres) in area and is on average between 3 to 5 meter (10 to 15 ft) in depth. The CDDL was used as a burial area for non-radioactive construction, office, and plant waste.

Waste was originally placed in the CDDL in 1963 by Bechtel, the construction subcontractor for the Western New York Nuclear Services Center. Although no records were located, it appears that Bechtel began using the area to dispose of general construction debris (scrap lumber, rebar, metal, electrical wiring, and concrete). Nuclear Fuel Services (NFS) took over the landfill operation when the fuel reprocessing activities began in 1965. NFS used the landfill until 1981 for burial of nonradioactive wastes generated by both the plant and office. The Department of

Energy assumed control over the site after the West Valley Demonstration Act in 1982 and continued to use the landfill for similar burial operations until December 1984 when closure in accordance with New York State Construction and Demolition Debris Landfill closure standards was pursued. Final closure was certified by the New York Department of Environmental Conservation (NYSDEC) in October 1986.

The CDDL is located in the sand and gravel unit of the north plateau which extends approximately 4 meters (15 ft) below pre-operational grade. The fill area was originally a natural depression that was deepened by further excavation activities 0 to 2 meters (0 to 6 ft). Directly north and east of the CDDL are low-lying wet areas.

During the life of the landfill waste was placed directly into the area without any specific engineering control features (i.e., liner, leachate collection/detection, compaction of surface soils). From review of various aerial photographs and discussions with prior NFS employees, it was determined that after each 1 to 2 meter (3 to 5 ft) lift of waste, it was covered with soil and compacted to the extent that heavy equipment such as bulldozers and trucks could make the working surface easily accessible for the next lift of waste.

During the early to mid-1970's (exact date unknown), NFS constructed a drainage ditch directly to the north of the CDDL. This drainage ditch, which was approximately 183 meters (600 ft) long, 6 meters (20 ft) deep, and 9 meters (30 ft) wide, acted to divert surface water and groundwater drainage. In addition, this ditch acted as drainage for the saturated area north of the CDDL near the original "plant equipment hardstand." During capping of the CDDL for final closure, part of the ditch was filled in, however, it may still act as a diversion for groundwater and surface water.

File searches and interviews with site personnel with historic knowledge provided only limited detail regarding the manner in which this facility was operated. Most historical information (NFS and early WVDP operations) located during the file searches was prepared as a reconstruction of events.

Disposal records were not maintained for the CDDL, therefore the exact composition and quantity of wastes are not known other than the general working knowledge of NFS employees. Numerous employees who had historical knowledge of the site's operations were able to provide information regarding the types of waste disposed and the manner in which the area was managed. A description of CDDL operations, prepared early (1983) in WVDPs tenure, summarized the types of waste that were disposed of in the CDDL. This summary stated, "that until the late 1970s combustible wastes were burned in-situ at the CDDL." This statement could not be confirmed by document searches or employee interviews. Interviewed employees could only recall one fire at the CDDL that was set accidentally when hot incinerator ash was dumped into the unit.

NFS's operation of the CDDL began in the western corner of the area and progressively moved east. According to at least one report (1984 Landfill Permit Application), less than .2 hectares (½ acre) was used for disposal during the NFS operations. Site personnel with historic knowledge stated that the disposed material was compacted incidentally during the dirt-moving activities of heavy equipment and covered with soil on a periodic basis, but the frequency at which this was performed was not known. Other than the ditch that was discussed previously, no other surface water management or erosion control programs were known to exist near the CDDL during the NFS tenure. While disposal operations were taking place in the western corner, what appears to be soil-borrowing activities were occurring in the eastern corner as early as 1978. The sand and gravel mined from this area was reportedly used in site construction projects and as cover at the CDDL.

In 1972, NFS obtained a permit to operate an incinerator for combustion of nonradioactive paper and cardboard generated from office and plant operations. The installation and start-up of the incinerator reduced the quantity of waste, particularly paper and cardboard wastes, disposed of in the CDDL. The incinerator ash was disposed of in the CDDL.

The WVDP assumed control of the site in 1982 and disposal operations at the CDDL remained fairly consistent, with some exceptions, with previous practices. The Project instituted monthly radiation surveys of the CDDL to ensure that the area was kept free of radioactive contaminants and periodic inspections of the CDDL were performed. A limited number of documented surveys were located between 1982 and 1986

to confirm this. According to an aerial map, the WVDP placed waste on an additional acre of the CDDL. Between 1982 and 1985 the majority of waste disposed of in the CDDL was excess equipment and scrap from nonradioactive areas in and around the plant. In addition, wastes generated in the plant and office continued to be incinerated until some time in 1984 (exact date unknown) and the resulting ash was disposed of in the CDDL. Some time after the incinerator was taken out of service and the WVDP contracted with a state approved off-site disposal location for on-site generated wastes.

In December 1984, the Project discontinued burial of wastes in the CDDL and prepared for closure in accordance with appropriate state and federal standards. As of February 21, 1985, all solid nonradioactive waste was sent off-site for disposal at a state-approved landfill. An engineered closure plan was submitted to the NYSDEC for review and approval in the middle of 1985; in July 1985 the NYSDEC performed a closure inspection of the disposal unit. During this inspection, the presence of leachate outbreaks on the north and east slopes were noted. The liquid seeping from the unit was sampled and analyzed for extraction procedure toxicity tests (EP Tox) metals and total organic halogens (TOX). Based upon the analytical results, the leachate was determined to be nonhazardous for toxicity characteristics. A supplemental closure plan was developed and implemented to correct the leachate outbreaks. Final closure of the CDDL was pursued and the unit was certified closed as a construction and demolition debris landfill by the NYSDEC in October of 1986.

Closure specifications for the unit were in accordance with 6 NYCRR 360. Specifically these requirements were: grass or ground cover crop shall be established and maintained on all exposed final cover material within four months after placement or, season not permitting, as otherwise prescribed by NYSDEC; final cover over this facility will be as defined in 6 NYCRR 360, consisting of a minimum of 0.46 meters (18 in) of compacted soil and 0.15 meters (6 in) of topsoil suitable to sustain plant growth; the entire cover will be graded at a minimum slope of 2%.

The final cover requirements for closure of the unit were determined based upon the existing condition of the low permeability soil that was placed in the summer of 1985. This placed soil was tested to determine moisture content, dry density, Atterburg limits, grain size distribution, and permeability. Five samples were taken

at random locations of cover material. Results of this sampling event indicated that the cover had a relatively uniform in-place permeability of less than 1 x 10^{-7} cm/sec (Glynn Geotechnical Engineering November 1985). This information was presented to NYSDEC and the unit was approved and certified closed in October 1986. Refer to Attachment B-5 for the supplemental closure plan.

During closure of the unit, the cover was vertically surveyed to determine the additional soils needed to satisfy the capping requirements; however, the horizontal extent of the waste footprint was never surveyed.

As part of the closure requirements stipulated by NYSDEC, the WVDP is required to report on an annual basis any corrective or maintenance measures performed at the CDDL. This is reported in conjunction with the WVDP Annual Environmental Monitoring Report. In August of 1992, a formal standard operating procedure was established to ensure proper long-term care of the CDDL. This procedure includes inspection protocol and maintenance requirements in a more formal fashion for the unit. The inspections are performed on a semi-annual basis and maintenance measures are initiated as necessary.

On May 14, 1992, a WVDP employee reported the presence of a 55-gallon drum protruding through the ground on the southeast side of the Construction and Demolition Debris Landfill (CDDL)--SWMU#8). As described in Section 1.7.8 of the RFI Work Plan, the landfill was closed in 1986 with NYSDEC approval. A visual inspection confirmed the presence of two drums likely exposed by groundhogs burrowing the immediate area. A sample of surface water taken immediately down gradient from the drums indicated all parameters within normal ranges for surface water. A radiation survey of the drums and immediately surrounding area was conducted. Readings were within normal background radiation. Since all historical data indicate that non-radioactive, non-hazardous scrap drums were disposed in the CDDL, further examination was determined to be uncessary and the area was covered, graded and re-seeded. This finding will be addressed in the RFI report for the CDDL.

The presence of organic contaminants has been detected in the groundwater monitoring wells located in close proximity to the CDDL. The two constituents detected, 1,1-dichloroethane and dichlorodifluoromethane, are listed as hazardous constituents in

Appendix IX - Groundwater Monitoring List of 40 CFR 264. A source of these chemicals has not been specifically identified in the CDDL, however, there are possible sources such as paint residues, refrigerant cartridges, refrigerators, empty drums with residual contaminants, and vehicles.

1.7.8.2 Environmental Setting

SSWMU #8 is situated on the north plateau atop the sand and gravel unit which is approximately 4 meters (15 ft) thick beneath the unit. The Lavery till underlies the sand and gravel unit. Flow in the sand and gravel unit is toward the northeast (Plate 10). Groundwater monitoring from this unit occurs via seepage along the edge of the plateau. The sand and gravel unit represents the primary pathway of concern for this SSWMU.

1.7.8.3 Contamination Characterization

1.7.8.3.1 Groundwater Monitoring

The groundwater contaminant pathway of concern is the sand and gravel unit. Of the eight wells under consideration in assessment of this SSWMU, four are downgradient (86-12, 802, 803 and 804), three are upgradient (601, 86-3, and 801) and one is used for background (NB-1S) refer to Plate 11. One of these downgradient wells may not fully represent water quality. This well, 802, is situated opposite a backfilled trench north of the CDDL (see Fig. B-2) that historical records indicate may divert groundwater flow. In 1991, the water level at well 802 was frequently below the elevation of the dedicated bladder pump. Examination of a November, 1978 aerial photograph has concluded that the trench (now partially filled in and occupied by a culvert beneath the cover) was probably a minimum of 5 meters (15 ft) deep during use of the CDDL in 1979 and depending on the backfill material used, it may have the capacity to redirect and/or conduct flow to the edge of the plateau.

Sampling and field measurements of groundwater at this SSWMU will consist of data collected during calendar years 1991 and 1992. This data will include water levels taken prior to sampling which will be used to generate water table/potentiometric maps. Although most recent interpretations of the sand and gravel water table

indicate that the cold dump is actually cross-gradient of the seep location, plans are underway to more fully characterize those landfill monitoring wells that have detected volatile organic compounds. The expanded list of analytical parameters for the CDDL will be finalized in accordance with the schedule in Appendix A.

The analytical parameters for SSWMU #8 characterization are detailed in Table B-1. The groundwater monitoring program will be based on 1991, 1992 and 1993 data and the two expanded rounds of groundwater monitoring (October, 1993 and April, 1994). Tentatively identified compounds will also be reported in the Contractual Level 2 reporting for the expanded rounds. Groundwater monitoring results will be statistically analyzed pursuant to Section 1.13 of Appendix B to characterize this unit.

1.7.8.3.2 Soils and Sediment Sampling

Soil and sediment sampling at SSWMU #8 comprises three elements: (1) a drilling program intended to explore the uppermost groundwater pathway (sand and gravel unit); (2) a shallow soil sampling program based on both results of the overland gamma survey and recent information on facility operational history/source characterization, and; (3) stream and ditch sampling designed to provide information on impacts to the surface water system. These elements are intended to be applied in a focused and judgmental strategy to supply the data necessary to assess the nature and extent of soil contamination attributable to SSWMU #8.

The drilling program consists of a total of 5 locations: borings 25, 26, 27, and 28 as downgradient locations and boring 30 as the upgradient location (refer to Plate 12 and Table B-7) designed to assess a total of 37 samples (35 saturated and 2 unsaturated). Borehole 28 is positioned so that it is located between groundwater monitoring well 80-5 and the roadway. Auguring and sampling will be advanced into the confining Lavery till beneath the sand and gravel unit. Shallow soil sampling will be accomplished in concert with drilling, by selecting samples (as appropriate) from the uppermost split spoon. (Refer to Plate 12).

Stream and ditch sampling will be conducted at 9 judgmentally chosen locations to evaluate the surface water/sediment contaminant pathway. One sample will be taken at

each location. This sampling is proposed because the drainage-ways generally experience flow only in direct response to runoff of precipitation. If present, a sample will also be collected from the leachate seep indicated on Plate 12 by a triangle and analyzed for TCL volatiles, TCL semi-volatiles, and TCL metals in accordance with Table B-7.

Chemical analysis of samples will be performed as follows; unsaturated samples will undergo analyses for TCL volatiles and TCL metals and saturated samples will be analyzed for TCL volatiles, TCL semi-volatiles and TCL metals.

In addition to the parameters to be analyzed for this SSWMU, tentatively identified compounds will also be disclosed in the Contractual Level 2 reporting format.

1.7.9 SSWMU #9 - NRC LICENSED DISPOSAL AREA (NDA)

1.7.9.1 Operational History and Source Characterization

The NDA is located 365 meters (1,200 feet) south of the process building in the south plateau, which is bounded by Erdman Brook and Frank's Creek on the north and east.

In addition to the NDA, specific units located in the south plateau are the state-licensed low-level radioactive waste disposal area (SSWMU #11), and the RTS Dum C11 Area (SSWMU # 10).

Areas of interest within SSWMU # 9 are the NRC-licensed waste burial area (NDA), buildings, the Trench Interceptor Project (TIP), an inactive waste hardstand, an inactive water line for the plant, a closed lagoon, and an inactive leachate transfer line. Four 1,000-gallon tanks used during the solvent remediation were sized-reduced and packaged and now reside in on-site storage facilities. One 5,000-gallon kerosene tank used during remediation was decontaminated and placed in service as part of the Liquid Pretreatment System (LPS) at the NDA.

The disposal area is rectangular in shape, measuring approximately 122 meters X 183 meters (400 ft X 600 ft) and covers an area of approximately 2 hectares (5 acres). The geology of the area has been characterized by both site-specific studies and as a

result of incidental soil work performed by the USGS and site personnel. The soil at the site is defined as having an upper 10 feet (3 meters) of weathered till capable of lateral flow, and then approximately 60 feet (18.3 m) of unweathered till characterized by downward flow. The types of disposal techniques used in the NDA include deep holes, special holes, and trenches.

The operating history of the NDA is marked by three phases. The first and second phase consist of disposal activities that occurred between 1966 and 1981 when NFS was reprocessing nuclear fuel and performing some decontamination and decommissioning work. The third phase is marked by the Department of Energy assuming control of the Project facilities and continuing the decontamination and decommissioning work from late 1982 through 1986. Disposal operations were suspended in 1986 pending resolution of issues in a settlement of a lawsuit filed against the DOE by the Coalition on West Valley Nuclear Waste and the Radioactive Waste Campaign.

NFS disposals were limited to a U-shaped area around the perimeter of the overall unit, while the WVDP used some of the available space inside this U-shaped area to dispose of the Project-generated radioactive waste. The WVDP also had two burials outside the physical limits of NFS burials on the east and west boundaries of the NDA.

The NDA was licensed in conjunction with the fuel reprocessing plant in the early 1960s by the NRC. There were no specific design or maintenance criteria identified in the license for operations at the disposal area.

Two disposal unit designs were used by NFS. The first are deep holes that are approximately 32 inches wide, 78 inches long, and about 50 feet deep (.8m X 2m X 15m) that were dug with a clam shell crane. Reports indicate that NFS disposed of spent fuel hardware and hulls and, on at least one occasion, spent fuel encased in cement in these deep holes. The second type of holes are special or shallower holes that were dug with a back hoe or dozer and used until 1975 for disposal of material over 200 mR/hr. NFS disposed of approximately 167,000 cubic feet of waste in a total of 237 burial holes in the NFS portion of the NDA. NFS disposals represent the predominant quantity of radiological contaminants in the NDA.

The WVDP disposed of approximately 200,000 cubic feet (5,663 m^3) of wastes, containing about 625 curies, in the unused portion of the NDA from late 1982 through 1986. The WVDP burial area (trenches 1-12) was limited to the inner section of the NDA, with the exception of four caissons, and is surrounded on three sides by NFS disposal. The wastes disposed during WVDP's operations (Trenches 1 - 12 and Caissons 1 - 4) included Class A low-level wastes generated during plant decontamination activities. These wastes consisted of radiologically contaminated plant equipment, protective clothing, contaminated soils, and other types of similar waste. Four of the disposals were in steel-lined caissons. The remaining wastes were disposed of in the trenches. Wastes were packaged in drums and boxes and also were disposed as bulk material. Refer to Plate 14 for NDA disposal units.

Complete waste inventories for all of the disposal units are being generated based on historical operating records. These inventories will be included in the NDA RFI report.

Caissons 1-4 are between 50 and 65 feet deep and 7 feet in diameter. They are constructed of stainless steel cylinders that are capped and plugged in the bottom with concrete. The thickness of the Lavery till on the east side of the NDA is approximately 100 feet and on the west side of the NDA. The Lavery till on the east side of the NDA the Lavery till is approximately 80 feet thick (Plate 4). As shown on Plate 4, the remaining thicknesses of the till below the caisson holes are 32 feet on the east and 27 feet on the west. The base of the till sheet is synonymous in this area with the top of the recessional sequence. Therefore, it is not anticipated that the caissons penetrate the kent recessional unit.

WVDP trenches 1-7, 10, 12 were all excavated within in-situ soils from the burial area. These trenches were also capped with clay that had been excavated during construction. Depths of the specified trenches ranged from 14-30 feet (4-9 m) deep, with waste placed (according to the WVNS Disposal Summary records) between 4 to 10 feet (1.2-3 m) below the surface elevation. These minimum depths to waste were based on an in-house assessment by the Environmental and Operational Safety Department in 1986.

One of the buildings at SSWMU #9, the IWSF, serves as a storage facility for containerized wastes of three categories: mixed wastes, wastes requiring radiological and/or chemical analysis, and radioactive and non-radioactive wastes not meeting the acceptance criteria of WVDP for on-site storage structures. The facility is located within the NDA area, next to the Trench Interceptor Project. Wastes of unknown constituency are staged and sampled at the IWSF. Once chemical and/or radiological analyses is complete, the wastes either remain in the IWSF or are transferred to another on-site facility. The IWSF is a pre-engineered metal structure measuring approximately 35 feet X 35 feet. A concrete slab foundation with an 8" high concrete curb encloses the inner perimeter. Based upon the location and waste containment design of the IWSF there is little chance of a waste being released from the unit to the environment.

The interceptor trench system located at the NDA is used to passively collect groundwater from the weathered till migration pathway around the NDA. The trench is located to the north and east boundaries of the burial area. The trench is approximately 4 feet (1.2 m) wide, 12 to 16 feet (3.7 to 4.9 m) deep, and 875 feet (266.7 m) long with a 1% to 6% slope along the bottom. The trench is lined with a nonwoven polyester geotextile material and is backfilled with pea gravel. A 7-inch perforated drain pipe is installed at the bottom of the trench and serves as a collection unit to gravity drain groundwater that the trench intercepts. Collected water flows to the sump where it is collected and transferred to Lagoon 2 (if solvent is not detected) or routed to the Liquid Pretreatment System. As of the date of this report no solvent has been detected in the trench, therefore, all water collected has been directly transferred to the Lagoon 2 for treatment.

A compacted clay cap has been placed over the trench with a side slope centered on the trench and a minimum 18-inch (1.5 m) overlap over the trench to protect against rainwater intrusion. There are six manholes and one trench sump. The trench manholes are used to maintain the piping system and inspect the completed system. The manholes are of standard pre-cast construction and provide approximately a 4-foot circular work area. The interceptor trench sump has an electrically powered 1-horsepower pump and a stilling well fastened to the wall with a float to control pump operation inside the sump. (See the Interim Measures Work Plan: Solvent Migration

Containment, NRC-Licensed Disposal Area [West Valley Nuclear Services, Inc. 1992c] for a more detailed discussion of design.

NDA Investigation/Remediation Projects

According to a 1989 report (R.R. Blickwedehl et al. 1989), disposal records documented that at least twenty-two 1,000-gallon (3,785-L) tanks containing solvent from the fuel reprocessing process consisted of n-dodecane and tributyl phosphate (TBP). Migration of solvent contaminated with slight amounts of radioactivity from these special holes was first observed in a monitoring well within the NDA on November 30, 1983. The solvent migration was attributed to water accumulating in the disposal units. A detailed investigation between December 1, 1983 and February 28, 1984 to determine the source and location of the solvent migration showed that TBP material had been disposed in the northeast quadrant of the NFS disposal area between July 1968 and August 1971. In particular, eight tanks of the solvent were buried in special holes (SH) 10 and 11 between October 9, 1969 and November 19, 1969. As part of the remediation program to stabilize the migration of the solvent, the following actions were taken between October 1985 and January 1992:

- Eight 1,000-gallon (3,785-L) tanks containing solvent-contaminated absorbents were excavated from SH-10 and SH-11.
- Contaminated absorbent and soils were removed and packaged for treatment.
- Tanks were size-reduced and packaged.
- The solvent was solidified into a qualified waste form suitable for Class A low-level waste disposal.
- Special Holes 10 and 11 were backfilled.
- Ten new monitoring wells were installed in other special holes suspected of containing solvent. These wells are monitored in accordance with the site's sampling and analysis plan.

- A trench to intercept the potential migration of contaminated groundwater was installed.

- A water pre-treatment plant at this trench interceptor project was installed.

The stabilization program generated approximately 9,675 cubic feet (272 m^3) of packaged solid waste contained in 888 cubic feet (2.5 m^3) steel containers, including 8,016 cubic feet (227 m^3) of contaminated soil, 880 cubic feet (25 m^3) of contaminated absorbents and 706 cubic feet (20 m^3) of size-reduced tanks. The solvent collected in the NDA during remediation amounted to 429 gallons (1,624 L), which was solidified by WVNS in twenty-six 55-gallon drums. The unrecovered solvent, which may be as great as 3,571 gallons (13,518 L) is thought to have been absorbed by the surrounding soil or to be on the recovered vermiculite, and/or to the extent that it is soluble, in the groundwater. In addition, 2,228 gallons (1,624 L) of radiologically contaminated solvent (n-dodecane), stored elsewhere on-site was also solidified during the migration project. Approximately 150,000 gallons (567,811 L) of solvent-contaminated water were routed through the lagoon system before discharge via the SPDES outfall in accordance with permit requirements.

According to NFS records, a total plant inventory of 18,820 gallons (7,241 L) of n-dodecane and 5,335 gallons (10,195 L) of TBP was procured during NFS operations. The quantity held up in the plant was about 2,228 gallons (8,434 L); thus the total quantity of spent reprocessing solvent that could be disposed in the NDA could be as much as 21,927 gallons (83,003 L).

1.7.9.2 Environmental Setting

Soil Characteristics

The NDA is underlain throughout its extent by the Lavery till, a dense, gray, clayey, glacial unit derived from the upper Devonian shales and siltstones that underlie the site vicinity and from the older glacial units that occupy the valleys to the north of the WNYNSC. In 1960, before earth-moving operations on the south plateau, the Lavery till at the NDA was mantled with alluvium which has since been removed.

Presently, the Lavery till (the burial till) extends down-section from the existing grade to the top of the periglacial sequence interposed between the lavery and the older Kent till. The Kent till is the deepest glacial deposit that might need to be considered in investigating contaminant migration.

The Lavery till beneath SSWMU #9 ranges in thickness from 23 meter (75 ft) on the west to 32 meters (105 ft) on the east. Thickness variation is mainly attributable to an eastward decline in the base of the till sheet rather than to modern topographic relief. The considerable thickness of the Lavery till was a principal consideration in the siting of the disposal facility. The minimum thickness, 9 meters (30 ft), underlies a disposal hole on the western edge of the NDA.

In addition to its thickness, the Lavery till was selected as a burial medium because of its particular physical and chemical characteristics. The physical properties of the Lavery are generally favorable to the interment and containment of wastes.

Hydrogeology

The uppermost water-bearing zone present in the vicinity of the NDA is the weathered zone of the Lavery till (weathered Lavery till). It is characterized by an oxidized, yellowish-brown, fractured zone of silty clay whose thickness is variable but averages about 3 meters (10 ft). The brownish soil matrix usually extends about 3 meters (10 ft) below the surface, where it changes to an olive-gray. The theoretical depth limit to which fractures could occur in the Lavery till is 15 meters; however, the maximum depth to which fractures were observed in research trenches at the site was 4.5 meters.

The unweathered Lavery till is the burial medium for wastes at the NDA and is an olive-gray, calcareous, inorganic silty clay to clayey silt of low to medium plasticity. Primary minerals are illite and quartz with subordinate chlorite. There is petrographic evidence that the till is texturally isotropic. Hydraulic conductivities range from 2×10^{-8} cm/sec to 6×10^{-8} cm/sec. Clustered piezometers have shown a downward (near vertical) gradient to the underlying more permeable Kent recessional sequence.

Underlying the Lavery till is the Kent recessional sequence, an interval of interbedded fine sands, silts, and clays with minor amounts of medium to coarse sand and gravel. The Kent recessional sequence is the same unit previously referred to in the literature as the lacustrine, which more accurately describes the laterally equivalent lake beds deposited to the east. The top of this interval lies 24-27 meters (79-89 ft) below grade in the vicinity of the NDA. The upper contact of the Kent recessional sequence with the Lavery is often gradational and probably represents Lavery ice advance. However, even local correlations are difficult, and in some cases these upper coarse deposits may be of Lavery age. This lacustrine-equivalent interval of primarily outwash facies (frequently interpreted as kame/delta) typically ranges in thickness from 12-18 meters (39-59 ft). This interval thickens and slopes to the northeast at approximately 2.5%. Fine grained units locally present and interbedded appear capable of separating distinct water-bearing zones of coarser deposits, but current water level data suggests that the entire interval may function as a single hydrostratigraphic unit. It is uncertain how much flow is derived from recharge through the Lavery till and how much enters from the bedrock hills to the west. Downgradient outflow, via seepage occurs at the Buttermilk Creek valley which is approximately 610 meters (2,001 ft) to the east.

1.7.9.3 Contamination Characterization

1.7.9.3.1 Groundwater Monitoring

At SSWMU # 9, wells 908, 1005, 1006, and 1007 monitor upgradient conditions in the weathered till. These wells are considered to be representative wells for monitoring the weathered till for the reasons given. Well 908 is believed to reflect weathered till groundwater chemistry, notwithstanding water level data. Well 904, similarly, is believed to 'straddle' the weathered and unweathered till thereby exposing it to lateral flow found only in the weathered zone. Cross sectional data refutes the assertion that well 905 is not hydraulically connected to the weathered till because of the intervening drainage course. Potentiometric data indicates well 1007 is upgradient, however, the well will be further evaluated during the groundwater investigation at this unit. Wells 904, 905, 906, 907 and 909 monitor downgradient conditions. The Kent recessional represents the deep pathway and wells 901, 902, 1001, 1002 and 1003 monitor upgradient conditions; wells 903, 86-10 and 86-11 monitor

downgradient conditions (see Plate 11). The weathered till represents the primary water bearing pathway of concern for these units. Well 1008C is the background well for the weathered till and well 1008B is the background well for the Kent recessional sequence.

The analytical parameters for SSWMU #9 characterization are detailed in Table B-1. The groundwater monitoring program will be based on 1991, 1992 and 1993 data and the two expanded rounds of groundwater monitoring (October, 1993 and April, 1994). Tentatively identified compounds will also be reported in the Contractual Level 2 reporting for the expanded rounds. Groundwater monitoring results will be statistically analyzed pursuant to Section 1.13 of Appendix B to characterize the unit. The compounds N-dodecane and tributylphosphate (TBP) will be analyzed for in aqueous samples collected from the NDA Interceptor Trench sump manhole as part of the two rounds of expanded characterization. Analysis for semivolatile organics is projected when the two sampling rounds for expanded parameters are conducted (refer to the project schedule in Appendix A).

1.7.9.3.2 Soil and Sediment Sampling

Soils/sediment investigations at SSWMU #9 consists of: a drilling program intended to explore the uppermost groundwater pathway (weathered till); a shallow soil sampling program based on both the results of the overland gamma survey and recently developed operational history information to determine the nature and extent of shallow soil contamination (if any); and stream and ditch sampling designed to provide information on impacts to the surface water system. These elements are intended to be applied in a focused and judgmental strategy to supply data necessary to assess the nature and extent of soil contamination attributable to SSWMU #9.

The drilling program will consist of two 25 foot bore holes (numbers 41 and 42) resulting in thirty-six (36) samples, twenty-three (23) of which will be in the saturated zone while thirteen (13) will be from the unsaturated zone. The locations chosen were based on groundwater migration patterns and also to determine the effectiveness of the interceptor trench. Samples will be continuously taken of the Lavery till or any other fill material that might be present.

The shallow soil sampling will employ two (2) locations, one (1) upgradient, and two (1) downgradient. This sampling regime provides information to determine background conditions and also the effectiveness of the interceptor trench to contain superficial migration of contaminants in the soils.

Stream and sediment sampling will be conducted at three (3) locations; one (1) to the north, one (1) to the east of the NDA, along surface water drainage channels, and one (1) further downstream in Erdman Brook. This sampling is proposed because the drainage ways generally experience flow in direct response to runoff of precipitation.

Two additional soil sampling points have been added to Plate 12 which will address the investigation of the NDA Staging Area. Soil sample SS-20 (shallow surface sample) has been added to characterize the source and sample selection will be based on selection of the most radiologically hot spot. WVDP is currently evaluating whether health and safety considerations may impact obtaining the source sample. Soil sample SS-21 represents a deeper surface sample immediately downgradient of the staging area to aid in addressing whether hazardous constituents may have been released from the area. The downgradient sample will be located in the drainage swale which runs north west from the Staging Area. These soil samples have also been added to Table B-7 and will be evaluated for TCL volatiles and TCL semi-volatiles and TCL metals.

Chemical analyses of borehole 41 and 42 samples at SSWMU #9 are as follows: unsaturated samples will be analyzed for TCL metals, and saturated samples will be analyzed for TCL metals, TCL volatiles, TCL semi-volatiles and Kerosene/TBP. The surface soils samples will be analyzed for TCL volatiles, TCL semi-volatiles and TCL metals. In addition to the parameters to be analyzed for this SSWMU, tentatively identified compounds will also be disclosed in the Contractual Level 2 reporting format.

1.7.10 SSWMU #10 - RTS DRUM CELL

1.7.10.1 Operational History and Source Characterization

The drum cell is the final component of the WVDP's integrated radwaste treatment system (IRTS) which includes the supernatant treatment system (STS), the liquid waste treatment system (LWTS), the cement solidification system (CSS), and the drum cell. The drum cell receives cement-filled drums of stabilized low-level radioactive waste from the CSS.

The RTS drum cell is located on the south plateau of the WVDP, approximately 600 meters (2,000 ft) southeast of the process building. The drum cell is a shielded storage facility for drums of Class C or less cement-stabilized waste. The drum cell consists of a base pad, shield walls, remote waste handling equipment, waste unloading area, a waste storage area, control room, and building structure.

It is currently anticipated that 19,325 square drums of cement-solidified, low-level radioactive waste, each containing 0.27m^3, will be stored in the drum cell upon completion of IRTS processing. As of February 9, 1993 there were 12,569 drums of waste in the drum cell. The drums are 23in x 23in x 35 in (584.2mm x 584.2mm x 882.7mm) and are high-integrity containers. The drums are stacked by a remotely operated crane that runs along a track on the inside walls of the building above the shield walls.

A 4.60 meter (15 ft) high, 0.51 meter (20 in) thick reinforced concrete shield wall of cast-in-place construction (ACI 318, Building Code Requirements for Reinforced Concrete) surrounds the storage area pad. The drum cell is enclosed inside a Butler building, a metal building 114.29 meter (375 ft) long, 18.29 meters (60 ft) wide, with 7.92 meter (26 ft) high vertical walls. The drum cell was enclosed in the Butler building so that waste could be handled and and protected from weather conditions.

The drum cell equipment consists of a bridge, crane, and trolley. The bridge is approximately 17 meters in length (55 ft) and moves east and west inside the drum cell. The trolley travels north and south along the bridge. A 1,818 kg (4,000 lb)

capacity crane is attached to the hoist and trolley. A 909 kg *(2,000 lb) grabber*, a crane attachment and a power rotating lifting device, is used to pick up and hold the drums along their axis angle as it moves the drums parallel to the drum stack. Drums are then placed at their respective coordinates in the drum stack.

The moisture cups, which are working, were installed to detect the presence and permit the sampling of leachate that might accumulate beneath the waste mass during the institutional control, if and when the drum cell is converted into a tumulus for disposal. Some of the moisture cups are beneath the building enclosure and could be used to monitor for the detection of a spill. However, considering the length of tubing between the collection cups and the instrument house, it would take a considerable volume of spilled material to be detectable. It should be noted, however, that this unit has no known release of hazardous constituents and TCLP testing on the cement waste form are negative with regard to the potential for releases of hazardous constituents.

The equipment for the drum cell is operated from control panels located in the control room. Operations are initiated from the control room. All waste handling is done remotely so that personnel exposure levels to radiation are minimized.

The waste unloading area is a shielded area at the north side of the drum cell. The remote unloading of drums by conveyors from the transporter takes place in this area.

In terms of waste characterization, these drums originate at the cement solidification system (CSS), which solidifies liquid low-level radioactive wastes in a Portland cement matrix. The CSS was designed to solidify three WVDP waste streams - uranyl nitrate hexahydrate, decontaminated supernatant, and sludge wash - from the high-level waste storage tanks, by mixing it with Portland Type I cement. The initial CSS waste processing campaign of uranyl nitrate hexahydrate began in January 1985 and created 250 drums of low-level cement solidified waste (55 gallons each). These waste drums are not stored in the drum cell but at the lag storage waste complex at the WVDP.

PUREX wastes consist of PUREX supernatant and sludge wash solutions. PUREX wastes from high level waste (HLW) tank 8D-2 have been determined to be RCRA hazardous

wastes because the toxic characteristics of barium (D005), cadmium (D006), chromium (D007), mercury (D009), and selenium (D010). The supernatant was processed via the above mentioned system from May of 1988 to November 1990, creating 10,394 drums of solidified wastes. The chemical constituency of supernatant before IRTS processing is identified in Table B-9. The supernatant is classified as a RCRA hazardous waste for toxic characteristics of chromium (D007) and selenium (D010). The supernatant solidified waste created by IRTS processing has been rendered non-hazardous waste as determined by sample analysis. Table B-8 provides toxicity characteristic leachate procedure (TCLP) laboratory analytical results for analyses associated with cement solidified PUREX supernatant.

Sludge wash solutions are also processed via the IRTS. IRTS processing of sludge wash solutions began in May 1992 and is anticipated to continue until approximately 8,425 drums of cement-solidified wastes are processed. The processing is expected to occur during three separate washing campaigns; wash one will create 6,800 drums; wash two will create 1,325 drums; and wash three will create 300 drums. The chemical consistency of the PUREX sludge wash before IRTS processing is identified in Table B-9. The PUREX insoluble solids are classified as RCRA hazardous waste by characteristic for chromium (D007), barium (D005), mercury (D009), and cadmium (D006). Sludge wash solutions before and after decontamination through the titanium-treated zeolite columns have been sampled and analyzed. The results indicate that chromium is the only hazardous constituent present in the sludge wash solution above the 40 CFR 261 TCLP regulatory limit. In addition, the PUREX sludge wash solution solidified waste created by IRTS processing has been sampled and analyzed for EP Toxicity and TCLP parameters. Table B-8 provides the TCLP laboratory analytical results of the samples. As evidenced by the results, the solidified waste form is not a RCRA characteristic hazardous waste.

The CSS process requires the addition of Portland Type 1 cement and chemical additives to the above-mentioned waste streams to adequately create an acceptable solidified waste form. Calcium nitrate may be mixed with the dry cement to accelerate the gelation rate of the waste/cement mixture. Other chemical additives are sodium silicate and dimethylsilicone (5%). As evidenced by Tables B-8 and B-9, these additives do not render the cement-solidified waste a RCRA characteristic hazardous waste.

The initial investigation and assessment of this unit concluded that there has been no storage or release of RCRA-regulated hazardous wastes at the drum cell. Furthermore, there is no evidence of any release of hazardous constituents from the stabilized waste form stored at the drum cell. Due to the stabilized, nonhazardous characteristic of the waste, container (drum) integrity and containment procedures, the potential for the release of waste or constituents to the environment is virtually nonexistent. Accordingly, it is concluded that no further RCRA actions are warranted at SSWMU #10.

1.7.11 SSWMU #11 - STATE-LICENSED DISPOSAL AREA (SDA)

The SDA is an inactive unit managed by NYSERDA. The RCRA Facility Investigation for the SDA is being conducted by NYSERDA.

1.7.12 SSWMU #12 - HAZARDOUS WASTE STORAGE LOCKERS, (HWSL)

Based on our review of the operational history of the HWSL, we believe that no further RCRA corrective actions are necessary concerning this SSWMU. A summary of this information is presented below in support of our conclusion regarding this unit. RCRA hazardous wastes have never been released to the environment due to waste management procedures employed as part of the HWSL operations. There is no known or suspected release of any materials from the Hazardous Waste Storage Lockers either prior to their installation at their present location or since they've been in operation as temporary waste storage lockers.

The four Hazardous Waste Storage Lockers are located approximately 107 meters (350 feet) north of the Main Plant and approximately 61 meters (200 ft) north of the Lag Storage Building in the north plateau of the WVDP site. The purpose of the Hazardous Waste Storage Lockers is to temporarily store non-radioactive solid, liquid or gaseous hazardous wastes which are awaiting disposal at an off-site RCRA-permitted treatment, storage, and disposal (TSD) facility. The HWSL were first used in December 1989 and are planned to be in use until the completion of WVDP. The lockers are identified as RCRA interim status waste management units.

The hazardous wastes stored in the HWSLs are from various WVDP operations and facilities such as the Analytical and Process Chemistry (A&PC) Laboratory, the warehouse and general maintenance activities. Items including paint cans, refractory brick, reproduction fluid, and solvent contaminated absorbents are stored in specific lockers based on compatibility and capacity. No radioactive or mixed wastes are stored in the lockers. Table B-10 presents the current inventory as of November 30, 1992. The wastes are strictly managed in accordance with standard operating procedures for packaging, handling, and storing hazardous wastes.

As indicated on Table B-10, there are approximately 239 kilograms (kg) of containerized wastes with various chemical characteristics currently maintained within the HWSLs. The waste is contained in 55-gallon drums and 5-gallon pails. The inventory described in Table B-10 was current as of November 30, 1992 but fluctuates over time due to the temporary storage function of the lockers. Written inventories of the lockers are updated weekly as part of routine waste management practices. No waste materials from within the HWSL have been spilled outside of the lockers and no wastes have ever been released from the lockers as a result of waste management practices at the HWSL. No wastes contained within the lockers have ever breached their containers i.e. pails, drums, and leaked to the locker spill basins during the history of the lockers.

The four HWSL are pre-engineered lockers. Each locker is identical in size and measures 8 feet x 15 feet x 8 feet. The lockers are equipped with a spill basin beneath a steel grate floor with a capacity of 474 liters (10 percent of the volume of material stored in the locker). All four of the lockers are designed to contain flammable materials. They are equipped with fire suppression devices, remote and local fire alarm systems, explosion-proof electrical components, and explosion-proof vents.

The superstructure of the lockers consists of ASTM A Grade 500-B 4-inch tubular steel stock for the base vertical cradle and lifting crown framework. The door openings have a vertical subframe of 4-inch tubular steel to prevent deflection displacement and twisting of the steel door and frame. The wall system within the 4-inch tubular steel interior wall panel finish is porcelain enamel steel with 20-gauge galvanized steel studs, base track, and double channel head mount components. The wall system

employs a 3 ½-inch fiberglass insulating blanket that serves as a thermal and dust barrier and aids in humidity and noise control. This wall system rates a thermal value of R-12.

Two Underwriters Laboratory (UL) rated and approved fire dampeners complete with 165 degree fusible link for automatic closure in case of fire are incorporated within the wall system and prevent ventilation during a fire. A 2,500 cfm explosion-proof ventilator is provided for positive air movement. Also incorporated within the enclosure wall system are two approved 20 pounds per square foot (psf) explosion relief panels designed to relieve pressure within the building in the event of an accident. The pressure relief panels remain fully watertight under normal conditions.

The lockers are equiped with a secondary containment system which consists of a 10-gauge steel, liquid-tight sump area constructed within the floor system that is designed to hold 10 percent of the volume of material stored in the lockers. A separate leak detection system in each locker activates a local alarm in the event of a spill or leak.

In summary, the assessment of this unit concluded that there have been no releases of hazardous wastes or hazardous constituents. Based upon this conclusion, we believe no further RCRA corrective actions are necessary concerning this SSWMU.

1.7.13 GROUNDWATER SEEP INVESTIGATION (WNGSEEP)

1.7.13.1 Operational History and Source Characterzation

In accordance with Section 7.f.ii of the RCRA 3008(h) Consent Order, WVDP prepared a full investigation report regarding the detection of 1,1,1-Trichloroethane at WNGSEEP, an on-site groundwater seep. The investigation report was submitted to the United States Environmental Protection Agency Region II and the New York State Department of Environmental Conservation on June 10, 1992. Based upon the results of WVDP's investigation, EPA and NYSDEC were able to conclude that, although a specific source for the contaminant was not identified, "there is no immediate threat to human health or the environment as a result of contaminants emanating from the WNGSEEP

location." Hence, it was determined by the Agencies that the need to continue the investigation as part of interim measures was not necessary. However, since a source of the 1,1,1-TCA was not determined during the investigation, WVDP proposed continued groundwater monitoring at the seep and continued investigations for a possible source in conjunction with ongoing RCRA Facility Investigations at upgradient solid waste management units. In correspondence from Andrew Bellina, P.E., USEPA and Paul Counterman, P.E., NYSDEC, to Richard Provencher USDOE, dated September 16, 1992, the Agencies agreed with WVDP's proposal and requested WVDP to provide an addendum to the RFI Work Plan. The objective of this section is to expand the RFI for purposes of continuing the WNGSEEP investigation.

1.7.13.2 Environmental Setting

WNGSEEP is located at the northeastern margin of the north plateau of the WVDP. This area is bounded by the deeply incised stream valleys of Frank's Creek (see Plate 8). Relief from the surface of Frank's Creek ranges from 40 to 100 feet. The sand and gravel unit is the uppermost geologic and principal water-bearing unit in the north plateau. Groundwater in this unit flows northeastward towards Frank's Creek and discharges from several seeps at the margin of the north plateau, along and above the contact between the surficial sand and gravel unit and the underlying Lavery Till (Plate 10). The Lavery Till has a low hydraulic conductivity of 1.0 E^{-08} cm/s which precludes downward flow of ground water from the overlying sand and gravel unit. Groundwater discharged from the seeps flows down the valley walls to Frank's Creek.

1.7.13.3 Contamination Characterization

Low concentrations of 1,1,1-TCA ranging from <5 μg/L to 41 μg/L, have been detected at WNGSEEP since October, 1989 when monitoring for volatile organic chemicals (VOCs) began at this location. During the initial investigation, a review of all WVDP well records indicated that 1,1,1-TCA was detected at only one other monitoring location near the High Level Waste Storage and Processing Area (well B-86-09). A review of the 1992 monitoring results for this unit indicate that during the eight sampling events, 1,1,1-TCA was not detected above the practical quantitation limit (PQL) as specified in 40 CFR 264 Appendix IX - Groundwater Monitoring. However there were three instances in 1992, where values were reported below the PQL for 1,1,1-TCA.

During the course of the High Level Waste Storage and Processing Area, sampling and analyses for volatile organic analytes will continue as described in this workplan.

TCA is quite soluble (S_{aqu} = 4400 ppm) and probably should be expected to emerge at groundwater seeps. TCA also is quite volatile (100 torr at 20° C) and, absent base-flow recharge to the adjacent surface waste system, surely would evaporate at the seepage face. Soil sample analysis for trichloroethene therefore is not appropriate nor is stream sediment analysis. TCL volatiles will be analyzed for, however, in saturated soil samples from the CDDL-downgradient boring locations; these possibly will provide information on the presence of trichloroethylene.

Trending of analytical results for samples collected at the WNGSEEP clearly show that the concentrations have also decreased to below the PQL. Sampling results for 1,1,1-TCA at WNGSEEP collected between January 15, 1991 and March 3, 1993 are depicted in Figure B-11. Results for the past fourteen months have been reported at less than the PQL of 5 μg/L and appear to be on a continued decreasing trend. Although, the analytical data for 1,1,1-TCA at the WNGSEEP suggests that its presence is dissipating, WVDP will continue to investigate upgradient super solid waste management units as possible sources of 1,1,1-TCA. Specifically, WVDP will evaluate Super Solid Waste Management Units 8, the Construction Demolition and Debris Landfill, 1, the Low Level Waste Treatment Facility, 5, the Maintenance Shop Leach Field, and 4, the High Level Waste Storage and Processing Area. The SWMU investigations include detailed evaluations of historical operating practices; waste and unit characterizations; and media specific investigations such as groundwater monitoring and soil sampling.

The presence of 1,1,1-TCA at WNGSEEP will continue to be monitored in accordance with the site groundwater monitoring program. The data will be compiled and the trends will be closely watched for any anomalies or changes in the groundwater quality. This data will be compared to other findings compiled during the SSWMU investigations identified above and conclusions will be made regarding whether there is any correlation between conditions at the SSWMU and WNGSEEP.

As depicted on Figure B-11, the 1,1,1-TCA at WNGSEEP has decreased steadily to below the practical quantitation limit as the trend shows. Also, we believe that WNGSEEP

is not downgradient but crossgradient to the CDDL. As described in this section, we will evaluate process knowledge, soil boring results, and assessment of the 2 additional rounds of groundwater data to establish whether known SSWMUs on the North Plateau were the source of the TCA.

In addition to the specific RCRA Facility Investigations discussed above, WVDP will also evaluate any new solid waste management units as potential sources of the 1,1,1-TCA, should any be identified during the course of the Project's investigations. WVDP will report conclusions regarding the source of the 1,1,1-TCA at WNGSEEP in conjunction with each of the SSWMU RCRA Facility Investigation Reports identified previously. In addition, should a source for 1,1,1-TCA be specifically identified, WVDP will prepare a separate letter report for submittal to the Agencies discussing those findings specifically.

1.8 QUALITY ASSURANCE OBJECTIVES

PC2> Quality assurance (QA) is a management system for ensuring that information, data, and decisions resulting from an investigation are technically sound and properly documented. Quality control (QC) is the functional mechanism through which quality assurance achieves its goals. Specific elements of the QA program for field activities are delineated according to installation of wells, water, soil and sediment sample collection, and analytical quality assurance procedures. General QA requirements are delineated in accordance the NYS Department of Environmental Conservation - RCRA Quality Assurance Project Plan Guidance, as revised March 29, 1991.

1.8.1 Quality Assurance Measurements

1.8.1.1 Field Activities/Tasks

The field activities and tasks outlined in this RFI-specific DCQAP include the following:

- Soil and sediment sampling and analysis
- Groundwater sampling and analysis

- Records review, including that for environmental setting and source and waste assessments.

1.8.1.2 Sample Collection for Quality Assurance

For aqueous (groundwater) samples field duplicates and field and trip blanks will be submitted to the laboratory along with the investigatory samples in order to assess the quality of data resulting from the field sampling program. Field duplicates and equipment rinse blanks will be submitted for soil/sediment samples. As per NYSDEC guidelines field and trip blanks are not being taken for soil/sediment sampling. QA/QC requirements for samples submitted for analysis are as follows:

Trip Blanks

A) Purpose:

A trip blank (aqueous samples only) is a control mechanism for evaluating sample bottle preparation, blank water quality, and sample handling. To simulate sample handling conditions, the trip blank travels to the field with the empty sample bottles and back from the field with the collected samples. Trip blanks are used to assess the effects of transportation and storage.

B) Definition:

Trip blanks will be prepared for all sample types (soil and groundwater) taken for VOA analyses per shipment. The trip blank will be analyzed only if samples from a particular cooler exhibit detection results of a common volatile constituent. If holding times will be exceeded on the trip blank before results are available then the trip blank will be analyzed. Sample containers are supplied by the WVDP Environmental Laboratory. The WVDP laboratory will fill the bottles with laboratory-demonstrated deionized, analyte-free water that originates from one common and physical location within the laboratory. (Note: Unlike a typical trip blank that comes from the laboratory analyzing the samples or producing method blanks, these trip

blanks will originate from the on-site WVDP Environmental Laboratory because samples are sent to different laboratories based on the parameters being analyzed. Depending on the activity level and type of analysis required, the trip blanks will go to either one or two of the three off-site laboratories providing analytical services for this program. Table B-11 identifies the participating laboratories and the services they provide.

C) Frequency and Handling Time:

One trip blank is prepared per day, for volatile organic analysis only, per matrix for each day of sampling. A trip blank will be employed for all samples types taken for volatile analysis. The trip blank will be analyzed should samples from a particular cooler exhibit detection results of a common volatile constituent. Trip blanks will be received in the field within one day of preparation in the lab. The temperature of the trip blanks will be maintained at the same temperature as the VOA samples.

D) Holding Time

Holding time for volatile organics analysis is seven days for non-preserved water samples, fourteen days for preserved samples.

Field Blanks

A) Purpose

A field blank (aqueous sample only) is a control mechanism for evaluating sample collection, handling, storage, and transport. The field blank travels and is stored with the samples and is thereby a representative of various effects on sample quality. The field blank is opened in the field and simply transferred into sample containers in the field and closed after sampling. The field blank thus also indicates atmospheric conditions and/or equipment conditions that may affect sample quality.

B) Definition:

Field blanks will be analyzed for the parameters of samples collected that day. The field blank consists of one set of sample containers into which deionized, analyte-free water is placed while in the field.

C) Procedure:

In the field analyte-free water is placed in an empty set of sample containers for analysis.

D) Frequency:

Field blanks are filled at a rate of 1-to-20 blanks to samples collected for each analytical parameter.

E) Holding Time:

Holding times for individual parameters are dictated by the analytical method.

Equipment Blanks

A) Purpose

An equipment blank is a control mechanism for evaluating decontamination of sample collection equipment. Equipment blanks are collected for sample equipment that requires decontamination between sampling events to determine inadequate equipment cleaning which could introduce contamination to the sample.

B) Definition

If field decontamination of sample collection equipment needs to be performed one equipment blank per day will be done on one piece of equipment per batch

of equipment type cleaned. An equipment blank is collected for each parameter set of interest.

C) Procedure

Equipment blanks are collected in the field by passing demonstrated analyte-free water through and over cleaned sampling equipment.

D) Frequency

Equipment blanks are collected at a rate of one per day for each analytical parameter set of interest per type of sampling equipment. Where dedicated equipment is used equipment blanks are not required.

E) Holding Time

Holding times for individual parameters are dictated by the analytical method.

Field Duplicate Samples

Collecting duplicate samples allows the overall precision of data collection activity to be evaluated by comparing analytical results of two samples from the same location. For each medium sampled, one sample is collected for every twenty samples as a duplicate (or a minimum rate of 5%). If fewer than twenty samples are collected for a particular sampling episode, then one sample will be collected as a duplicate.

Aqueous Matrix

Duplicates of water samples (ie. monitoring well water, surface water) will be obtained by alternately filling sample containers from the same sampling device for each parameter. (Volatile organic analysis sample vials should be filled from the same bailer of water whenever possible and be the first set of containers filled). When other sampling devices such as pumps are used, the sample vials for volatile organics should be alternately filled.

Soil/Sediment Metrix

Duplicates of soil/sediment samples will be obtained and analyzed for each parameter of interest. Because volatile organic samples are particularly sensitive to handling, this sample will be collected from the interior of the soil or sediment sample by cutting down the vertical axis of the sample and scraping along the freshly exposed surface with a stainless steel spatula. Scrapings from each half will be placed in separate containers. The remainder of the sample will be placed in a stainless steel mixing bowl, homogenized, and placed in the appropriate sample containers.

Laboratory Method Blanks

Method blanks for each analyte consist of laboratory-demonstrated analyte-free water prepared and analyzed in the same manner as the samples.

1.8.2 Accuracy and Precision of Analysis

The primary objective of the analytical quality assurance/quality control plan is to ensure the integrity of analytical results. Samples collected for laboratory chemical analysis will be analyzed at laboratories on WVDP-approved suppliers list and at NYSDEC-approved laboratories and will also be certified by the NYSDOH Environmental Laboratory Approval Program in the relevant analytical services. QA/QC procedures for these laboratories are approved through the NYSDOH certification program or its equivalent if out-of-state. If laboratories other than those certified are used for Project-specific reasons (i.e., radiological contamination), laboratory selection will be verified by appropriate certification and documented. These laboratories must maintain appropriate certifications and demonstrate proficiencies by participating in appropriate crosscheck programs. At a minimum, the accuracy and precision requirements specified as a result of method development and validation will be used.

Accuracy and precision are defined and measured as follows:

Accuracy, the measure of the bias that exists in the measurement system, is the degree of difference between measured or calculated values and true values. Sources of error can include sampling processes, field contamination, preservation, handling, sample matrix, sample preparation, and analysis techniques.

Analytical accuracy is assessed by analyzing quality control samples such as standards, matrix spikes, and surrogate spikes as specified in the analytical method. The percent recovery of the analyte added to the sample at a known concentration will be documented.

Field collection accuracy is assessed by comparing/verifying field documentation against that planned in the RFI Work Plan.

Precision is the measure of the reproducibility of an analysis, under the program's specific set of conditions, through a quantitative measure of the variability of a group of measurements compared to their average value.

Analytical precision for this program will be determined by analyzing duplicates, spikes, and matrix spike duplicates. When the analysis calls for a spike, the laboratory selects one sample per shipment, for a minimum of one sample in twenty, and splits the sample into three aliquots. The first aliquot is analyzed routinely for the parameters requested, while the other two aliquots are spiked with known quantities of the selected parameters of interest before analysis. For duplicates, spikes, and matrix spike duplicates, the relative percent difference between the two results is calculated and used as an indication of the analytical precision.

Sampling precision for this program will be determined by collecting and analyzing duplicate samples as described in section 1.8.1.2 above.

While collecting data using field analysis methods and/or field instrumentation (i.e., data on pH and conductivity), precision will be checked by reporting several measurements taken at one location and comparing the results. Precision will be

reported as the relative percent difference for two measurements and as standard deviation for three or more measurements.

1.8.3 Data Evaluation Parameters: Completeness, Representativeness, and Comparability

Data evaluation parameters - precision, accuracy, representativeness, completeness, and comparability - are established to ensure the validity of the data. These parameters will be assessed as program data are reviewed keeping in mind that the end use of the data will determine its acceptability.

Completeness

Completeness is a measure of the amount of valid data obtained to the amount that was expected to be obtained under normal conditions. Completeness is usually expressed as a percentage. Sampling problems, analytical problems, poor accuracy or precision, and the data validation process can all contribute to missing or invalid data. A completeness goal has been included to ensure that enough data of sufficient quality are obtained to fulfill the objective of the program. The Project's objective is to achieve 100% completeness, with the recognition that data gaps/documentation problems do occur in the field and with the laboratories. If problems are encountered with completeness, the NYSDEC will be contacted to discuss resolution in defining an appropriate course of action to address the particular situation.

Critical data points are sample locations for which valid data must be obtained in order for the sampling event to be considered complete. An example of a critical data point may be an upgradient well or any other data point considered vital to the decision-making process. Critical data points for the groundwater monitoring program and soil sampling program will be determined in the field by the task leader before each field activity and in relation to each SSWMU. The completeness goal for critical data is 100% for this program.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is a qualitative parameter that is most concerned with the proper design of the sample programs.

Soil/sediment sample locations, monitoring well locations, and sample frequency have been selected based on RCRA guidance documents and local conditions as specified in sections 1.4 through 1.7. Representativeness will be assessed by noting variances from field procedures and the results of duplicate sample analysis.

Comparability

Comparability expresses the confidence with which one data set can be compared to another. In the most general of circumstances, this means that prescribed standard field and analytical techniques are strictly adhered to and that analytical data are reported in the same units.

Comparability in data collection takes into account differences in the physical nature of the subject and the procedures through which the data were obtained. To ensure comparability, specific protocols, as discussed in section 1.9, as well as standard methods will be used in obtaining and analyzing samples.

1.9 FIELD INVESTIGATION PROCEDURES

1.9.1 General

This section outlines the field procedures that are applicable to the RCRA SWMU investigation program. Any deviations from the field procedures that are necessitated by actual field conditions will be documented as a field change.

The following subsections outline relevant environmental monitoring procedures and guidance for conducting the investigation.

1.9.2 Groundwater Sampling

Program

Groundwater sampling is conducted in accordance with the site Environmental Monitoring Program Plan. The program plan includes sampling groundwater monitoring wells to comply with RCRA guidelines as well as other routinely sampled and analyzed wells, including the SDA groundwater monitoring wells.

Sample Designation

Samples are identified by a computer-generated sample (bottle) ID number and a location code consisting of matrix, SSWMU number, and well number. For example, sample ID 91-02942 indicates the year (1991) and the sample trace number. Location code WNW0601 indicates water, on-site, well, SSWMU number 6, and well number 1. Up- and downgradient location and the lithologic unit screened are maintained in the database on well information.

Sample Type: Groundwater-Grab
Sample Method: Pump or bailer
Sample Code Prefix: WNW (W = water, N = on-site, W = well)

Sample designations are approved by the Environmental Laboratory manager to ensure unique designations and compatibility with the existing database.

Sample Container, Preservation, and Analysis

Appropriate sample containers and preservatives for various analytes are provided in accordance with "Test Methods for Evaluating Solid Waste Physical/Chemical Methods" (EPA SW-846).

Preparatory Field Activities

Sampling personnel are familiar with site Data Collection/Quality Assurance requirements and any deviations from the stated procedures are recorded in field records.

Sample Location

All sample locations are within the WVDP limited area or the SDA (Figs. B-2 and B-3).

Responsibilities

Program responsibilities are listed in Appendix A. Personnel collecting groundwater samples are responsible for seeing that representative samples are taken. Environmental monitoring personnel are responsible for providing sampling equipment, containers, labels, forms, and records.

Subcontractor Coordination

Groundwater analysis may be performed wholly or in part by a contracted analytical laboratory providing such services. The contracted laboratory shall be notified of the expected total number of samples and required analyses before field activities begin. Required sample volumes, preservatives, holding times, and testing procedures shall be confirmed with the contract laboratory. When practical, schedules shall be prepared and submitted to the contract laboratory noting total samples, required analyses, and due date of analytical reports.

Sample Handling

Sample collection shall be annotated on the Field Sample Record. All samples shall be kept in a secure sample storage area until retrieved for analysis in accordance with ELAP requirements. A chain-of-custody/analytical request form shall accompany all sample shipments. Preservation requirements, such as cool storage temperatures and holding times for all samples shall conform to site requirements and shipping

procedures. Shipments shall be either hand-carried or express mailed or shipped to the analytical laboratory. Mode of delivery and Federal Express numbers shall be noted on the chain-of-custody form.

Health and Safety Requirements

Field activities are conducted in accordance with the Health and Safety Plan, Appendix D.

1.9.3 Sediment/Sludge Sampling

Objective

Sediment/sludge sampling has been identified in accordance with Section 1.7 of Appendix B. This section describes the sampling techniques that will be used to obtain sediment/sludge samples.

Sample Designation

Sample locations are designated on Plate 12.

Preparatory Activities

Preparatory activities will involve assembling and laboratory precleaning all laboratory equipment before beginning sampling activities. Decontamination procedures are detailed in later sections of Appendix B. Sample locations are established prior to field activities.

Field Equipment

- Wooden stakes
- Sediment hand corer
- Dedicated sample collection tubes
- Sample containers
- Dedicated stainless steel trowel or knife

- Dedicated stainless steel mixing bowls
- Sample packaging and shipping materials
- Field notebook
- Personnel protective equipment

Health and Safety

It is anticipated that Level C and Level D safety attire will be used during this activity. Field activities will be performed in accordance with Appendix D, the Health and Safety Plan.

Responsibilities

Responsibilities are outlined in Appendix A.

Subcontractor Coordination

Off-site analytical services and subcontractors will be used. The off-site analytical laboratory will be contracted before beginning field activities and before each day's samples are shipped. Subcontractors, if utilized for a particular sample location, will be managed by the supervising field geologist.

Specific Sample Collection Protocol

1. Use dedicated and/or precleaned, decontaminated sampling equipment.

2. Establish sample location, noting characteristics.

3. Collect samples by driving a sediment corer into the lagoon bottom to a maximum sample depth of approximately 3 feet. If the corer will not penetrate into the sediment, samples will be collected from the top 1-3 inches.

The following procedure will be used to collect sediment cores:

a. Place a clean sediment core sampler over the desired sample location.

b. Push the sampler down into the sediment until the barrel core is full.

c. Retrieve the sample core; visually examine and characterize the sample.

d. Extrude and proportion the core using a clean, dedicated device into a clean stainless steel pan or bowl.

e. Collect the sample from the center of the core being careful not to collect smeared material from the side walls of the core.

f. Collect the volatile organic sample first. The last material to make up a sample will be taken such that the vial is completely filled to avoid excess headspace. The teflon lever should rest on the contents of the vial.

g. Upon retrieving sediment sample, do not remove native water on the top of the final sample.

h. After collecting the volatile portion, sediment samples will be placed in the sample containers.

i. Retain a 50-gram sample in a plastic bag for screening purposes.

j. Package samples as specified in Section 6 and complete the required paperwork.

k. Place samples in temporary storage at 4°C ± 2°C pending the screening results.

l. Package and ship samples as per the screening results and Section 5.9 (sample screening and shipping procedure).

m. Decontaminate the sample device and provide a new dedicated collection tube between successive sampling locations.

1.9.4 Drilling, Subsurface Soil Sampling, and Geologic Logging

Objective

Approximately 40 boreholes will be drilled at various SWMU locations as outlined earlier in Appendix B. Each borehole will be geologically logged and drilled material will be described and recorded according to accepted standards and methods, e.g., ASTM standards. Subsurface soil samples will be collected following all USEPA- and NYSDEC-approved methods and procedures. Prior to sampling, utility drawings, and process plans will be reviewed for locating actual field sampling locations. The DEC site monitor will be contacted to verify locations and to ensure sampling coverage of potential migration pathways. All drawings and plans utilized will be documented for reference in the RFI reports.

Sample Designation

Sample Type: Soil-Grab for stratigraphic purposes
Sample Method: Split-spoon
Sample Code Prefix: SN (S - soil, N = on-site)

Samples shall be identified using an eight (8) character code. The first two letters in the code shall comprise the prefix. Characters three (3) through seven (7) identify the borehole location designation. Character eight (8), shall be used to identify the sample sequence number.

Sample Container, Preservation, and Analysis

Soil samples shall be obtained in accordance with ASTM procedures and methods. Containers shall be selected based on chemical and radiological testing requirements.

In general, 16-ounce glass soil-jars shall be used for soil samples collected for archival, analytical, and lithologic purposes.

Sample Location

Borehole locations are shown on Plate 12 (soil/sediment sample location map).

Field Equipment

See earlier listing under Section 1.9.3, Appendix B.

Responsibilities

Program responsibility is outlined in Appendix A. The field geologist is responsible for ensuring that representative soil samples are collected and that the borehole is drilled according to prescribed procedures and methods.

Subcontractor Coordination

The supervising geologist shall provide coordination with the drilling subcontractor and the WVNS personnel and departments.

Sample Handling

Soil sample collection shall be annotated on the Log of Boring. All samples shall be kept in a secure area designated as the sample storage area until retrieved for analysis.

Health and Safety Requirements

The Health and Safety Requirements are outlined in Appendix D.

Specific Sampling Procedures

Drilling, soil sampling, and geological logging procedures will be performed in accordance with site procedures. These sampling procedures are provided as Attachment B-8. Please note, however, that these procedures may be modified to accomodate field changes but will not alter the intent of the procedures.

1.9.5 Stream Sediment Sampling

Objective

In order to provide additional information to characterize the extent and type of contaminant migration via surface water, stream sediment and drainageway samples will be collected. The locations are planned as shown on Plate 12.

Sample type, Sample Method, Sample Code and Sample Control

Sample Type	Stream sediment
Sample Method:	Grab sampling
Sample Code:	WVDP-STS-01 (West Valley Demonstration Project-Stream Sediment-No.1)
Sequence No.:	01, 02

Preparatory Activities

Preparatory activities involve assembling and decontaminating (if necessary) all equipment before beginning the sampling activities, including sample bottle preparation.

Field Equipment

- Sample containers
- Stainless steel trowel or scoop
- Field notebook
- Stakes

Health and Safety Considerations

Field activities will be conducted in accordance with the Health and Safety Plan, Appendix D.

Responsibilities

The field team leader will coordinate this effort with the facility-wide soil investigation.

Subcontractor Coordination

The off-site lab will be contacted before sampling activities and before each day's samples are shipped.

Specific Protocol

- Notify QA/QC department before sampling
- Obtain the necessary equipment and decontaminate according to the requirements for this program.
- Sketch the sample area and measure nearest grid locations.
- Insert scoop trowel or sample container into sediments and remove sample.
- Transfer sample into an appropriate sample bottle (if scoop is used).
- Obtain 50-gram sample for screening purposes.
- Place sample into storage at 4°C ± 2°C.
- Complete field notebook.
- Follow proper chain-of-custody procedures.

1.9.6 Decontamination

Radiological Decontamination

Decontamination of sampling equipment to prevent radionuclide cross-contamination of samples will proceed as follows:

A radiation technician will field screen equipment (split-spoon) for radioactivity. If radioactivity is not detected, chemical decontamination procedures will be followed. If activity is detected the procedure below will be followed:

a. Equipment will be scrubbed with tap water and nonphosphate detergent*

b. Equipment will be rinsed with tap water

c. Steps a and b will be repeated one time.

d. Before equipment is released from the drilling area, it will be screened by directly checking with filed instrumentation and performing a smear test.

* A solvent or solution such as Windex can be used as a substitute but, depending on the solvent or solution used, a mixed waste may be created.

Chemical Decontamination

Decontamination of sampling equipment to prevent chemical cross-contamination of samples is vital in maintaining the integrity of individual samples. In addition, the generation of additional mixed waste due to chemical decontamination fluids must be minimized. Therefore, the following procedures are to be used for all drilling and sampling equipment (downhole tools, samplers, and back of rig):

a. An alconox wash and tap water rinse;

b. Radioactivity screening and possible repeat of wash and rinse;

c. Steam cleaning.

Chemical and acid rinses will not be used.

Multiple Decontamination Requirements

In the event that both radiological decontamination and chemical decontamination of equipment is required, proceed in the order of the above detailed discussions.

Decontamination, Waste Minimization, and Segregation

Radiological decontamination and chemical decontamination of equipment may occur independently of each other or as one procedure, but in the appropriate sequence. In practice, steps "a" and "b" of the chemical decontamination procedures are adequate for radiological decontamination. Waste liquids generated in steps "a" and "b" first should be disposed of in separate containers (55-gal. DOT-approved drums), then

wastewaters generated in steps "c" through "g," thus reducing the potential for the creation of a mixed waste. Liquids from the segregated drums should be sampled and analyzed to determine their radiological and chemical constituency for treatment, storage, and disposal.

To further minimize the volume of liquid waste generated during these procedures spray bottles will be used to apply decontamination solutions to potentially contaminated sampling equipment.

All decontamination-generated wastes will be stored in accordance with applicable state and federal regulations and in accordance with the site media policy.

1.9.7 Sample Screening and Off-site Sample Shipment

Purpose

This section outlines procedures for shipping samples to off-site contract laboratories for chemical and radiological analyses. All samples collected for analysis will be sent to either a radiological or mixed-waste laboratory. Strict adherence to QA/QC protocol is required (i.e. holding times). This section formalizes procedures that will be followed to ship samples off-site so that QA/QC protocols satisfy federal and state requirements. WVDP Shipping Procedures comply with applicable DOT, DOE, state, and federal regulations.

Sample Screening for Radioactivity and Shipment Classification

Environmental samples will be screened by the Radiation and Safety (R&S) Department for gross alpha and gross beta-gamma in accordance with Radiological Control Procedure RC-ADM-27. RC-ADM-27 is included as Attachment B-6, please note, however, that changes are sometimes required to facilitate site implementation and, as such, should not affect the procedural intent of the program. If the samples are determined to be radioactive by this screening (> 30 dpm/g alpha or > 100 dpm/g beta-gamma for soil), the results will be given to the Transportation Group for shipment classification. Based on radioactivity levels, the shipment will be classified as either Limited Quantity or Type A and the samples will be packaged

accordingly. Because of chemical parameter holding times, the samples must be screened as quickly as possible allowing them to be shipped to the appropriate contract laboratory the next day after collection. Since the classification will be based on gross activities and not on isotope specific analysis, a larger number of samples may have to be shipped conservatively by the more restrictive Type a method.

Packaging of Environmental Samples

Samples to be shipped to an off-site analytical laboratory must be listed on a "request for analysis" packing sheet. Corresponding request forms are chosen according to laboratory destination. Samples determined to be radiologically contaminated or known or suspected of containing hazardous materials must follow a separate packaging procedure. (See "Packaging of Radiologically Contaminated or Hazardous Materials" in this section). All sample containers should be tightly sealed and inverted to check for leaks. If leakage is noted the sample media should be transferred to another appropriate sample container. If no leakage is noted, each sample container is placed in a ziplock plastic bag. All glass bottles must be wrapped in bubble wrap for additional protection. Ice or blue ice is placed in the cooler so the samples will remain as close to 4°C +/- 2°C as possible during shipment. Bagged samples are packed in a sturdy container, such as an ice chest, with adequate packing material such as vermiculite to prevent shifting and breakage and to absorb any leakage that could occur during shipping.

The chain-of-custody record is prepared by the sampling team or the sample custodian before shipping. A copy of the completed chain-of-custody record and signed packing sheet is made for on-site records. The chain-of-custody record and packing sheet shall be placed in a plastic ziplock bag and taped to the inside of the container's lid. Chain-of-custody records may be inspected for QA/QC purposes before sealing shipments.

Shipment of Environmental Samples

An off-site shipping request shall be prepared in accordance with site procedures before sample shipment. A shipping label addressed to the appropriate contract laboratory shall be affixed to the ice chest. The ice chest shall be closed and

taped securely for transport. The weight of the cooler shall be recorded on the shipping form.

Individual sample containers shall be checked for contamination, and appropriate samples shall be reviewed for gross alpha/beta screening results. Release tags shall be issued and the shipping form signed. The form must accompany the shipment to the front lobby for pickup. A security guard shall review the form for the necessary signatures.

Packaging of Radiologically Contaminated or Hazardous Material Samples

Radiologically contaminated samples will be packaged in accordance with strict site procedures and are inspected before leaving the site.

Shipment of Radiologically Contaminated or Hazardous Material Samples

Samples determined to be radiologically contaminated or suspected of containing hazardous materials must be considered hazardous substance samples and transported according to the following requirements:

If the substance in the sample is known or can be identified, it is packaged, marked, labeled and shipped according to the specific instructions for the material if it is listed the DOT Hazardous Materials Table, 49 CFR 172.101.

For samples of hazardous materials of unknown content, 40 CFR 172.402(h) allows the designation of hazard class based on the shipper's knowledge of the material and selection of the appropriate hazard class from subpart 173.2.

1.10 SAMPLE CUSTODY

This section describes the protocols used from the time the sample is obtained through receipt at the analytical laboratory. Sample custody documentation procedures ensure sample integrity from collection through analysis. Sample shipping and handling procedures, applicable to samples shipped to laboratories and described, protect the personnel involved in the shipment of samples. Detailed records of all

activities will be kept, including inspections and photographs taken, and the field task leader will thoroughly review all notes.

At a minimum the following sample custody documentation procedures will be followed:

- Procedures and forms will record the exact location and specific considerations associated with sample acquisition.
- Previously prepared sample labels will be completed with the necessary sample I.D. and tracking information.
- Standardized field tracking reporting forms will be used.
- Laboratory sample custody procedures for sample handling, storage, and analysis will include key individuals and responsibilities.
- Laboratory sample custody logs and standard lab-tracking report sheets will be used.

1.10.1 Field Notebook and/or Field Documentation Forms and Sample Form Entry Procedures

Field notebooks and/or field documentation forms provide the means for recording all data-collecting activities performed at a site. As such, entries will be as descriptive and detailed as possible so that a particular situation may be reconstructed without reliance on the collector's memory.

If field notebooks are used they will be bound, with consecutively numbered pages. Each notebook is identified by a unique number in the following format:

WVDP-GW-FN-XXXX-X, which corresponds to:

WVDP - Groundwater - Field Notebook - Document Control # - Sequence #1

In most cases field documentation forms will be used to document field activity. These include:

- Daily field report
- Field memoranda

- Monitoring well installation and sample forms.

The cover of each notebook will contain the following information:

- Book number
- Start date
- End date.

Entries into the logbook will contain a variety of information. At the beginning of each field investigation entry, the following information will be typically recorded:

- The date and start time
- Weather conditions
- All field personnel present
- Level of personal protection used on-site
- The signature of the person making the entry.

All samples collected will be recorded by location code (assigned as noted above under "Sample Designation" in each section) along with other information related to the sample effort in the sample form, such as:

- The time and date of sampling
- Description and location of sampling point and general conditions (i.e., condition of monitoring well)
- Purpose of sampling and sample description
- Type and make of all equipment used including calibration date, where applicable
- Analytes for which samples were collected
- Field measurement results (i.e, pH, conductivity)
- Sample volume and number of containers
- Laboratory used for analysis
- Air and radiation monitoring readings/findings (if applicable).

All entries will be made in waterproof pen; no erasures will be permitted. If an incorrect entry is made, the data will be crossed out with a single strike mark,

initialed, and dated. Entries will be organized into easily understandable tables where possible. Any significant observations will also be recorded. Logbooks will be reviewed and signed off daily to ensure all entries are valid and complete.

At each station where the sample is collected or a measurement made, a detailed description of the location of the stations will be recorded. All equipment used to collect samples will be identified. In addition to entries made in the log book, if used, a sampling form must be completed.

1.10.2 Chain-of-Custody

To maintain a record of sample collection, transfer between personnel, shipment, and receipt by the laboratory, a chain-of-custody record is filled out for samples being shipped off-site for analysis. Each time the samples are transferred to another custodian, signatures of the person relinquishing the sample and receiving the sample, as well as the time and date, should document the transfer. A sample is considered to be in an individual's custody if the following criteria are met:

- It is in the individual's possession or view after being in the individual's possession
- It was in the individual's possession and then locked up or transferred to a designated secure area.

Under this definition the team member actually performing the sampling is personally responsible for the care and custody of the samples collected until they are transferred or dispatched properly.

The chain-of-custody record is employed as physical evidence of sample custody. Each time the samples are transferred to another custodian, the party relinquishing and receiving the sample must sign, date, and record the time of transfer.

The top or original signature copy of the chain-of-custody record is enclosed in plastic and secured to the inside of the cooler lid. A copy of the custody record is retained for the sampler's files.

Shipping coolers are secured with fiber tape placed across cooler openings.

Whenever samples are split with a source or government agency a separate chain-of-custody record should be prepared for those samples, indicating with whom the samples are being split and the I.D. numbers from splits.

1.10.3 Sample Identification Procedures

Sample identification procedures are as noted above.

For samples analyzed on-site the groundwater sampling record serves as a chain-of-custody. For samples being shipped off-site, a sample analysis request sheet/chain-of-custody form will accompany the sample on delivery to off-site laboratories. This form will be completed by the laboratory personnel and will at a minimum include:

1. Name of person receiving the sample
2. Date and time of sample receipt
3. Laboratory sample ID numbers and location codes
4. Analyses to be performed.

Samples collected at a site will be classified as either environmental or hazardous material samples. In general, environmental samples collected from streams, ponds, or wells are not expected to be grossly contaminated with high levels of hazardous materials. Materials from obviously contaminated soil, ponds, lagoons, pools, and leachates are considered hazardous. A distinction must be made between the two types of samples in order to:

- Determine appropriate procedures for transportation of samples. If there is any doubt, a sample should be considered hazardous and shipped accordingly.
- Protect the health and safety of laboratory personnel receiving the samples. Special precautions are used at laboratories when samples other than environmental samples are received. Laboratories must follow OSHA 29 CFR 1910 procedures.

- Prevent cross contamination of samples from occurring.

1.10.4 Sample Container Labeling

All samples must be identified with a tag or label attached directly to the container. Labels must be completed with a waterproof pen. The information recorded on the sample label includes:

- Sample designation
- Date: Six-digit number, indicating month, day, and year of collection
- Time
- Sampled by: Initials of person who collected the sample
- Special instructions and cautions: Split samples are labeled with identifiable information and "SPLIT" is noted. Duplicates are given entirely separate identification numbers and are not identified on the sample label
- Preservative: If a preservative is added to the sample container it is noted
- Parameter to be analyzed: Specific parameters or general groups of parameters.

1.10.5 Sample Handling and Shipping

The protection of personnel involved in the shipment of samples to contract laboratories and the maintenance of the integrity of the samples themselves is important. When sent by common courier, the packaging, labeling, and shipping of hazardous substances is regulated by the U.S. Department of Transportation (DOT) under CFR 49.

■ Marking/Labeling

Return address labels must be attached to outside of cooler in a clearly visible location.

The appropriate side of the container must be marked "This End Up" and arrows placed accordingly. No DOT markings or labeling are required unless special packaging requirements are imposed.

- Shipping Papers

No DOT shipping papers (i.e., bill of lading) are normally required in the shipment of groundwater samples unless special packaging requirements are imposed. A complete chain-of-custody record, however, must be included. A Federal Express, Emery, or other overnight delivery service air bill must accompany each cooler. (Only one air bill number is required for all coolers shipped to the same laboratory). Other sample documentation as described in section 5.10.3 as applicable is required.

- Sample Transportation

Samples should be shipped via overnight delivery service or hand carried to the analytical facility. Hazardous samples will not be transported by a carrier that also carries passengers and must be shipped "Cargo Only."

- Sample Holding Times

Sample holding times are specific to the analyte(s) of interest and are based upon EPA, NYSDOH, and NYSDEC guidelines.

1.10.6 Sample Container Provision

Generally, sample bottles will be purchased precleaned for the analyte(s) of interest. Clean sample containers will be stored in a clean, controlled area free from potentially contaminating volatile organic compounds such as solvents and gasoline.

Sample containers may also be obtained from contract laboratories or may be cleaned and used accordingly. In all cases, containers used will be cleaned and appropriate for the analyte(s) of interest.

A certificate of analysis, to demonstrate the efficacy of cleaning, will be obtained for each batch of sample containers and will be maintained on file.

Minimum recommended sample volumes for various types of analyses are confirmed with the receiving laboratory before samples are collected.

1.10.7 Sample Shipment Coordination

To enable tracking of the samples from the field to the laboratory and to ensure timely laboratory receipt of samples, the designated personnel in charge of shipping samples will log the samples as soon as practicable after collection into the data files (i.e., LIMS), including the following information:

- Sample ID (computer generated)
- Location code
- Date and time of sample collection
- Laboratory(s) where samples will be analyzed
- Analyses requested

- Date of shipment
- Carrier and air bill number(s) for the shipment
- Number(s) and type(s) of samples shipped
- Any irregularities or anticipated problems with the samples, including special handling instructions or deviations from established sampling procedures
- Status of the sampling project (e.g., final shipment, update of future shipping schedule).

1.10.8 Environmental Samples

Environmental samples will be packaged and shipped according to the following:

■ Packaging

Note: If samples contain greater than DOT shipping limits (0.002 μ Ci/g total radioactivity), special packaging requirements must be followed. If this situation arises, package the shipment in accordance with site procedures.

■ Marking/Labeling

Sample containers will have a completed sample identification label and the outside shipping container must be marked "Environmental Samples." The appropriate side of the container should be marked "This End Up" and arrows placed accordingly. No DOT markings or labeling are required.

■ Transportation

No DOT shipping papers are required.

1.10.9 Hazardous Material Samples

Packaging of hazardous material samples depends on the type of sample. Samples not determined to be environmental samples or samples known or expected to contain hazardous materials must be considered hazardous substance samples and transported according to the following requirements:

- If the substance in the sample is known or can be identified, package, mark, label and ship according to the specific instructions for the material if it is listed in the DOT Hazardous Materials Table, 49 CFR 172.101.

- For samples of hazardous materials of unknown content, Part 172.402(h) of 40 CFR allows the hazard classification to be based on the shipper's knowledge of the material and selection of the appropriate hazard class from Part 173.2.

The correct shipping classification for an unknown sample is selected through a process of elimination using the DOT classification system. Unless known to be or demonstrated by radiation survey instruments to be nonradiological, the sample is

considered radioactive and appropriate shipping regulations for radioactive material must be followed. If radioactive material is eliminated, the sample is considered to contain "Poison A" materials, the next classification on the list. DOT defines "Poison A" as extremely dangerous poisonous gases or liquids of such a nature that a very small amount of gas or vapor from the liquid, mixed with air, is dangerous to life.

With the elimination of radioactive materials, Poison A, flammable gas, and nonflammable gas, the sample can be classified as a flammable liquid and shipped accordingly. (These procedures clearly would also suffice for shipping any other samples known to be less hazardous than flammable liquids in the DOT classification table).

Classifying unknown substances into a category below flammable liquid requires flash point testing, which may be impractical and possibly dangerous at the site. Thus, unless the sample is known to consist of a material less hazardous than flammable liquid it is considered a flammable liquid (or solid) and shipped as such.

Radioactive Material Samples

Packaging of radioactive material samples depends on the activity levels of the sample. If the sample is determined to be radioactive based on screening results, it must be classified and shipped in accordance with site procedures which detail marking/labeling and shipping paper requirements for radioactive materials shipment.

1.11 CALIBRATION PROCEDURES AND FREQUENCY

1.11.1 General

Typical calibration procedures that may be used are noted below.

1.11.2 Field Equipment and Field Instrumentation

A calibration database is maintained for tracking instruments, equipment, and calibration devices requiring periodic calibration or recertification. Real-time field measurements, for pH and conductivity, for example, will be made with

instruments that are calibrated according to NYSDOH ELAP requirements, where applicable.

The operation and use of field equipment is covered by specific EM procedures. These procedures are based upon NYSDOH requirements where applicable and/or equipment manufacturer's instructions. Dedicated log books, along with the sampling record will be used to document calibration of field equipment as appropriate.

If satisfactory calibrations cannot be attained, equipment will be tagged "Out of Service". Out-of-service equipment will not be used for analysis.

1.11.3 Laboratory Equipment

Sample analyses will be performed by both on-site laboratories and contract laboratories. Both types of laboratories are subject to periodic internal and external audits. (See Table B-11 identifying the laboratories associated with this program).

Nonradiological contract laboratories located within New York State will be required to participate in the NYSDOH ELAP and acquire ELAP's certification for all chemical constituents of concern. Laboratories located outside New York State will be encouraged to participate in the NYSDOH ELAP. At a minimum, nonradiological out-of-state laboratories will be required to participate in their own state certification program and be a listed federal CLP laboratory. Non-mixed chemically contaminated samples must be sent to a NYS ELAP certified laboratory or an out-of-state laboratory with equivalent certification and the laboratory must demonstrate satisfactory performance by means of performance evaluation samples. The use of out-of-state laboratories for mixed waste analyses is necessary because no laboratories capable of performing chemical analyses on radiologically contaminated samples that meet WVDP quality assurance requirements are located in New York State. Agency concurrence will be obtained for use of any out-of-state laboratory.

All laboratories will be required to follow USEPA and/or NYS protocols for chemical analyses. These protocols ensure that laboratory instruments are calibrated and operating properly so that data are both valid and traceable.

Laboratories analyzing radiological constituents are required to use methods consistent with HASL-300 methods and/or appropriate USEPA methods.

All laboratories will be required to have in place a laboratory quality assurance plan approved by the WVDP Quality Assurance Department that is consistent with EPA protocols and with WVDP quality assurance protocols.

Analytical instruments shall be calibrated in accordance with requirements specific to the instrumentation and procedures employed. Introductory Methods 7000 and 8000 in Test Methods for Evaluating Solid Wastes (EPA/SW-846) and the procedures specified in the individual methods shall be consulted for criteria for initial and continuing calibration. Table B-16 has been prepared as a summary of the acceptance criteria and necessary corrective actions to be employed by the laboratory when using the SW-846 methodologies described for this program.

1.12 ANALYTICAL PROCEDURES

1.12.1 Field Activities

The analytical program for historical and current groundwater monitoring field activities is described in Table B-1 and B-3. As noted, the groundwater monitoring parameters will be reviewed and revised for later 1993 and 1994 sampling. The analytical program for the soil/sediment program is described in Table B-3. Table B-12 tabulates by matrix the parameter(s) and the analytical method(s) used. Laboratory analysis will consist of three types:

- Standard approved methods such as NIOSH, EPA, and ASTM and analytical methods other than routine methodologies used primarily in support of engineering studies.

- Those analyses using methods specific to radiological parameters. (not detailed here).

- Those analyses using methods specific to chemical parameters. This analysis is characterized by the use of EPA, NYS or APHA analytical procedures methodologies.

The chemical parameters to be analyzed for the groundwater program are subdivided into indicator and groundwater parameters. (See Table B-1). The chemical parameters to be analyzed for in the soil and sediment program are SWMU specific (see Tables B-3 and B-6).

Analyte concentrations of preparation (method) blanks are not to exceed the lower-limit detection level (LDL) where applicable.

Matrix spikes are to be about two times the indigenous levels and the recovery limits are to be from 80% to 120%.

Every ten analyses are to have a verification of calibration. Recovery limits of ± 20% for verification standards for midrange and recovery limits of ± 25% for verification standards for low range will apply.

For duplicate analyses, the relative percent deviation is not to exceed 20% for concentrations greater than five times the instrument detection unit (IDL). If duplicate concentrations are less than five times the IDL, then the difference in the determined concentrations is not to exceed the IDL.

1.13 DATA REDUCTION, VALIDATION, AND REPORTING

The collected data can be divided into field and technical data. Field data will consist of all real-time measurements. Technical data will include all field and laboratory analytical data and the results of field and laboratory QC samples. Documentation of both types of data will enable definitive characterization of the extent and magnitude of specific contaminants at each site.

Data reduction, validation, reporting, and other recordkeeping and documentation associated with processing samples through the analytical laboratory are based on the requirements mandated by NYSDOH, NYSDEC, and USEPA with variations as specified below.

The results of all QC samples will be incorporated into the RFI report. Elements of this internal documentation will include those discussed in the subsections that follow.

1.13.1 Laboratory Data Logging

Upon receipt of samples for analysis accompanied by a completed field sampling/chain-of-custody form detailing requested analysis, designated personnel will:

1) Verify all paperwork and chain-of-custody forms.
2) Log in samples, assign unique log numbers, and label the container(s) with the numbers.
3) Assign priority and any appropriate hazard rating criteria.
4) Store samples in refrigerated sample bank or in an appropriate manner, depending on analytical requirements.

1.13.2 Field Data Logging

Field data will be recorded as described in sections 1.9 and 1.10.

1.13.3 Analyzing the Sample and Procedural Detail

The samples will be analyzed by chemists and/or technicians using approved analytical procedures as specified in Table B-12 and discussed in Section 1.12.

The chemist or technician will then record the results of analyses and detail all procedural modifications, deviations, or problems associated with analyses in the parameter workbooks or on data sheets.

1.13.4 Data Reduction

- Field Measurement Data

The reduction of real-time-generated field data will involve correcting measurement data for the measurement system's baseline value. The data will be adjusted only after

data forms have been reviewed by field/laboratory personnel. All PID/OVA and radiological instrument readings must be compared to background and referenced to a particular span or reference gas. Also the instrument must be adjusted prior to use and periodically during each day to ensure it is properly "zeroed" pursuant to instrument specification.

■ Duplicate and Replicate Sample Data

If validated relative percentage difference (RPD) values are acceptable, duplicate and replicate measurements of a single sample will be averaged before further data reduction. This removes bias from the overall mean.

If RPD values are not acceptable, there may be a problem in the analytical process. Data and calculations should be re-checked. An error in analysis of one duplicate may necessitate its exclusion from the data base. In extreme cases, re-analysis or resampling may be necessary.

■ Outliers

Field variability of environmental measurements can be great and any program of environmental measurement can produce numbers that lie outside the expected range of values. Outlier values may be the result of:

- A catastrophic unnatural (but real) occurrence such as a spill
- Inconsistent sampling or analytical chemistry methodology
- Errors in the transcription of data values or decimal points
- True but extreme concentration measurements.

The data should be corrected, for example, if outliers are caused by incorrect transcription and the correct values can be obtained and documented from valid records. Also, if a catastrophic event or a problem in methodology occurred that can be documented, data values should be reported with clear reference. Documentation and validation of the cause of outliers will accompany any attempt to correct or delete data values because true but extreme values must not be altered. Statistical methods for identifying outliers require that the analytical laboratory have an ongoing program

of quality assurance and that sufficient replicate samples be analyzed to account for field variability.

Outlier values will not be omitted from the raw data; however, these values will be identified within the summary tables.

1.13.5 Validation of Data

Upon completing an analytical procedure data will undergo QA/QC review before final reporting.

The validation process will include mechanisms to verify data reduction. In the case of computerized data reduction, this will include subjecting a surrogate data set to reduction by the software prior to use of computer programs/applications to ensure that valid results are produced.

PC2> The principal criteria that will be used to validate the integrity of analytical data will be modeled from Functional Guidelines for Evaluating Organics Analyses, (U.S. Environmental Protection Agency, February 1, 1988), EPA 68-01-6699, and Functional Guidelines for Evaluating Inorganic Analyses (U.S. Environmental Protection Agency, July 1, 1988), or their updated versions. Although these documents are not completely applicable to RCRA projects, they are good models for the level of detail required in criteria for data validation. Specifically, EPA Region II SOP. No. HW-6 Rev. 7 (3/90), SOP. NO. HW-2 Rev. 10 (2/90), and the NYSDEC Analytical Services Protocol - Sept. 1989 (Rev. 12/91) are the sources of the principal validation criteria. These EPA SOPs are consistent with CLP sampling and analysis protocol.

WVDP sampling and analysis plans are designed to provide representative, characterizing environmental data of ascertainable quality, but not in strict compliance to CLP protocol. Complete CLP deliverables are not received from vendor laboratories and thus strict, complete CLP-type validation is not performed. Rather, contractually there are provisions to receive data from vendor laboratories packaged in two different formats - one of which approximates CLP deliverables.

Level I Report Format is basically summary data which provides sample identity information, analytical results, WC results with their acceptance criteria, holding times, detection limits and report narrative.

Level II Report Format is Level I format plus raw data, such as instrument output and log records, whereby calibration and quantitation can be validated. Examples of the data reporting formats are provided as Figure B-12. Refer to Section 1.13.5.2 Laboratory Data Validation for a description of the contents of Level I and Level II reporting packages.

Routinely, in support of environmental monitoring, Level I data packages are received from vendor laboratories and accordingly validated.

The plan of data validation relative to sample chronology is as follows: Historical environmental data (i.e. prior to 1991) will necessarily be assessed and used as is without formal, documentable data validation. Data from 1991 and 1992 was validated and accordingly documented as Level I data. The exceptions to this are that groundwater data from Nov. - Dec. 1991 sampling round and the July - August 1992 sampling round will additionally be subjected to Level II data validation. Change in contracted vendor laboratory prompted the decision to pursue Level II data validation for the July - August 1992 sampling and analysis.

Data from anticipated soil sampling in 1993 will be in Level II format deliverables and be accordingly validated. Groundwater data from 1993 and into the near future will routinely be validated as Level I unless Level II format deliverables are required. There has been in the past, present, and will continue to be for future vendor Laboratory services contracts, provision to obtain Level II deliverables at the time of original analysis or subsequently thereafter.

After validation, analytical data will be examined to determine if project activities and/or waste management units are having significant effects upon the surrounding environment.

The specific statistical procedures used for the evaluation of the data, along with the conditions for their use are currently under development. A statistical process is

being refined as indicated in Section 1.2 for continued evaluation of groundwater monitoring results. This process will also include non-statistical triggers such as those contained in the site Environmental Monitoring procedures. It is recognized that this statistical process will require NYSDEC/EPA approval.

1.13.5.1 Field Data Validation

Field data will be validated at two levels. First, field activities and the data obtained will be validated at the time of collection by following approved standard procedures and QC checks. Secondly, data will be validated by supervisory personnel who will review the data for completeness, reasonableness, and acceptable QA/QC. After data reduction into tables or arrays, trained personnel will review data sets for anomalous values. Any inconsistencies discovered will be resolved immediately, if possible, with the field personnel responsible for data collection. These personnel are also responsible for ensuring that justifiable data are obtained by following these field objectives:

- Adhering to the approved sampling plan
- Ensuring that equipment and instruments are properly calibrated and in working order
- Collecting samples according to written standard operating procedures
- Collecting sufficient sample volume to maintain sample integrity and conduct all required analyses
- Preserving samples properly
- Providing all applicable field QC samples with each sample set
- Maintaining complete chain-of-custody documentation throughout the duration of field activities and including copies with each sample shipment

- Ensuring that field samples will arrive at the laboratory in good condition
- Ensuring that field, sampling, and shipping records are complete and signed/dated appropriately.

Random checks or surveillance observations of sampling activities and field conditions will be made by the supervisory personnel, who will check recorded data at that time to confirm observations. Peer review will also be incorporated into the data validation/verification process to confirm accuracy and maximize data consistency between field personnel.

1.13.5.2 Laboratory Data Validation

Depending on where the analytical data is produced (e.g. on-site Environmental Laboratory or external vendor laboratory), data verification and validation is conducted accordingly. The following text is a generic description of the process and the aspects/items given consideration:

WVDP Level I and Level II data validation designation is parallel to Level 2 and 3 designations respectively of the NYSDEC-RCRA Quality Assurance Project Plan Guidance (3/91) which delineates analytical levels, type of analyses, data uses, data quality control, etc. These levels are slightly more rigorous compared to the respective Level C and Level B data validation of the Hazardous Remedial Actions Program (HASWRAP) as described in DOE 1 HWP-65/R (July 1990).

Key

O	-	Organics
I	-	Inorganics
VOA	-	Volatiles
SVOA	-	Semi-volatiles

Level I validation consists of review of the following items:

- Chains of custody
- Holding times
- Method, field, and trip blanks (I,0)
- Laboratory control samples (I,0)
- Field and laboratory duplicates (I,0)
- Matrix spikes/matrix spike duplicates (I,0)
- Surrogate recovery (0)

- Detection limits (I,0)
- Percent moisture determination (I,0)

Level II validation consists of review of the following items:

- Chains of custody
- Cover letter and narrative
- Holding times
- GC/MS tuning and mass calibration (VOA, SVOA)
- Initial calibrations (verifications) (0,I)
- Continuing calibrations (Verifications) (0,I)
- Blanks (Method, field, trip and calibration (0,I)
- Surrogates (0)
- Matrix spikes/matrix spike duplicates (0,I)
- Detection limits (I)
- Laboratory control samples (0,I)
- Internal standards (VOA, SVOA)
- Percent moisture determination (0,I)
- Chromatrographs and mass spectrographs (0,)
- Field and laboratory duplicates (0,I)
- DDT/Endrin breakdown (Pest/PCB)
- External standard linearity (Pest/PCB)
- Surrogate retention time shifts (Pest/PCB)
- Analytical sequence (Pest/PCB)
- Standards summary (Pest/PCB)
- Compound identification (Pest/PCB)
- Post digestion spikes (I)
- Method of standard additions (I)
- Serial Dilutions (I)
- Soluble vs. Total Metals (Metals)
- Audits of report forms, notebooks and other data sheets by the QA coordinator
- Scheduled review of performance indicators such as blanks, surrogate recoveries, duplicate analyses, matrix spike analyses and internal standard performance.

- Checks and sign-off of all calculations by a qualified analyst other than the one who performed the original analysis
- Checks on a random selection of calculations by the laboratory QA coordinator
- Review and approval of all data entered into the LIMS by a qualified person other than the one doing the original entry
- Review and approval of final report by a qualified peer reviewer.

Results from the analysis of project and blind audit QC samples will be calculated and evaluated as reported. If these results indicate data quality problems, immediate corrective action will be taken and documented and all data collected since previous QC audits will be carefully reviewed for validity.

1.13.5.3 Independent Validation

Once field and analytical data have been combined, the resulting technical documentation will be evaluated according to the following criteria by an independent validator which includes, but is not limited to:

- Stated objectives of the sampling plan
- Designated data quality objectives
- Analysis date versus the applicable holding times
- Frequency and performance results of QC analysis
- Field and laboratory blank contamination
- Percent recovery of laboratory QC spike samples
- Relative percent differences of laboratory replicate analyses or of field duplicate samples
- Internal standard and surrogate recovery.

In generalized summation, the independent data validator will review all data for:

1) Completeness of analytical data. This criterion, a measure of the amount of valid data obtained from the measurement system(s) compared with the amount that was expected under normal conditions, is expressed as a percentage.

2) Comparability of analytical data. This criteria is simply a check of cited analytical methodology to confirm that it is approved methodology and consistent with that of other analyses - the results of which would be used for data assessment purposes.

3) Accuracy. A comparison of reported values to known values, accuracy will be expressed as a percentage difference between the reference value and the actual value.

4) Precision. This criterion measures the reproducibility of a measurement. Estimates of precision may also include some measurement of dispersion such as standard deviation or range.

5) Representativeness. From a validation perspective and founded upon an approved sampling and analysis plan, representativeness is an evaluation of the data's credibility, based on historical trend or expected values and reasonableness.

1.13.6 Data Report Generation and Report Archiving

Upon successfully completing QA/QC processings, the validated and approved data is released. Data validation documentation as completed Data Review Cover Sheet for Level I or formal, stand-alone Level II report and approval in LIMS is produced and maintained in similar fashion as other data and/or reports. Originals of all analytical data and/or final reports are retained on-site in files and/or are stored on computer disks for a minimum of one year. Thereafter, data and reports will be stored in the Master Records Center.

- Field and Laboratory Data Reporting

All field real-time measurements and observations will be recorded in project log books, field data records, computerized files, or similar types of recordkeeping. Field measurements include pH, temperature, specific conductance, turbidity and possibly flame ionization/photoionization (FID/PID) measurements. All data will be recorded directly and legibly in field logbooks or appropriate forms, and/or in the

LIMS. Logs and/or records will be reviewed and signed off by appropriate supervisory personnel.

Data necessary for calculating percent recoveries will be presented along with the analytical results. The data package section containing QC data will include upper and lower control limits for percent recovery and relative percent difference.

Laboratory data will be cross-referenced to the appropriate trip blank, field blank, method blank, field duplicate, matrix spike, and matrix spike duplicate. Sample identification will be cross-referenced by WVDP sample ID (container designation), location code, vendor lab ID, and date collected.

In addition, all pertinent dates (i.e., dates collected, received by the laboratory, extracted, and analyzed) for each sample applicable to the project will be noted against their respective holding times.

Reporting analytical results on a wet-weight or a dry-weight basis is dictated by factors such as sample matrix, program or regulatory requirements, and objectives of the analysis. analytical results will be reported with the percent moisture or percent solid content of the sample, where applicable.

1.13.7 Data Assessment

After validation, analytical data will be examined to determine if project activities and/or waste management units are having a significant effect upon the environment. For groundwater results with respect for 6 NYCRR, analytical data must be examined to determine "whether background values or concentration limits have been exceeded." With an adequate statistical population of data established, the analytical data will be compared to the NYS groundwater standards where applicable and/or to existing on-site historical data as well as to upgradient vs downgradient information. Response measures for confirmed significant detections may include resampling for expanded analytical parameters, depending on the nature of the increase.

Statistical analysis and trend evaluation will be performed. It is anticipated that "Control Charting" will be used for "Intra-Well" trend analysis. Data evaluation is

further explained in section 1.2 under "Data Quality Objectives." Upon detection of significance, events will be reported based upon the process detailed in Section 1.13.8 below.

1.13.8 Reporting Obligations

Reporting to federal and state agencies will be in accordance with the 3008(h) Administrative Order on Consent. Appendix A (Project Management Plan), fig. A-2, indicates the schedule for RFI reports.

- Chemical Analyses

Chemical analysis reports shall consist of a summary cover sheet or sheets listing purchase order number, release number, charge number per request-for-analysis (RFA), date of receipt, condition upon receipt, general method references, date report issued, and review and approval signatures from the vendor facility.

Additionally, a tabular listing of sample ID, analysis performed, and specific method reference number should follow. For example:

WVDP Sample ID	WVDP Location	Analysis	Method
90-00034	WVW86-12	TOC	SW846, 9060
90-00056	WNW86-12	VOA	SW846, 8240
90-00077	WNW86-12	Nitrate	USEPA 1983, 353.2

This should be followed by a narrative listing any QC problems encountered in the analysis of the samples, together with explanation/resolution of these problems.

Analytical results should then be itemized. Reports for each analysis shall contain the following information (Level 1 Data Reporting):

- Sample ID (WVDP log number)
- Sample location code (WVDP sample name)

- Date of collection
- Date of extraction or digestion (if applicable)
- Sample weight (if applicable)
- Final volume of extract or diluted sample (if applicable)
- Date of analysis
- Method detection limit
- Analytical results in proper units
- Results for duplicates, method blanks, matrix spike and matrix spike duplicates, and surrogate spike amounts and percent recovery (if applicable), from samples analyzed with the same run as the sample
- Comments on any peculiarities concerning analysis of a sample, such as necessary dilutions or matrix interferences

In some instances, supplemental information necessary for WVDP validation of data for RCRA purposes will be specially requested from the vendor (Level 2 Data Reporting). Level 2 shall include all the above information, plus:

- Instrument detection limits
- Calibration that describes or coefficient of the linear equation that describes the calibration curve
- Correlation coefficient of the linear calibration
- Concentration/response data (or relative response data) of the calibration check standards, along with dates on which they were analytically determined
- Results of column chromatography check, with the chromatogram
- All chromatograms for reported results, properly labeled with sample ID, method ID, identification of retention of analyte on the chromatogram, retention time of analyte, amount injected, and area of appropriate calculation of detection response
- Spectra of standards generated from authentic standards (one for each report for each compound detected)
- Spectra of analytes from actual analyses
- Spectrometer identifier
- Metal interference check sample results
- Results of standard additions

- Results of serial dilutions
- ICP interelement correction factors and ICP linear ranges
- Percent solids
- Calculations
- Cleanup procedures
- Data validation procedures and the laboratory-completed data validation checklist
- Documentation illustrating how blank water is determined to be analyte-free.

In all instances, chain-of-custody documentation must be enclosed, confirming unbroken chain-of-custody.

All results shall be sent in full via hard copy, unless a disk or electronic format is requested. In the case of priority or emergency analyses, results may be faxed immediately to WVDP with backup hardcopy following.

Disk or electronic transmission: If requested, the vendor will supply data results in an electronic format mutually agreed upon by the customer and the vendor. A properly signed hard copy certifying the results will be required in any case.

Correlation with analysis request: Where possible, all samples sent in a shipment under one analysis request shall be reported together. Reports shall cite the sample ID (WVDP log number) in all analyses in order to trace sample analyses and ensure completion of all requested analyses.

Quality Control

Internal quality control samples shall be run by the analytical laboratory at frequencies as recommended in relevant method references, and their results and acceptance criteria reported as contractually required.

If results indicate an inadequate analysis, corrective measures must be taken, including correcting the problem and reanalyzing the samples, if necessary and

available. The QC narrative section of the report should discuss any analytical problems and report on the specific impact to WVDP samples.

Dilutions

If dilutions are necessary in order to get all results from multi-component analyses within the calibration range of the instrument (e.g. volatiles), the data report will not compromise the detection limits and data reports will contain results from all runs. When dilutions are necessary, a known standard or matrix spike should be diluted similarly to serve as a control. Dilutions that compromise the method detection limits for that sample shall be authorized.

1.14 QUALITY ASSURANCE

Quality Assurance requirements for groundwater monitoring are mandated by the EPA. The WVDP QA program is based primarily on ANSI/ASME NQA-1 1989, its supplements, DOE-ID Order 57.006C, the NYSDEC RCRA Quality Assurance Project Guidance, and upon the USEPA QAMS-005/80 (EPA-600-83-004), Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans.

Nonroutine analyses (nonstandard counting geometries, small sample size, unusual media) are subject to this program to the maximum practicable extent. In such cases, deviations from the established QA program are documented, and the data to which the exceptions apply are noted.

Through several avenues that include routine reviews, quarterly internal appraisals, and external audits that include the U.S., DOE, and NRC, the work performed by the on-site Environmental Laboratory is regularly reviewed for accuracy, compliance with applicable regulations, proper record keeping and reporting, timely calibration of equipment, training and proficiency of personnel, adherence to accepted procedures, and general laboratory safety.

Additionally, the Environmental Laboratory participates in several quality assurance crosscheck programs administered by federal agencies. Outside laboratories contracted to perform analyses for the WVDP are regularly subjected to performance audits.

Off-site non-WVDP laboratory contracts require that data be reviewed and signed-off by a cognizant manager and laboratory QA/QC officer. The contracts also require a narrative addressing any peculiarities in the analysis of a sample, including problems, corrective actions, and specific impacts to WVDP sample results.

Responsibility for review of data generated at the WVDP is designated by the Environmental Laboratory Manager, and includes only persons qualified to perform the analyses being reviewed. Any problems with the analysis of a sample are recorded on the bench log, including corrective actions taken and reanalyses performed. Quality control records for all analyses are reviewed monthly by the laboratory QA Coordinator and reported to management in summary form.

1.14.1 Internal Quality Assurance Checks

Internal quality assurance procedures ensure the consistency and continuity of data. If required, external quality assurance procedures (interlaboratory checks) are carried out to assess the accuracy of the data generated. Internal quality assurance procedures include QC checks and generally include:

- Instrument performance checks
- Instrument Calibration
- Documentation of the traceability of instrument standards, samples, and data
- Documentation of analytical methodology (QA/QC methodology including spiked samples, duplicate samples, split samples, and use of reference blanks and check standards for method accuracy and precision)
- Documentation of sample preservation, storage, and transport.

Internal quality assurance checks will be the responsibility of the laboratory. Specific QA/QC instructions relevant to the standard analytical method listed in SW846 or NYSDOH ELAP will be used. At a minimum the program will use the following internal quality control: Where applicable the generic quality control checks stipulated in Appendix J of NYSDEC's "RCRA Quality Assurance Project Plan Guidance" will be used as guidance for nonstandard analytical methods. Data and reports submitted by the laboratory will be reviewed and maintained in the project files.

1.14.2 Frequency of Quality Control Checks

The frequency of quality control checks is based on the type of analysis. These checks will be carried out in accordance with the requirements mandated by the agency for the contract laboratory program and in accordance with NYSDOH or SW846 methods.

1.14.3 Types of Quality Control Checks

Standard analytical QC includes, but is not limited to, the items discussed in the subsections that follow. (See section 1.8.1.2 for a discussion of trip and field blank requirements).

1.14.4 Field Duplicate Samples

Duplicate samples are collected from the same sampling location at the same time. This provides a check of sampling equipment and technique for precision.

1.14.5 Laboratory Split Samples

A representative sub-sample from the collected sample is removed in the laboratory and both are analyzed for the parameters of interest. To accomplish an effective split, the original sample must be basically homogeneous.

1.14.6 Spiked Sample

Known amounts of a particular constituent are added to an actual sample or to blanks at concentrations at which the accuracy of the test method is satisfactory. The amount added is coordinated with the laboratory. This method provides a proficiency check for the accuracy of the analytical procedures.

1.15 SURVEILLANCES AND QUALITY ASSURANCE

Surveillances are a key mechanism for ensuring the technical and procedural accuracy of the RCRA investigation program. The two types of surveillance audits are:

- A system surveillance that entails checking the project files to ensure that all required document sign-offs have been made indicating the required QC activities are being performed.

  System surveillances of deliverables, field notebooks, calculations, and data entry are routinely performed as part of the collection and analytical process.

- A performance surveillance conducted by a surveillance team that goes to the field (or office) and actually observes that the proper QC work is being performed.

Surveillances will be performed by a Quality Assurance representative. These surveillances will evaluate the capability and performance of project and contractor personnel, items, activities, and documentation of the measurement system(s). The laboratory shall provide evidence of acceptable audits as described below. Surveillants will identify nonconformances or deficiencies, report and document, and follow up with a compliance review. A report on each surveillance will be made to the manager of WVNS RFI Manager who will disseminate the findings to the appropriate personnel.

1.15.1 Non-Laboratory Procedures

1.15.1.1 Performance Audits

During field activities, an unannounced audit investigating conformance with QA/QC procedures may be scheduled at the discretion of the Quality Assurance group to oversee as many different field activities as possible. The auditor(s) will compare current field practices with standard procedures and the procedures identified in this DCQAP. This audit will be conducted by the WVDP quality assurance representative. A written audit report on the results will be generated.

Nonconformances not identified as findings in the audit report will be documented these findings will be forwarded to the WVNS RFI Manager.

1.15.1.2 Systems Audit

Systems audits will be scheduled during field work and report preparation for this investigation in order to:

- Verify that a system of quality control measures, procedures, reviews and approvals is established for all activities that generate and process environmentally related data
- Verify that a system for project documentation (records, chain-of-custody forms, analytical tags, log books, and work sheets) is established
- Verify documentation of the required quality control reviews, approvals and activity records (log books and work sheets)
- Identify nonconformances with the established system of quality control measures, procedures, reviews, approvals and documentation
- Recommend corrective actions for identified nonconformances
- Verify that corrective actions have been taken
- Provide written reports of audits

The following elements should be evaluated during a field systems audit:

- Overall level of organization and professionalism
- Conformity of activities with the work plan
- Conformity of procedures and analyses with the Data Collection\Quality Assurance Plan (DCQAP)
- Level of activity and sample documentation
- Working order of instruments and equipment
- Level of QA activities and procedures of each field team
- Contingency plans in case of equipment failure or other events preventing the planned activity from proceeding
- Decontamination procedures
- Level of efficiency with which each team conducts planned activities at one site and proceeds to the next
- Sample packaging and shipment
- Effectiveness of system.

After completing the audit any deficiencies are to be discussed with the field staff and corrections identified. If any of these deficiencies could affect the integrity of the samples being collected, the auditor(s) are to inform the field staff immediately so that corrections may be made immediately.

1.15.2 Laboratory Procedures

Performance and system audits of the laboratory will be scheduled and carried out by the QA representative. Performance audits, which are based on the laboratory's ability to properly analyze an unknown reference sample, are done on a semiannual basis. Systems audits are based on-site inspection of the laboratories.

Laboratory Performance Audits

Laboratory performance audits will be conducted on a routine basis and include items such as:

- Verification of written procedures and analyst(s) understanding
- Verification and documentation of procedures and documents
- Periodic inspection of the sample handling group
- Periodic inspection of the analytical process recordkeeping
- Review of a portion (usually 10%) of all analytical data and calculations.

Corrective action will be taken for any deficiencies noted during the audit.

Laboratory Systems Audits

Laboratory systems audits are qualitative audits of the measurements systems that ensure that the systems are properly maintained and used. In the event that a major defect is discovered as a result of one of these audits, a followup inspection will be conducted after sufficient time has passed for correction of the deficiency, or evidence of correction of the deficiency may be presented by the laboratory. These audits will take place on a regularly scheduled basis and include review of:

- Analytical and support instrumentation maintenance logs
- Analytical and support instrumentation calibration logs
- Refrigerator and freezer temperature records
- Distilled/deionized water supply records
- Sample tracking system
- Reagent tracking system
- Reagent chemical log-in, tracking, and disposal.

Laboratory records and procedures also will be inspected for completeness, accuracy, precision, and adherence to prescribed methods. This inspection will include:

- Following the sample chain-of-custody from time of sample receipt through all analysis steps to data reduction, validation, and report generation
- Examination of maintenance and calibration logbooks to ensure that maintenance and calibration are performed on a scheduled basis
- Examination of procedures and records for data calculation, transfer and validation
- Spot-check of calibration, QC, and sample data from selected instruments for selected days to ensure acceptable precision, accuracy, and completeness
- Inspection of storage areas, glassware preparation areas, and distilled/deionized water system records and procedures
- Examination of QA procedures and records (standard and spike solution logbooks and storage areas, control charts, QA manuals).

1.15.3 Corrective Action

Specific procedures for addressing nonconformances and checking and correcting uncontrolled situations are detailed in section 1.18.

1.16 PREVENTIVE MAINTENANCE

1.16.1 Master Equipment Control Record

An inventory control system including all equipment and instrumentation is maintained by the cognizant manager as the basis for maintenance and calibration control. Inventory control documentation includes the following:

- Description of item
- Manufacturer, model number, and serial number
- Identification number
- Name, address, and telephone number of company that services item
- Type of service policy
- Time and frequency of routine maintenance, servicing, and calibration.

1.16.2 General Equipment Maintenance, Repair, and Calibration

Standard procedures for equipment maintenance, repair, and calibration for all instrumentation and equipment are maintained. Individual maintenance, repair, and calibrations are also noted in the appropriate instrumentation section, as listed in section 1.11.

1.16.3 Critical Spare Parts and Equipment Identified for this Program

The specific field equipment to be used at this site includes the following:

- Organic vapor analyzer
- Radiation meters
- pH meter
- Specific conductivity meter
- Turbidity meter
- Thermometer

No spare parts are expected to be necessary for the equipment used in this project. The on-site coordinator keeping the field notebook will be responsible for recording any maintenance of the equipment during field activities.

1.17 SPECIFIC ROUTINE PROCEDURES TO BE USED TO ASSESS DATA PRECISION, ACCURACY, AND COMPLETENESS OF SPECIFIC MEASUREMENT PARAMETERS

1.17.1 Overview

The reliability and credibility of analytical laboratory results will be established by including a program of scheduled duplicate analyses and analyses of standard or spiked samples. These external quality control checks will be an integral part of the sampling and analysis plan.

Regularly scheduled analyses and assessment of known duplicates, standards, and spiked samples are a routine aspect of sampling and analysis, data reduction, validation, and reporting procedures. Samples will be analyzed by the WVDP Environmental Laboratory or by a subcontractor laboratory, if necessary. Analytical data from the laboratories will be assessed for accuracy, precision, and completeness in accordance with the respective standard procedures. Procedures that may be used to assess data produced by the subcontractor laboratories are described below.

The specific analytical procedures to be used by the laboratory are provided in Table B-15 and are discussed in section 1.12. Data reduction, validation, and reporting are discussed in section 1.13.

1.17.2 Laboratory Assessment Procedures

The reliability and credibility of analytical laboratory results will be established by including a program of scheduled replicate analyses, analyses of standard or spiked samples, and the cooperative analyses of split samples by several laboratories. These external quality control checks will be an integral part of the sampling and analytical plan.

Scope and Application

The typical procedures described herein are designed to evaluate data precision and accuracy for each analytical method and analysis. To ensure that reliable data continue to be produced, systematic checks must show that test results remain reproducible and that the methodology is actually measuring the quantity in each sample. Quality assurance must begin with sample collection and not end until the resulting data have been reported.

Statistical Evaluation of Quality

Formulas for calculating precision and accuracy:

- Precision

$$\text{Relative Percent Difference (RPD)} = \frac{V_1 - V_2}{[(V_1 + V_2)/2]} \times 100$$

V1 and V2 are obtained by analyzing duplicate samples.

- Accuracy:

Percent recovery upon spiking is good indication of accuracy:

$$\text{Percent Recovery} = \frac{S_s - s}{S_o} \times 100$$

where

s = Background concentration of unspiked sample,

S_o = Concentration of spike added to sample, and

S_s = Measured concentration of spiked sample

Quality Assurance Procedures

- Duplicate Samples

A minimum of 10% of the samples submitted to the laboratory will be analyzed as laboratory splits. The selection of samples for duplicate sample analyses will be

dependent on the homogeneity of the sample and the ability to obtain a representative split. The split will occur at the analyzing laboratory as noted in section 1.14.

- Standard Quality Assurance Samples

A selected number of the sample parameters analyzed will require submitting a standard quality assurance sample for that parameter. This sample will receive a log number and fictitious identification and will be submitted as a bona fide client sample.

- Standard Curve Validation

Before samples are analyzed, instruments are calibrated as outlined by analysis-specific directions given in SW-846 (or other appropriate references). In general, calibration standards are certified or traceable to NIST, and the range covered by the standards should encompass the range of sample values likely to be measured. In most instances, new standard curves must be established with each new group of samples and a continuing calibration check conducted periodically during sample analysis, usually after a specific number of samples have been analyzed.

Quality Control Charts

When an out-of-control situation occurs, analyses will be stopped until the problem has been identified and resolved, after which the frequency should be increased for the next few percent recovery QC checks. The problem and its solution will be documented, and analyses done since the last in-control point should be repeated or discarded.

Analyses and Reporting of Results of Quality Assurance Samples

Quality assurance data and reports received from the laboratory will be reviewed and maintained in the project files.

1.18 CORRECTIVE ACTION

1.18.1 Overview

Corrective action will be initiated by the quality assurance representative designee after identifying a nonconformance. The Environmental Laboratory manager ensures that corrective action is initiated. The QA representative will evaluate the corrective action to determine if it has in fact corrected the nonconformance.

1.18.2 Non-Laboratory Activities

All technical staff are responsible for reporting all suspected technical nonconformances of any issued deliverable or document by initiating a nonconformance report. All staff are responsible for reporting all suspected quality assurance nonconformances by initiating a nonconformance report.

The QA representative is responsible for ensuring that corrective actions for nonconformances have been taken by:

- Evaluating all reported nonconformances
- Controlling additional work on nonconforming items
- Determining disposition or action to be taken
- Maintaining a log of nonconformances
- Reviewing nonconformance reports
- Evaluating disposition or action taken
- Ensuring nonconformance reports are included in the final site documentation in document control.

The WVNS RFI Manager ensures that no additional work dependent on the nonconforming activity is performed until the nonconforming event report is corrected.

Also, the WVNS RFI Manager will be responsible for carrying out corrective action. The quality assurance representative will be responsible for determining that the corrective action has indeed been taken and that it adequately addresses the nonconformance.

1.18.3 Laboratory Activities

1.18.3.1 Quality Control Charts

Control charts, used to monitor the day-to-day variations in the precision or accuracy of routine analyses, can indicate trends in these variations. Construction of a control chart requires an initial data base to establish the mean and standard deviation of measurements. The data base will consist of measurements obtained from performing the complete analytical method. Data falling outside the upper control limit or the lower control limit of either of these charts indicates an "out-of-control" situation, as follows.

a. Precision

Most frequently, precision is monitored on a range control chart. This chart is most frequently constructed (assuming a series of duplicate measurements) by obtaining the average value of the range for such measurements, and plotting this value as the central line. The lower control limit is the x axis of the plot (as the range cannot be less than zero). The upper warning limit for the range for any duplicate measurement is the established average value of the range multiplied by 2.512. The upper control limit for the range for any duplicate measurement is the established average value of the range multiplied by 3.267. Duplicates are assessed using these precision control charts.

b. Accuracy

Mean and standard deviations are calculated as described above. The upper control limit (UCL) and lower control limit (LCL) will be established at three times the standard deviation (3s) above and below the central line, respectively. An upper warning limit (UWL) and lower warning limit (LWL) are established at 2 times the standard deviations. If the majority of values fall within the bounds of the UCL and LCL, the process is considered in control. Values consistently falling outside this area indicate an out-of-control situation requiring corrective action. Except for the data obtained from standard samples, no data may be discarded unless sufficient reason can be cited

to justify the discarding process. That a point is beyond control limits is not sufficient justification to discard the point. An out-of-control situation may be indicated by:

1. A value outside the control limits.
2. A series of three points outside the warning limits.
3. A series of seven successive points on the same side of central line.

An out-of-control analysis will cause the analytical results after that result to be rejected and the following actions, if appropriate to the analysis, may be taken:

1. Check the instrument calibration record and standard samples used for calibration.

2. Check all calculations for mathematical accuracy.

3. If necessary have the instrument recalibrated and rechecked with QC performance standards.

4. If the instrument is operating satisfactorily, repeat analyses of samples, duplicates, and spikes done since the last in-control point.

5. If one instrument is not operating satisfactorily, label it "out-of-order" and have it repaired before checking and reanalyzing samples.

6. Ensure that no instrument is returned to operational status until check analyses indicate an "in control" situation.

7. Document fully all results of checks and remedial action.

Actions to be taken in case of an "out-of-control" result are frequently analysis-specific and outlined in SW-846 or EM methods for that analysis. In this case, accepted procedure will take precedence over the actions listed above.

1.19 QUALITY ASSURANCE REPORTS

The proper maintenance of quality assurance records is essential to provide data of sufficient quality. These quality assurance records will contain documentation of identification, evaluation, and corrective actions.

The procedures for storage and retrieval of quality assurance records will be the responsibility of the QA representative. The quality assurance representative will also be responsible for forwarding the quality assurance records to the Master Records Center.

The original quality assurance records will be kept in the QA representative's files. A quality assurance files index will be included in the quality assurance records. All quality assurance information received from outside sources (i.e., laboratory QA/QC reports) will be revised by the group using the data and will be retained with the original data.

Original quality assurance records developed through system audits required by the QA representative will be forwarded to the Master Records Center as part of site records.

Upon completion of the RCRA Facility Investigations, all working files will be processed per Appendix C. All quality assurance records will be archived.

TABLE B-1

1991 AND 1992 GROUNDWATER MONITORING PARAMETERS

Indicator Parameters

pH	(N/A)	Specific Conductance*	(1μmho/cm at 25°C)
N.P.O.C	(1000 μg/L)	Total Organic Halogens	(5 μg/L)
Tritium	(μCi/L)	VOAs (per Appendix IX)	(see Table B-1A)
Gross Alpha	(μCi/L)		
Gross Beta	(μCi/L)		

Groundwater Quality Parameters

Chloride (1000 μg/L)	Iron (30 μg/L)
Manganese (10 μg/L)	Phenols (10 μg/L)
Sodium (100 μg/L)	Sulfate (1000 μg/L)
Nitrate/Nitrite (50 μg/L)	Ammonia (50 μg/L)
Potassium (100 μg/L)	Bicarbonate/carbonate
Calcium (100 μg/L)	
Magnesium (100 μg/L)	Redox potential**

EPA Interim Primary Drinking Water Parameters (40 CFR 265, Appendix III)***

Arsenic (2 μg/L)	Barium (50 μg/L)
Cadmium (2 μg/L)	Chromium (10 μg/L)
Fluoride (100 μg/L)	Lead (2 μg/L)
Mercury (0.2 μg/L)	Selenium (2 μg/L)
Silver (3 μg/L)	Endrin (0.1 μg/L)
Lindane (0.1 μg/L)	Methoxychlor (3.5 μg/L)
Toxaphene (1 μg/L)	2, 4 D (1 μg/L)
2, 4, 5-TP Silvex (0.1 μg/L)	Radium ($2x10^{-9}$ μCi/mL)
Turbidity* (NTU)	Nitrate/Nitrite (50 μg/L)

* Analyze in field.
** The analysis of this parameter is currently under discussion.
*** Coliform not included.

Note: Under the 1991, 1992, and 1993 Groundwater monitoring program, indicator parameters are sampled and analyzed eight times per year. Groundwater quality parameters are typically analyzed twice per year and drinking water parameters once per year. Additional drinking water analyses were performed in 1991 and early 1992 in accordance with the previous RFI Work Plan. In addition, detection limits or practical quantitation limits (in brackets) are matrix dependent and may not always be achievable.

TABLE B-2

[1]EXPANDED GROUNDWATER PARAMETER LIST AND EXPECTED DETECTION LIMITS

Common Name	WATER (ug/kg)
VOLATILES[2]	
1,1,1,2-Tetrachloroethane	5
1,1,1-Trichloroethane	5
1,1,2,2-Tetrachloroethane	5
1,1,2-Trichloroethane	5
1,1-Dichloroethane	5
1,1-Dichloroethylene	5
1,2,3-Trichloropropane	5
1,2-Dibromoethane	5
1,2-Dichloroethane	5
1,2-Dichloropropane	5
1,4,-Dioxane	3.5
2-Hexanone	50
4-Methyl-2-pentanone	50
Acetone	50
Acetonitrile	-
Acrolein	5
Acrylonitrile	5
Allyl chloride	5
Benzene	0.7
Bromodichloromethane	50
Bromoform	50
Carbon disulfide	-
Carbon tetrachloride	5
Chlorobenzene	5
Chloroethane	5
Chloroform	7
Chloroprene	5
DBCP	5
Dibromochloromethane	5
Dichlorodifluoromethane	5
Ethyl benzene	5
Ethyl methacrylate	-
Isobutyl alcohol	-
Methacrylonitrile	5
Methyl bromide	-
Methyl chloride	5

[1] Specific quantitation limits are highly matrix dependent and may not always be achievable.

[2] Detection limits for volatile compounds are applicable for April 1994 expanded groundwater monitoring event only.

TABLE B-2 (Continued)

EXPANDED GROUNDWATER PARAMETER LIST AND EXPECTED DETECTION LIMITS

Common Name	WATER (ug/L)
Methyl ethyl ketone	-
Methyl iodide	5
Methyl methacrylate	50
Methylene bromide	-
Methylene chloride	5
Pentachloroethane	5
[3] 2-Picoline	-
Propionitrile	-
[3] Pyridine	50
Styrene	5
Tetrachloroethylene	5
Toluene	5
Vinyl acetate	-
Vinyl chloride	2.0
Xylene (total)	5
cis-1,3-Dichloropropene	5
trans-1,2-Dichloroethylene	5
trans-1,3-Dichloropropene	5
trans-1,4-Dichloro-2-butene	5
Trichloroethylene	5
Trichlorofluoromethane	5
1,2-Dichloroethylene (Total)	5
PESTICIDES AND PCBS	
2,4,5-T	2
2,4-D	10
4,4-DDD	0.10
4,4-DDE	0.10
4,4-DDT	0.10
Aldrin	0.05
alpha Chlordane	0.5
gamma Chlordane	0.5
Chlordane (Total)	0.5
Dieldrin	0.10
Dinoseb	10
Disulfoton	10
Endosulfan I	0.10
Endosulfan II	0.10

[3] These compounds may be analyzed by either volatile or semi-volatile methods. Compounds shall be reported as semi-volatiles if analyzed as a semi-volatile or in conjunction with volatile analysis.

TABLE B-2 (Continued)

EXPANDED GROUNDWATER PARAMETER LIST AND EXPECTED DETECTION LIMITS

Common Name	WATER (ug/L)
Endosulfan sulfate	0.10
Endrin	0.10
Endrin aldehyde	0.20
Hepatachlor	0.05
Hepatachlor epoxide	0.05
Methoxychlor	0.5
Methyl parathion	10
PCB-1242	0.5
PCB-1254	1
PCB-1221	0.5
PCB-1232	0.5
PCB-1248	0.5
PCB-1260	1
PCB-1016	0.5
Phorate	10
Silvex	2
Toxaphene	1
alpha-BHC	0.05
beta-BHC	0.05
delta-BHC	0.05
gamma-BHC (Lindane)	0.05
METALS	
Antimony	60
Arsenic	10
Barium	200
Beryllium	5
Cadmium	5
Chromium	10
Cobalt	50
Copper	25
Lead	3
Mercury	0.2
Nickel	40
Selenium	5
Silver	10
Thallium	10
Tin	3000
Vanadium	50
Zinc	20

TABLE B-2 (Continued)

EXPANDED GROUNDWATER PARAMETER LIST AND EXPECTED DETECTION LIMITS

Common Name	WATER (ug/L)
ACID, BASE NEUTRAL COMPOUNDS	
1,2,4,5-Tetrachlorobenzene	10
1,2,4-Trichlorobenzene	10
1,4-Naphthoquinone	10
1-Naphthylamine	10
2,2'-oxybis(1-Chloropropane)	10
2,3,4,6-Tetrachlorophenol	10
2,4,5-Trichlorophenol	25
2,4,6-Trichlorophenol	10
2,4-Dichlorophenol	10
2,4-Dimethylphenol	10
2,4-Dinitrophenol	50
2,4-Dinitrotoluene	10
2,6-Dichlorophenol	10
2,6-Dinitrotoluene	10
2-Acetylaminofluorene	10
2-Chloronaphthalene	10
2-Chlorphenol	10
2-Methylnaphthalene	10
2-Naphthylamine	10
3,3-Dichlorobenzidine	10
3,3-Dimethylbenzidine	10
3-Methylcholanthrene	10
4,6-Dinitro-o-cresol	50
4-Aminobiphenyl	10
4-Bromophenyl phenyl ether	10
4-Chlorophenyl phenyl ether	10
4-Nitroquinoline 1-oxide	10
5-Nitro-o-toluidine	10
7,12-Dimethylbenz[a]anthracene	10
Acenaphthene	10
Acenaphthylene	10
Acetophenone	10
Aniline	10
Anthracene	10
Aramite	10
Benzo[a]anthracene	10
Benzo[a]pyrene	10
Benzo[b]fluoranthene	10
Benzo[ghi]perylene	10
Benzo[k]fluoranthene	10
Benzyl alcohol	10
Bis(2-chlorethyl)ether	10
Bis(2-chloroethoxy)methane	10

TABLE B-2 (Continued)

EXPANDED GROUNDWATER PARAMETER LIST AND EXPECTED DETECTION LIMITS

Common Name	WATER (ug/L)
Bis(2-ethylhexyl)phthalate	10
Bis(2-chloro-1-methlethyl)ether	10
Butyl benzyl phthalate	10
Carbazole	10
Chlorobenzilate	10
Chrysene	10
Di-n-butyl phthalate	10
Di-n-octyl phthalate	10
Diallate	10
Dibenz[a,h]anthracene	10
Dibenzofuran	10
Diethyl phthalate	10
Dimethoate	10
Dimethyl phthalate	10
Diphenylamine	10
Ethyl methanesulfonate	10
Famphur	10
Fluoranthene	10
Fluorene	10
Hexachlorobenzene	10
Hexachlorobutadiene	10
Hexachlorocyclopentadiene	10
Hexachloroethane	10
Hexachlorophene	10
Hexachloropropene	10
Indeno(1,2,3,-cd)pyrene	10
Isodrin	10
Isophorone	10
Isosafrole	10
Kepone	10
Methapyrilene	10
Methyl methanesulfonate	10
N-Nitrosodi-n-butylamine	10
N-Nitrosodiethylamine	10
N-Nitrosodimethylamine	10
N-Nitrosodipropylamine	10
N-Nitrosodiphenylamine	10
N-Nitrosomethylethylamine	10
N-Nitrosomorpholine	10
N-Nitrosopiperidine	10
N-Nitrosopyrrolidine	10
Naphthalene	10
Nitrobenzene	10
O,O,O-Triethyl phosphorothioate	10

TABLE B-2 (Continued)

EXPANDED GROUNDWATER PARAMETER LIST AND EXPECTED DETECTION LIMITS

Common Name	WATER (ug/L)
O,O-Diethyl O-2-pyrazinyl-phosphorothioate	10
p-(Dimethylamino)azobenzene	10
p-Chloroaniline	10
p-Chloro-m-cresol	10
p-Cresol	10
p-Dichlorobenzene	10
p-Nitroaniline	50
p-Nitrophenol	50
p-Phenylenediamine	10
Parathion	10
Pentachlorobenzene	10
Pentachloronitrobenzene	10
Pentachlorophenol	50
Phenacetin	10
Phenanthrene	10
Phenol	10
Pronamide	10
Pyrene	10
Safrole	10
Tetraethyl dithiopyrophosphate	10
alpha,alpha-Dimethylphenethylamine	10
m-Cresol	10
m-Dichlorobenzene	10
m-Dinitrobenzene	10
m-Nitroaniline	50
o-Cresol	10
o-Dichlorobenzene	10
o-Nitroaniline	50
o-Nitrophenol	10
o-Toluidine	10
sym-Trinitrobenzene	10
Cyanide	10
Sulfide	1000

INDICATOR PARAMETERS

pH (N/A)	
Specific Conductance*	1μmho/cm at 25°C
N.P.O.C	1000 μg/L
Total Organic Halogens	5 μg/L
Tritium	1 x E^{-7} μC/mL
Gross Alpha	Varies Depending On % Solids
Gross Beta	Varies Depending On % Solids

TABLE B-2 (Continued)

EXPANDED GROUNDWATER PARAMETER LIST AND EXPECTED DETECTION LIMITS

Common Name	WATER (ug/L)
INDICATOR PARAMETERS (Cont'd)	
VOAs (per Appendix IX)	(see detection limits above)
Tributyl Phosphate	10 μg/L
N-Dodecane	Not Yet Established
GROUNDWATER QUALITY PARAMETERS	
Aluminum	200
Chloride	1000
Iron	100
Manganese	15
Sodium	5000
Sulfate	1000
Nitrate/Nitrite	50
Ammonia	50
Potassium	5000
Alkalinity	1000
Magnesium	5000
Silica	Not Yet Established
Phosphorous as P (Total)	50
Sulfide	1000

TABLE B-3

WATER AND SOIL SAMPLE PARAMETERS LIST AND QUANTITATION LIMITS

Target Compound List (TCL)
From the USEPA Contract Laboratory Program

VOLATILES AND SEMIVOLATILES*1		
Compounds	Water µg/L	Soil µg/Kg
Acenaphthene	10	330
Acenaphthylene	10	330
Acetone	10	10
Anthracene	10	330
Benzo (a) anthracene	10	330
Benzo (a) pyrene	10	330
Benzene	10	10
Benzo (b) fluoranthene	10	330
Benzo (ghi) perylene	10	330
Benzo (k) fluoranthene	10	330
Bis (2-chloroethoxy) methane	10	330
Bis (2-chloroethyl) ether	10	330
Bis (2-chloroisopropyl) ether	10	330
Bis (2-ethylhexyl) phthalate	10	330
Bromoform	10	10
Bromodichloromethane	10	10
Bromomethane	10	10
4-Bromophenyl phenyl ether	10	330
2-Butanone	10	10
Butyl benzyl phthalate	10	330
Carbazole	10	330
Carbon disulfide	10	10
Carbon tetrachloride	10	10

TABLE B-3

WATER AND SOIL SAMPLE PARAMETERS LIST AND QUANTITATION LIMITS

Compounds	Water µg/L	Soil µg/Kg
4-Chloro-3-methyl phenol (P-Chloro-m-cresol)	10	330
4-Chloroaniline	10	330
Chlorobenzene	10	10
Chloroethane	10	10
Chloromethane	10	10
Chlorodibromomethane	10	10
Chloroform	10	10
2-Chloronaphthalene	10	330
2-Chlorophenol	10	330
4-Chlorophenyl phenyl ether	10	330
Chrysene	10	330
Di-n-butyl phthalate	10	330
Di-n-octyl phthalate	10	330
Dibenz (a,h) anthracene	10	330
Dibenzofuran	10	330
1,2-Dichlorobenzene	10	330
1,3-Dichlorobenzene	10	330
1,4-Dichlorobenzene	10	330
3,3'-Dichlorobenzidine	10	330
1,1-Dichloroethane	10	10
1,2-Dichloroethane	10	10
1,1-Dichloroethylene	10	10
1,2-Dichloroethylene (total)	10	10
2,4-Dichlorophenol	10	330
1,2-Dichloropropane	10	10
Cis-1,3-Dichloropropylene	10	10

TABLE B-3

WATER AND SOIL SAMPLE PARAMETERS LIST AND QUANTITATION LIMITS

Compounds	Water µg/L	Soil µg/Kg
Trans-1,3-Dichloropropylene	10	10
Diethyl phthalate	10	330
Dimethyl phthalate	10	330
2,4-dimethylphenol	10	330
4,6-Dinitro-2-methylphenol	25	800
2,4-Dinitrophenol	25	800
2,4-Dinitrotoluene	10	330
2,6-Dinitrotoluene	10	330
Ethylbenzene	10	10
Fluoranthene	10	330
Fluorene	10	330
Hexachlorobenzene	10	330
Hexachlorobutadiene	10	330
Hexachlorocyclopentadiene	10	330
Hexachloroethane	10	330
2-Hexanone	10	10
Indeno (1,2,3-cd) pyrene	10	330
Isophorone	10	330
Methylene chloride	10	10
4-Methyl-2-pentanone	10	10
2-Methylnaphthalene	10	330
2-Methylphenol	10	330
4-Methylphenol	10	330
Naphthalene	10	330
N-Nitrosodiphenylamine	10	330
N-Nitroso-di-n-propylamine	10	330

TABLE B-3

WATER AND SOIL SAMPLE PARAMETERS LIST AND QUANTITATION LIMITS

Compounds	Water µg/L	Soil µg/Kg
2-Nitroaniline	25	800
3-Nitroaniline	25	800
4-Nitroaniline	25	800
Nitrobenzene	10	330
2-Nitrophenol	10	330
4-Nitrophenol	25	800
Pentachlorophenol	25	800
Phenanthrene	10	330
Phenol	10	330
Pyrene	10	330
Styrene	10	10
1,1,2,2-Tetrachlorethane	10	10
Tetrachloroethene	10	10
Toluene	10	10
Total Xylenes	10	10
1,2,4-Trichlorobenzene	10	330
1,1,1-Trichloroethane	10	10
1,1,2-Trichloroethane	10	10
Trichloroethylene	10	10
2,4,5-Trichlorophenol	25	800
2,4,6-Trichlorophenol	10	330
Vinyl Chloride	10	10

TABLE B-3

WATER AND SOIL SAMPLE PARAMETERS LIST AND QUANTITATION LIMITS

TARGET ANALYTE LIST METALS		
Analytes	Water µg/L	Soil µg/Kg
Aluminum	200	50000
Antimony	60	6000
Arsenic	10	1000
Barium	200	20000
Beryllium	5	500
Cadmium	5	500
Calcium	5000	50000
Chromium	10	1000
Cobalt	50	5000
Copper	25	2500
Iron	100	10000
Lead	2	500
Magnesium	5000	500000
Manganese	15	1500
Mercury	0.2	20
Nickel	40	4000
Potassium	5000	500000
Selenium	5	500
Silver	10	1000
Sodium	5000	500000
Thallium	10	1000
Vanadium	50	5000
Zinc	20	2000

*1 The values given in this table are quantitation limits, not absolute detection limits. Specific quantitation limits are highly matrix dependent. The quantitation limits shown are provided for guidance and may not always be achievable.

TABLE B-3

WATER AND SOIL SAMPLE PARAMETERS LIST AND QUANTITATION LIMITS

Indicator Parameters*2	
(From RCRA Facility Guidance Investigation) - Quantitation Limits	
Parameter	Water
Total Organic Carbon (TOC)	1 mg/L
Total Organic Halogen (TOX)	5 μg/L
Total Phenols	5 μg/L
Soil pH	
Total Kjeldahl Nitrogen	0.05 mg/L
*2 Select indicator parameters have been chosen as appropriate parameters for the West Valley Site.	

Special Parameters	
Compound	Water
N-Dodecane	60 μg/L
Tributyl Phosphate	10 μg/L

TABLE B-4
SPECIFICATIONS FOR MONITORING WELLS
(Installed in 1989 - 1990 Program and 1986 Series)

Well ID	Well Pos.	Lith. Unit Screened	Well Depth(ft)	Screen Length(ft)	Bladder Intake Depth(ft)	Well Construction
1. Low-Level Waste Treatment Facilities						
WNWNB1S	B	S	13.0	5	Bailer	SS
WNW0104	U	S	23.0	15	20.2	SS
WNW0116	U	S	11.0	5	Bailer	SS
WNW0305	U	S	31.0	15	31.0	SS
WNW8604	U	S	22.6	15	15.0	PVC
WNW0103	D	S	21.0	15	18.3	SS
WNW0105	D	S	28.0	15	25.0	SS
WNW0106	D	S	14.5	5	Bailer	SS
WNW0111	D	S	11.0	5	10.3	SS
WNW8603	D	S	24.8	15	16.2	PVC
WNW8605	D	S	12.0	5	9.5	PVC
WNW1008C	B	T	18.0	10	17.3	SS
WNW0115	U	T	28.0	10	Bailer	SS
WNW0107	D	T	28.0	20	27.0	SS
WNW0108	D	T	33.0	20	32.3	SS
WNW0109	D	T	33.0	20	32.1	SS
WNW0110	D	T	33.0	20	32.1	SS
WNW0114	D	T	29.0	20	28.5	SS
2. Miscellaneous Small Units						
WNWNB1S	B	S	13.0	5	Bailer	SS
WNW0201	U	S	20.0	10	19.7	SS
WNW0205	D	S	11.0	5	10.6	SS
WNW0203	D	S	18.0	10	17.3	SS
WNW8606	D	S	12.1	5	9.8	PVC
WNW0207	D	S	11.0	5	Bailer	SS
WNW0202	U	T-S	38.0	5	37.3	SS
WNW0204	U	T-S	43.0	5	40.8	SS
WNW0206	C	T-S	37.8	5	37.0	SS
WNW0208	D	T-S	23.0	5	22.2	SS
3. Liquid Waste Treatment System						
WNWNB1S	B	S	13.0	5	Bailer	SS
WNW0301	U	S	16.0	10	Bailer	SS
WNW0305	D	S	31.0	15	30.4	SS
WNW0307	D	S	16.0	10	15.6	SS
WNW0408	D	S	38.0	10	37.2	SS
WNW8609	D	S	24.7	10	21.3	PVC
4. High-Level Waste Storage and Processing						
WNWNB1S	B	S	13.0	5	Bailer	SS
WNW0403	U	S	13.0	5	Bailer	SS
WNW8607	D	S	17.6	5	15.7	PVC
WNW0406	D	S	16.8	5	Bailer	SS
WNW0408	D	S	38.0	10	37.2	SS

Note: All depths are measured from ground surface.

TABLE B-4 (continued)
SPECIFICATIONS FOR MONITORING WELLS
(Installed in 1989 - 1990 Program and 1986 Series)

Well ID	Well Pos.	Lith. Unit Screened	Well Depth(ft)	Screen Length(ft)	Bladder Intake Depth(ft)	Well Construction
WNW8609	D	S	24.7	10	21.3	PVC
WNW0410	U	K	78.0	10	Bailer	SS
WNW0411	U	K	66.0	20	Bailer	SS
WNW0407	D	K	75.5	10	Bailer	SS
5. Maintenance Shop Leach Field						
WNWNB1S	B	S	13.0	5	Bailer	SS
WNW0408	U	S	38.0	10	37.2	SS
WNW0501	U	S	33.0	10	32.3	SS
WNW0104	D	S	23.0	15	20.2	SS
WNW0502	D	S	18.0	10	17.6	SS
WNW0602	D	S	13.0	5	Bailer	SS
WNW8604	D	S	22.6	15	14.7	PVC
6. Low-Level Waste Storage Area						
WNWNB1S	B	S	13.0	5	Bailer	SS
WNW0408	U	S	38.0	10	37.2	SS
WNW0501	U	S	33.0	10	32.3	SS
WNW0406	U	S	16.8	5	Bailer	SS
WNW0603	U	S	13.0	5	Bailer	SS
WNW0604	D	S	11.0	5	10.3	SS
WNW0601	D	S	6.0	2	Bailer	SS
WNW0605	D	S	11.0	5	Bailer	SS
WNW0602	D	S	13.0	5	Bailer	SS
7. CPC Waste Storage Area						
WNWNB1S	B	S	13.0	5	Bailer	SS
WNW0706	U	S	11.0	5	Bailer	SS
WNW0707	D	T	11.0	5	10.6	SS
WNW1008C	B	T	18.0	10	17.3	SS
WNW0702	C	T	38.0	10	Bailer	SS
WNW0705	C	T	21.0	15	18.0	SS
WNW0703	D	T	21.0	10	20.4	SS
WNW0704	D	T	15.5	10	12.2	SS
8. Construction and Demolition Debris Landfill						
WNWNB1S	B	S	13.0	5	Bailer	SS
WNW0601	U	S	6.0	2	Bailer	SS
WNW0801	U	S	17.5	10	15.5	SS
WNW8603	U	S	24.8	15	16.2	PVC
WNGSEEP	D					
WNW0802	D	S	11.0	5	10.1	SS
WNW0803	D	S	18.0	10	16.0	SS
WNW0804	D	S	9.0	5	8.3	SS
WNW8612	D	S	16.6	10	15.2	PVC

Note: All depths are measured from ground surface.

TABLE B-4 (continued)
SPECIFICATIONS FOR MONITORING WELLS
(Installed in 1989 - 1990 Program and 1986 Series)

Well ID	Well Pos.	Lith. Unit Screened	Well Depth(ft)	Screen Length(ft)	Bladder Intake Depth(ft)	Well Construction
9. NRC-Licensed Disposal Area						
WNW1008C	B	WT	18.0	10	17.3	SS
WNW0908	U	WT	21.0	15	Bailer	SS
WNW1005	U	WT	19.0	10	18.3	SS
WNW1006	U	WT	20.0	10	18.9	SS
WNW1007	U	WT	23.0	10	Bailer	SS
WNW0904	D	T	26.0	10	Bailer	SS
WNW0905	D	S	23.0	5	22.3	SS
WNW0906	D	WT	10.0	5	Bailer	SS
WNW0907	D	WT	16.0	10	15.3	SS
WNW0909	D	WT	23.0	15	Bailer	SS
WNW1008B	B	K	51.0	5	51.0	SS
WNW0901	U	K	136.0	15	135.3	SS
WNW0902	U	K	128.0	10	125.7	SS
WNW1001	U	K	116.0	10	113.8	SS
WNW1002	U	K	113.0	15	112.6	SS
WNW1003	U	K	138.0	10	135.8	SS
WNW0903	D	K	133.0	15	130.8	SS
WNW8610	D	K	114.0	15	Bailer	SS*
WNW8611	D	K	120.0	15	Bailer	SS*
WNW1109A	U	WT	17.5	10	17.4	SS
WNW1109B	U	T	32.1	15	31.2	SS
10. RTS Drum Cell						
WNW1008C	B	WT	18.0	10	17.3	SS
WNW1005	U	WT	19.0	10	18.3	SS
WNW1006	D	WT	20.0	10	18.9	SS
WNW1007	D	WT	23.0	10	Bailer	SS
WNW1108A	D	WT	16.0	10	Bailer	SS

Note: All depths are measured from ground surface.

* Wells WNW8610 and WNW8611 have stainless steel screens with galvanized steel risers.

Key

B - Background
U - Upgradient
C - Cross-gradient
D - Downgradient
SS - Stainless Steel
PVC- Poly Vinyl Chloride
S - Sand and gravel unit
WT - Weathered Lavery Till
T - Lavery Till
K - Kent Recessional Sequence

TABLE B-5

PRE-1989 EXISTING WELLS INCLUDED IN MONITORING NETWORK

Well ID	Diameter (in.)	Overall Depth (ft.)	Screen Length (ft.)	Unit Screened	Well Pos.	Sand Pack Length (ft.)
1. Low-Level Waste Treatment Facilities						
B-86-03	4	24.8	15	S	D	18
B-86-04	4	22.6	15	S	U	18
B-86-05	4	12.0	5	S	D	8
2. Misc. Small Units						
B-86-06	4	12.1	5	S	D	8
3. Liquid Waste Treatment System						
B-86-09	4	24.7	10	S	D	13
4. High-Level Waste Storage and Processing						
B-86-07	4	17.6	5	S	D	8
B-86-09	4	24.7	10	S	D	13
5. Maintenance Shop Leach Feild						
B-86-04	4	22.6	15	S	D	18
8. Construction and Demolition Debris Landfill						
B-86-03	4	24.8	15	S	D	18
B-86-12	4	18.1	10	S	D	13
9. NRC-Licensed Disposal Area						
B-86-10	2*	112.3	15	L	D	
B-86-11	2*	118.5	15	L	D	

* Stainless steel screen with galvanized steel riser
S = Surficial Soil Unit; L = Lacustrine-Kame Delta Deposits
D = Downgradient; U = Upgradient

Table B-6

Borehole Hydrostratigraphy and Sampling Strategy Rev. 10/13/93

Location (1)	Bore-hole (2)	Elev. @ Grade (3)	Elev. of Water Table (4)	Elev. Top of Lavery Till (5)	Feet of Fill/ Alluvium (6)	Feet Unsat-urated (7)	Feet Sat-urated (8)	No. of Unsat. Samples (9)	No. of Sat. Samples (10)	Total No. of Samples (11)
Lagoon 5	1	1385	1378	1360	25	07	20	1*	5	6
	2	1384	1375	1365	19	09	12	1*	4	5
Lagoon 4	3	1393	1382	1365	28	11	19	0	4	4
	4	1388	1382	1367	21	06	17	1*	5	6
Lagoon 1	5A	1392	1388	1375	17	04	13	0	4	4
	6E	--	--	--	--	--	--	-	-	-
	7A	1392	1390	1378	14	02	12	0	3	3
Vicinity Lagoon 1	8A	1392	1388	1375	17	04	13	1*	4	5
	9	1392	1386	1380	12	06	08	1*	2	3
	10A	1387	1370	1382	05	17	13	2	3	5
	33A	1380	1358	1379	01	22	13	1	3	4
Solvent Dike	11	1401	1393	1385	16	08	08	1	3	4
	12	1398	1392	1388	10	06	06	1*	2	3
Old Interceptor	13	1400	1393	1380	20	07	15	1*	4	5
	14	1397	1392	1380	17	05	14	1*	3	4

* Denotes one surface sample in the unsaturated zone.
** Denotes one surface sample in a saturated zone.
A - Denotes relocated sample.
E - Denotes sample eliminated from program.

Table B-6

Borehole Hydrostratigraphy and Sampling Strategy

Rev. 10/13/93

Location (1)	Bore-hole (2)	Elev. @ Grade (3)	Elev. of Water Table (4)	Elev. Top of Lavery Till (5)	Feet of Fill/ Alluvium (6)	Feet Unsat-urated (7)	Feet Sat-urated (8)	No. of Unsat. Samples (9)	No. of Sat. Samples (10)	Total No. of Samples (11)
Sludge Ponds	15	1394	1392	1390	04	02	04	1*	2	3
	16	1390	1385	1385	05	05	02	1*	1	2
S & SE Plant	17	1410	1393	1385	25	17	10	0	2	2
	18	1410	1393	1380	30	17	15	0	3	3
	20	1412	1404	1395	17	08	11	0	2	2
Swale W of RR Spur	22	1368	1367	1368	0	01	06	1*	2	3
	23A	1395	-	1385	10	-	-	-	-	3
	24	1388	1384	1388	0	04	10	1*	2	3
CDDL	25	1371	1370	1363	08	01	09	0	2**	2
	26	1366	1365	1350	16	01	17	0	3**	3
	27	1365	1365	1348	17	0	19	0	4**	4
	28	1372	1366	1361	11	06	07	1*	2	3
Lag Storage	29	1390	1384	1368	22	06	18	1	4	5
	30	1387	1379	1370	17	08	11	0	3	3
E & NE Plant	19A	1409	1394	1380	29	15	16	1*	3	4
	21A	1409	1393	1380	29	16	15	1*	3	4

* Denotes one surface sample in the unsaturated zone.
** Denotes one surface sample in a saturated zone.
A - Denotes relocated sample.
E - Denotes sample eliminated from program.

Table B-6

Borehole Hydrostratigraphy and Sampling Strategy

Rev. 10/13/93

Location (1)	Bore-hole (2)	Elev. @ Grade (3)	Elev. of Water Table (4)	Elev. Top of Lavery Till (5)	Feet of Fill/ Alluvium (6)	Feet Unsat-urated (7)	Feet Sat-urated (8)	No. of Unsat. Samples (9)	No. of Sat. Samples (10)	Total No. of Samples (11)
	31	1403	1393	1375	28	10	20	0	4	4
Process Cells	32	1402	1390	1368	34	12	24	1*	6	7
	34	1395	1387	1381	14	08	08	1*	3	4
Leachfield	35	1398	1390	1378	20	08	14	1*	4	5
	36	1402	1388	1370	32	14	20	1*	4	5
	37	1394	1386	1378	16	08	10	1*	3	4
Background North Plateau	38	1412	1405	1403	09	07	30	1*	3	4
Background South Plateau	39	1405	1395	1405	0	10	10	1*	3	4
HLWTs	40	1403	1392	1386	17	11	08	1*	2	3
NDA	41	1387	1365	1387	-	20	0	3*	1	4
	42	1376	1371	1376	-	5	20	2*	3	5
CPCWSA	43	1395	1391	1388	07	04	03	0	1	1

* Denotes one surface sample in the unsaturated zone.
** Denotes one surface sample in a saturated zone.
A - Denotes relocated sample.
E - Denotes sample eliminated from program.

TABLE B-7

ESTIMATED NUMBER OF SAMPLES FOR SOILS PROGRAM

Revised:10/13/93

Location / Borehole #	Total Number of Samples Radiological Parameters		
	Marker-ß List (1)	Alpha List (2)	Norm. List (3)
Lagoon 5:			
BH-1, surface	1	-	-
BH-1, sat	5	-	-
BH-2, surface	1	-	-
BH-2, sat	4	-	-
Lagoon 4:			
BH-3, sat	4	-	-
BH-4, surface	1	-	-
BH-4, sat	5	-	-
Lagoon 1:			
BH-5A, sat	4	4	-
BH-6, Sample eliminated	-	-	-
BH-7A, sat	3	3	-
BH-8A, surface	1	-	-
BH-8A, sat	4	4	-
BH-9, surface	1	-	-
BH-9, sat	2	2	-
BH-10A, unsat	2	-	-
BH-10A, sat	3	3	-
BH-33A, unsat	1	-	-
BH-33A, sat	3	3	-
Solvent Dike:			
BH-11, unsat (Fill)	1	-	-
BH-11, sat (Native)	3	3	-
BH-12, surface	1	-	-
BH-12, sat	2	2	-
Old Interceptor:			
BH-13, surface	1	-	-
BH-13, sat	4	4	-
BH-14, surface	1	-	-
BH-14, sat	3	3	-
Ponds:			
BH-15, surface	1	-	-
BH-15, sat	2	-	-
BH-16, surface	1	-	-
BH-16, sat	1	-	-
S & SE Plant:			
BH-17, sat	2	2	-
BH-18, sat	3	3	-
BH-20, sat	2	2	-

Location / Borehole #	Total Number of Samples Chemical Parameters				
	TCL VOAs	TCL Semi-VOAs	TCL Metals	TCL Pest/PCBs	Kerosene/ TBP
Lagoon 5:					
BH-1, surface	-	-	1	-	-
BH-1, sat	3	3	3	-	-
BH-2, surface	-	-	1	-	-
BH-2, sat	2	2	2	-	-
Lagoon 4:					
BH-3, sat	3	3	3	-	-
BH-4, surface	-	-	1	-	-
BH-4, sat	2	2	2	-	-
Lagoon 1:					
BH-5A, sat	3	3	3	-	-
BH-6, Sample eliminated	-	-	-	-	-
BH-7A, sat	3	3	3	-	-
BH-8A, surface	-	-	1	-	-
BH-8A, sat	3	3	3	-	-
BH-9, surface	-	-	1	-	-
BH-9, sat	1	1	1	-	-
BH-10A, unsat	1	1	1	-	-
BH-10A, sat	3	3	3	-	-
BH-33A, unsat	-	-	1	-	-
BH-33A, sat	3	3	3	-	-
Solvent Dike:					
BH-11, unsat (Fill)	1	-	1	-	1
BH-11, sat (Native)	1	-	1	-	1
BH-12, surface	-	-	1	-	-
BH-12, sat	1	-	1	-	1
Old Interceptor:					
BH-13, surface	-	-	1	-	-
BH-13, sat	2	1	2	-	-
BH-14, surface	-	-	1	-	-
BH-14, sat	2	1	2	-	-
Ponds:					
BH-15, surface	-	-	1	-	-
BH-15, sat	1	-	1	-	-
BH-16, surface	-	-	1	-	-
BH-16, sat	1	-	1	-	-
S & SE Plant:					
BH-17, sat	1	-	1	-	-
BH-18, sat	1	-	1	-	-
BH-20, sat	1	-	1	-	-

TABLE B-7 (Continued)

ESTIMATED NUMBER OF SAMPLES FOR SOILS PROGRAM

Location / Borehole #	Total Number of Samples Radiological Parameters		
	Marker-ß List (1)	Alpha List (2)	Norm. List (3)
RR Spur:			
BH-23A, surface	1	-	-
BH-23A, sat	2	-	-
BH-22, surface	1	-	-
BH-22, sat	2	-	-
BH-24, surface	1	-	-
BH-24, sat	2	-	-
CDDL:			
BH-25, sat (surface)	1	-	-
BH-25, sat	1	-	-
BH-26, sat (surface)	1	-	-
BH-26, sat	2	-	-
BH-27, sat (surface)	1	-	-
BH-27, sat	3	-	-
BH-28, surface	1	-	-
BH-28, sat	2	-	-
Lag. Sto.:			
BH-29, unsat	1	-	-
BH-29, sat	4	-	-
BH-30, sat	3	-	-
E & NE Plant:			
BH-19A, surface	1	-	-
BH-19A, sat	3	3	-
BH-21A, surface	1	-	-
BH-21A, sat	3	3	-
BH-31, sat	4	4	-
Leachfield:			
BH-35, surface	1	-	-
BH-35, sat	4	4	-
BH-36, surface	1	-	-
BH-36, sat	4	4	-
BH-37, surface	1	-	-
BH-37, sat	3	3	-
Process Cells:			
BH-32, surface	1	-	-
BH-32, sat	6	6	-
BH-34, surface	1	-	-
BH-34, sat	3	3	-
HLWTs:			
BH-40, surface	1	-	-
BH-40, sat	2	2	-

Location / Borehole #	Total Number of Samples Chemical Parameters				
	TCL VOAs	TCL Semi-VOAs	TCL Metals	TCL Pest/PCBs	Kerosene/ TBP
RR Spur:					
BH-23A, surface	-	-	1	-	-
BH-23A, sat	1	1	1	-	-
BH-22, surface	-	-	1	-	-
BH-22, sat	1	-	1	-	-
BH-24, surface	-	-	1	-	-
BH-24, sat	1	-	1	-	-
CDDL:					
BH-25, sat (surface)	-	-	1	-	-
BH-25, sat	1	1	1	-	-
BH-26, sat (surface)	-	-	1	-	-
BH-26, sat	2	2	2	-	-
BH-27, sat (surface)	-	-	1	-	-
BH-27, sat	2	2	2	-	-
BH-28, surface	-	-	1	-	-
BH-28, sat	1	1	1	-	-
Lag. Sto.:					
BH-29, unsat	-	-	1	-	-
BH-29, sat	2	-	2	-	-
BH-30, sat	1	-	1	-	-
E & NE Plant:					
BH-19A, surface	-	-	1	-	-
BH-19A, sat	3	1	3	-	-
BH-21A, surface	-	-	1	-	-
BH-21A, sat	3	1	3	-	-
BH-31, sat	2	1	2	-	-
Leachfield:					
BH-35, surface	-	-	1	-	-
BH-35, sat	2	-	2	-	-
BH-36, surface	-	-	1	-	-
BH-36, sat	3	1	3	-	-
BH-37, surface	-	-	1	-	-
BH-37, sat	2	-	2	-	-
Process Cells:					
BH-32, surface	-	-	1	-	-
BH-32, sat	2	1	2	-	-
BH-34, surface	-	-	1	-	-
BH-34, sat	2	-	2	-	-
HLWTs:					
BH-40, surface	-	1	1	-	-
BH-40, sat	2	1	2	-	-

TABLE B-7 (Continued)

ESTIMATED NUMBER OF SAMPLES FOR SOILS PROGRAM

Location / Borehole #	Total Number of Samples Radiological Parameters		
	Marker-ß List (1)	Alpha List (2)	Norm. List (3)
NDA:			
BH-41, surface	3	2	-
BH-41, sat	1	-	-
BH-42, surface	2	2	-
BH-42, sat	3	1	-
CPCWSA:			
BH-43, sat*	1	1	-
Bkgd. Haf., surface (BH-38)	-	1	1
Bkgd. Haf., sat (BH-38)	-	3	3
Bkgd. wtc., surface (BH-39)	-	1	1
Bkgd. wtc., sat (BH-39)	-	3	3
Additional:	-	10	-
Duplicates:	35	25	-
Equip. Blanks:	35	25	-

Location / Borehole #	Total Number of Samples Chemical Parameters				
	TCL VOAs	TCL Semi-VOAs	TCL Metals	TCL Pest/PCBs	Kerosene/ TBP
NDA:					
BH-41, surface	-	-	2	-	-
BH-41, sat	2	2	2	-	-
BH-42, surface	-	-	2	-	-
BH-42, sat	3	3	3	-	3
CPCWSA:					
BH-43, sat*	1	-	1	-	-
Bkgd. Haf., surface (BH-38)	-	-	1	-	-
Bkgd. Haf., sat (BH-38)	3	3	3	3	-
Bkgd. wtc., surface (BH-39)	-	-	1	-	-
Bkgd. wtc., sat (BH-39)	3	3	3	3	3
Additional:	-	-	-	-	-
Duplicates: (5)	35	25	35	1	2
Equip. Blanks: (6)	35	25	35	1	2

NOTES:

1) Marker-ß Parameter List- Sr-90, Gamma Scan, Gross Alpha and Beta
2) Alpha Parmeter List- Am-241, Pu-241, U-238, U Isotopic and Pu Isotopic, Gross Alpha and Beta
3) Norm Parameter List- Ra-226,228, Th-230,232, Gross Alpha And Beta, Total Uranium, Sr-90, Pu-241, Am-241, U Isotopic and Pu Isotopic
4) *-If rad. is not present here there was not a release therefore, there will not be any chemical or rad. analysis
5) These numbers will vary depending on the daily analysis
6) These numbers will vary depending on the daily analysis

TABLE B-7 (Concluded)

ESTIMATED NUMBER OF SAMPLES FOR SOILS PROGRAM

ESTIMATED NUMBER OF SOIL SAMPLES FOR SURFACE SOIL PROGRAM

Location/ Sample ID	*Number of Samples-Radiological*		
	Marker-ß List	*Alpha List*	*Norm. List*
Biased Site-Wide based on Gamma Survey:			
SS-1, SS-2, SS-3 to SS-5 & SS-8, SS-10, SS-11, SS-15, SS-16	10	-	-
Gully Road (SS-12, SS-13, SS-14)	3	-	-
Incinerator-composite (SS-9)	1	-	-
Fire Brigade Training Area (SS-6)	1	-	-
Subcontractor Maint. Area (SS-17)	1	-	-
NDA (SS-20 & SS-21)	2	-	-
Background (SS-7, SS-18, SS-19)	3	-	3
Duplicates:	2	-	1
Equip. Blanks:	1	-	1

Location/ Sample ID	*Number of Samples-Chemical*			
	TCL VOAs	*TCL Semi-VOAs*	*TCL Metals*	*TCL Pest/PCBs*
Biased Site-Wide based on Gamma Survey:				
SS-1, SS-2, SS-3 to SS-5 & SS-8, SS-10, SS-11, SS-15, SS-16	-	10	10	-
Gully Road (SS-12, SS-13, SS-14)	-	3	3	3
Incinerator-composite (SS-9)	-	1	1	-
Fire Brigade Training Area (SS-6)	1	1	1	-
Subcontractor Maint. Area (SS-17)	1	1	1	-
NDA (SS-20 & SS-21)	2	2	2	-
Background (SS-7, SS-18, SS-19)	3	3	3	-
Duplicates:	1	2	2	-
Equip. Blanks:	1	1	1	1

ESTIMATED NUMBER OF SAMPLES FOR SEDIMENT SAMPLING PROGRAM

Location/ Sample ID	*Number of Samples-Radiological*		
	Marker-ß List	*Alpha List*	*Norm. List*
Judgemental:			
ST-1 to ST-29 & ST-31	30	-	-
ST-3, ST-4, ST-7 to ST-11 & ST-19 to ST-23, ST-27 to ST-30	-	17	-
ST-6, ST-18, & ST-26	-	-	3
Sludge Pond:			
ST-35 & ST-36	2	-	-
Leach Field:			
Distribution Box: (ST-32)	1	-	-
Tank/sediment sample (ST-33 & ST-34	1	-	-
CDDL:			
ST-30	1	1	-
ST-38	1	1	-
8D1DR-Ditch:			
ST-37	1	1	-
Duplicates:	4	2	1
Equip. Blanks:	2	1	1

Location/ Sample ID	*Number of Samples-Chemical*			
	TCL VOAs	*TCL Semi-VOAs*	*TCL Metals*	*TCL Pest/PCBs*
Judgemental:				
ST-1 to ST-29 & ST-31	-	-	30	-
ST-3, ST-4, ST-6, ST-7				
ST-11, ST-18, ST-19	-	8	-	-
Sludge Pond:				
ST-35 & ST-36	2	2	2	2
Leach Field:				
Distribution Box: (ST-32)	1	1	1	-
Tank/sediment sample (ST-33 & ST-34)	2	2	2	2
CDDL:				
ST-30	1	1	1	-
ST-38	1	1	1	-
8D1DR-Ditch:				
ST-37	-	1	1	-
Duplicates:	1	2	4	1
Equip. Blanks:	1	1	2	1

TABLE B-8

TOXICITY CHARACTERISTIC LEACHATE PROCEDURE

Analytical Data from PUREX Sludge Wash Solution

IRTS Processed Waste Sample

Trace Metals Analytical Results
Method SW-846

Client: WVNS
Client Reference No.: 19-55443-C-RC/WH3250083/RLS0003
Client Location Code: Not Applicable
Date Collected: August 11, 1992
Client Sample No.: 84698

Lab Sample ID: 2105501
Date Received: October 20, 1992
Date Extracted: October 23, 1992
Matrix: TCLP Extract

Analyte	Date Digested	Date Analyzed	Dilution Factor	Result mg/L	Detection Limit mg/L	Note
Arsenic	10/27/92	10/28/92	10	<0.190	<0.190	
Barium	10/27/92	10/28/92	10	0.762	0.101	
Cadmium	10/27/92	10/28/92	10	<0.020	<0.020	
Chromium	10/27/92	10/28/92	10	0.612	0.020	
Lead	10/27/92	10/28/92	10	<0.120	<0.120	
Mercury	10/26/92	10/26/92	2	<0.0002	<0.0002	
Selenium	10/27/92	10/28/92	10	<0.240	<0.240	
Silver	10/27/92	10/28/92	10	<0.040	<0.040	N

* = The sample matrix duplicate's relative percent difference, RPD, was above the 0 - 20% control limits.
N = The TCLP matrix spike's percent recovery was outside of the 75 - 125% control limits.
E = The ICP serial dilution sample's percent difference was above the 0 - 10% control limits.
B = The analyte was observed in the preparation blank.

TABLE B-9

PUREX HIGH LEVEL WASTE SLUDGE COMPOSITION

Components	Weight (kg) in Sludge	
$Fe(OH)_3$	66,040	
$FePO_4$	6,351	
$Al(OH)_3$	5,852	
MnO_2	4,581	
$CaCO_3$	3,208	
SiO_2	1,263	
$Ni(OH)_2$	938	
$MgCO_3$	826	
AlF_3	659	
$Cu(OH)_2$	376	
$Zr(OH)_4$	159[2]	
$Zn(OH)_2$	128	
$Cr(OH)_3$	146	
$Hg(OH)_3$	23	
Subtotal		**90,550**
Actinides	**Weight (kg)**	
$UO_2(OH)_2$	3,087	
NpO_2	38	
PuO_2	37	
AmO_2	19	
CmO_2	0.1	
Subtotal		**3,181.1**
Fission Products	**Weight (kg)**	
$Zr(OH)_4$	917	
$Nd(OH)_3$	739	
$Ru(OH)_4$	447	
$BaSO_4$	423	
$Ce(OH)_3$	375	
$La(OH)_3$	226	
$Pr(OH)_3$	210	
$SrSO_4$	175	
$Pd(OH)_4$	166	
$Sm(OH)_3$	143	
$Rh(OH)_4$	123	
$Y(OH)_3$	103	
$Sn(OH)_4$	18.8	
$Eu(OH)_3$	15.8	
$Cd(OH)_2$	13.3	
$Gd(OH)_3$	11.2	
$AgOH$	9.7	
$Sb(OH)_3$	3.4	

[2] Excludes fission product zirconium

TABLE B-9 (Continued)

PUREX HIGH LEVEL WASTE SLUDGE SOLIDS CHEMICAL COMPOSITION

$In(OH)_3$	1.1	
$Tb(OH)_3$	0.3	
$Ge(OH)_3$	0.2	
$Dy(OH)_3$	0.2	
$Pm(OH)_3$	0.1	
Subtotal		4,121.1
Grand Total		97,852

TABLE B-10

HAZARDOUS WASTE STORAGE LOCKERS INVENTORY

(November 30, 1992)

CONT-ID	CONTENTS	RCRA WST CODE	KILOGRAMS	DATE OF HAZARDOUS DETERMINATION
RC-915	LIME-SOL (USED)	D002	127.00	09/18/92
X-1249	Cr(VI) WASTE - A&PC LAB	D002/D007	1.30	08/05/92
X-1296A	PCB CAPACITORS	B005	2.27	09/09/92
X-1296B	PCB CAPACITORS	B005	2.27	09/09/92
X-1316 A+B	Pu SCINTILLATION COCKTAIL (UNUSED)	D001	0.10	10/26/92
X-1324	LABORATORY REAGENT	D001/D002	0.09	10/26/92
*X-1362	ARSENIC STANDARD SOLUTION	D002/D004	0.10	10/23/92
*X-1364	CADMIUM STANDARD SOLUTION	D002/D006	0.19	10/23/92
*X-1365	LEAD STANDARD SOLUTION	D002/D008	0.25	10/23/92
*X-1372	SELENIUM STANDARD SOLUTION	D002/D010	0.28	10/23/92
X-1422	ELECTROSTATIC LIQUID DEVELOPER	D001	12.30	08/28/92
X-1431	ACIDIC LAB SOLUTION - TCLP METAL SAA	D004	2.97	09/02/92
X-1443	ELECTROSTATIC LIQUID DEVELOPER	D001	18.77	05/05/92
X-1462	BATTERIES - ALKALINE	D009	16.02	10/16/92
X-1466	ELECTROSTATIC LIQUID DEVELOPER	D001	9.20	10/27/92
X-1489	BATTERIES - CARBON-ZINC	D009	4.47	11/03/92
X-1506	BATTERIES - NICKEL-CADMIUM	D006	8.13	11/03/92
X-774	SODIUM AZIDE	N/A**	0.10	N/A
X-1381	BATTERIES-GLOBE GELCELL	UNDET.***	5.22	N/A
X-1382	BATTERIES	UNDET.***	28.00	N/A
	TOTAL		239.03	

* Materials all contained in overpack container X-1510

** This material is being temporarily contained in the HWSL prior to being recycled. RCRA work code and date of hazardous determination are not applicable (N/A).

*** This material is anticipated to be characterized as a RCRA regulated waste. Prior to the actual determination of the appropriate waste code, via laboratory analysis, the material is being stored in the HWSL.

TABLE B-11

1991-93 LABORATORY SERVICES FOR PROGRAM SAMPLE ANALYSES

1.) WVDP Environmental Laboratory (On-Site)

Limited chemical and radiological analyses

2.) Teledyne (03/91 - Present)

Full radiological analysis

3.) Ecoteck LSI (04/91 - Present)

Full chemical analyses of radioactively contaminated samples

4.) Controls for Environmental Pollution (08/92 - 12/31/92)

Full chemical analysis of radioactively contaminated samples

5.) Recra Environmental, Inc. (01/02/91 - 01/30/91, 06/01/92 - Present)

Chemical analysis of nonradioactive samples

6.) Ecology and Environment Inc. (02/05/91 - 05/30/92)

Chemical analyses of nonradioactive samples

7.) International Technology Corporation (Contract to be awarded)

Full chemical analysis of radioactively contaminated samples

TABLE B-12

SAMPLE PREPARATION AND ANALYSIS PROCEDURES

Parameter	Matrix	Preparation	Analysis
Volatile Organic	Water, water-miscible liquids, solids, sludges	SW846-5030	SW846-8240, SW846-8010, SW846-8020, SW846-8021, SW846-8260, 624, SM18, 6210
Semivolatile Organic	Water	SW846-3510/3520	SW846 - 8270, 625, SM18 6410,
	Solids and sludges	SW846-3540/3550	
Organic Chlorine Pesticides; PCBs	Water	SW846-3510/3520	SW846-8080, 608 SM18 6630
	Solids and sludges	SW846-3540/3550	
Chlorinated Herbicides	Water	SW846-3540/3550	SW846-8150, SM18 6640
	Solids and sludges	SW846-3540/3550	
Total Organic Halides (TOX)	Water	SW846-9020 SM18 5320B	SW846-9020 SM18 5320B
Total Phenolics	Water	SW846-9065 SW846-9066 SW846-9067 or 400 Series Equivalent	SW846-9065 SW846-9066 SW846-9067 or 400 Series Equivalent
Cyanide	Water, solids and sludges	SW846-9010 SW846-9012 or 335.2, 335.3	SW846-9010 SW846-9012 or 335.2, 335.3
Total Organic Carbon (TOC)	Water	SW846-9060 415.2, SM18 5310C	SW846-9060 415.2, SM18 5310C

TABLE B-12 (continued)

SAMPLE PREPARATION AND ANALYSIS PROCEDURES

Parameter	Matrix	Preparation	Analysis
Toxicity Characteristic Leaching Procedure (TCLP) (CFR 261, Appendix II)	Water and other liquids, solids and sludges	1311	Analyte specific as indicated below
Trace Metals	Water	SW846-3005 (FLAA or ICP) SW846-3010 (FLAA or ICP) SW846-3020 (GFAA)	SW846-6010 (ICP) SW846-7000 Series or 200 Series Equivalent(FLAA & GFAA), SM18 3111B, 3111D (FLAA), SM18 3113B (GFAA), SM18 3120B (ICP)
	Solids and sludges	SW846-3050 (FLAA, GFAA, or ICP)	SW846-6010 SW846-7000 Series or 200 Series Equivalent
	Oily Water	SW846-3040 (FLAA, GFAA, or ICP)	SW846-6010 SW846-7000 Series or 200 Series Equivalent
Hexavalent Chromium	Water	SW846-7197 218.4 218.4	SW846-7197
	Solids and sludges	(Reserved; method under development)	SW846-7197 218.4
Mercury	Water	SW846-7470	SW846-7470, 245.1, SM18 3500B-Hg
	Solids and Sludges	SW846-7471	SW846-7471, 245.5, SM18 3500B-Hg

TABLE B-12 (concluded)

SAMPLE PREPARATION AND ANALYSIS PROCEDURES

All the methods are from SW-846, Test Methods for Evaluating Solid Waste, 3rd Edition, 1986, except as noted here:

40 CFR 261 Appendix II

600 Series is from 40 CFR Part 136, Federal Register, Vol. 49, No. 209.

200, 300, 400 Series are from Method for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, revised March 1983.

SM18 is Standard Methods for the Examination of Water and Wastewater, 18th Edition, 1992, or as revised.

PC2> References:

NYS Department of Environmental Conservation Division of Hazardous Substances Regulation "RCRA Quality Assurance Project Plan Guidance," March 29, 1991.

USEPA Region II, CERCLA Quality Assurance Manual Final Copy, Revision 1, October, 1989.

TABLE B-13

HOLDING TIMES, PRESERVATIVES AND CONTAINER REQUIREMENTS FOR AQUEOUS SAMPLES

Parameter	Volume Required	Container	Preservative (see Key)	Holding Time*
Cyanide	1000 ML	P, G	P-3	14 Days
Fluoride	500 ML	P	P-1	28 Days
Herbicides	1000 ML	G	P-1	7 Days/ 40 Days**
Pesticides	1000 ML	G	P-1	7 Days/ 40 Days**
pH	250 ML	P, G	P-6	On-site immediately
Phenols	500 ML	G	P-5	28 Days
PCB	1000 ML	G	P-1	7 Days/ 40 Days**
Conductivity	150 ML	P, G	P-6	On-site Immediately
T.O.C.	500 ML	G-Amber	P-2	28 Days
Turbidity	100 ML	P, G	P-1	48 Hours
Volatile Organics	40 ML	G	P-1	7 Days (USEPA)/ 14 Days (NYSDEC)
Acid/Base Neutral Extractables	2000 ML	G	P-1	7 Days/ 40 Days**
T.O.X.	1000 ML	G-Amber	P-2	7 Days
Dioxin (2,3,7,8-TCDD)	2000 ML	G-Amber	P-1	7 Days/ 40 Days**
METALS***				
Aluminum	200 ML	P, G	P-4	6 Months
Antimony	200 ML	P, G	P-4	6 Months
Arsenic	200 ML	P, G	P-4	6 Months
Barium	200 ML	P, G	P-4	6 Months
Beryllium	200 ML	P, G	P-4	6 Months
Cadmium	200 ML	P, G	P-4	6 Months
Calcium	200 ML	P, G	P-4	6 Months

TABLE B-13

HOLDING TIMES, PRESERVATIVES AND CONTAINER REQUIREMENTS FOR AQUEOUS SAMPLES

Parameter	Volume Required	Container	Preservative (see Key)	Holding Time*
Chromium (Hex)	500 ML	P, G	P-1	24 Hours
Chromium (Tot)	200 ML	P, G	P-4	6 Months
Copper	200 ML	P, G	P-4	6 Months
Iron	200 ML	P, G	P-4	6 Months
Lead	200 ML	P, G	P-4	6 Months
Magnesium	200 ML	P, G	P-4	6 Months
Mercury	200 ML	P, G	P-4	28 Days
Nickel	200 ML	P, G	P-4	6 Months
Potassium	200 ML	P, G	P-4	6 Months
Selenium	200 ML	P, G	P-4	6 Months
Silver	200 ML	P, G-Dark	P-4	6 Months
Sodium	200 ML	P, G	P-4	6 Months
Tin	200 ML	P, G	P-4	6 Months
Zinc	200 ML	P, G	P-4	6 Months

* These holding times may need to be verified with the RCRA Quality Assurance Officer for the NYSDEC.

** Maximum holding time from sample collection to sample extraction is 7 days; maximum holding time to analysis for extraction is 40 days.

*** The volumes shown for each metal are those required if that metal were the only one of interest. In the more usual case where a combination of metals are required a total sample volume of 500 ML is required. On a case-by-case basis, still larger volumes may be required.

P = Polyethylene Bottles
G = Glass Bottles

KEY:

P-1 Cool to 4 degrees C in an ice chest
P-2 Preserve with conc. H_2SO_4 to a pH of 2. Do not add an excess amount of H_2SO_4. Cool to 4 degree C in an ice chest.
P-3 Preserve with 10N NaOH to a pH>12 and cool to 4 degrees C in an ice chest.
P-4 Preserve with conc. HNO_3 to a pH < 2.
P-5 Preserve with conc. H_2SO_4 or conc. HCL to a pH $\leq$ 2 and cool to 4 degrees C in an ice chest.
P-6 No preservative, determine on site by analyzing sample immediately
P-7 Preserve with conc. HCL to pH < 2 to 4 degrees C in an ice chest.

TABLE B-14

HOLDING TIMES, PRESERVATIVES, AND CONTAINER REQUIREMENTS FOR SOIL, SLUDGE AND SEDIMENT SAMPLES

ANALYTE	HOLDING TIME	PRESERVATION (See Key)	CONTAINER
Volatile Organics	7 days (NYSDEC) 14 days (USEPA)	P-1	40 ml glass with Teflon septum or 4 oz. glass septum jars (I-chem Corp. 53210125, or comparable)*
Extractable Organics	7 days to extraction, 40 days to analysis	P-1	8 oz. glass
Cyanide	14 days	P-1	8 oz. glass or P
Metals	6 months	none	8 oz. glass or P
Hexavalent Chromium	24 hours	P-1	8 oz. glass or P
Mercury	28 days	P-1	8 oz. glass or P
Dioxin (2,3,7,8-TCDD)	7 days to extraction, 40 days to analysis	P-1	low conc.: 4 oz. amber glass; high conc.: 6 oz. amber glass
P=Polyethylene Bottles			

* If 4 oz. glass septum jars are to be used for volatile organics, then procedures must be placed in the QAPjP that demonstrate preventing the loss of volatiles.

KEY:

P-1 Cool to 4 degrees C in an ice chest
P-2 Preserve with conc. H_2SO_4 to a pH of 2. Do not add an excess amount of H_2SO_4. Cool to 4 degree C in an ice chest.
P-3 Preserve with 10N NaOH to a pH>12 and cool to 4 degrees C in an ice chest.
P-4 Preserve with conc. HNO_3 to a pH < 2.
P-5 Preserve with conc. H_2SO_4 or conc. HCL to a pH $\leq$ 2 and cool to 4 degrees C in an ice chest.
P-6 No preservative, determine on site by analyzing sample immediately
P-7 Preserve with conc. HCL to pH < 2 to 4 degrees C in an ice chest.

TABLE B-15

COMPONENTS REQUIRED FOR RCRA ANALYTICAL DATA
SUBMITTED TO
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

A report narrative should accompany each submission, summarizing the contents, results, and all relevant circumstances of the work.

A. Parameter requested.

B. Sample number or numbers, matrix, and:

1. Date collected
2. Date extracted and/or digested
3. Date analyzed
4. Chain-of-custody report and/or form, including confirmation of unbroken chain-of-custody, intact sample packaging and container seals and adequate temperature and/or other preservation.

C. Results[b,e,f]

1. Sample Results
2. Duplicate
3. Blank[a]
4. Spike; spike duplicate
5. Surrogate recoveries, if applicable

D. Supporting QA/QC[b]

1. Methodology
2. Method detection limits, instrument detection limits[c]
3. Linear curves[d]
4. Percent Solids
5. Calculations[d]
6. Cleanup Procedures
7. Data validation procedures and the laboratory-completed data validation checklist.
8. Documentation illustrating how blank water is determined to be analyte-free

In addition to submitting the above, all sample data and QA/QC data as specified in SW-846, Chapter 1, must be maintained accessible to NYSDEC either in hard copy or on magnetic tape or disk (computer data files). The data, if requested by NYSDEC, should be formatted as described in SW-846, Chapter 1. This requirement may be changed in the future to mandate computer data files, accessible to NYSDEC on request.

TABLE B-15 (concluded)

COMPONENTS REQUIRED FOR RCRA ANALYTICAL DATA
SUBMITTED TO
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

This does not obviate the requirement of the QA/QC specified in each individual EPA-approved method.

Components for RCRA submissions for non-contract lab protocols. If CLP, the CLP deliverables are required, unless otherwise stated in the approved plan.

a) The data should include all blanks (trip, equipment rinse, method and instrument blanks) as specified in the sampling and analysis plan, guidance, and regulation.

b) Supporting QA/QC should be specific to the RCRA samples analyzed.

c) Every effort practicable must be made to achieve optimal detection limits below regulatory limits and comparability to the Practical Quantitation Limits specified in the EPA-approved methods.

d) Alternatively, include QA/QC summaries validating the data, including calibration control charts, coefficients, etc. The report narrative should describe the data validation and explain discrepancies. The supporting data should be provided to NYSDEC upon request.

e) Frequency of blanks, duplicates, spikes, surrogates, calibrations, standard reference materials, etc., should be as stated in the approved sampling and analysis plan, the approved analytical methods and the SW-846 3rd Edition, Chapter 1, requirements. Any perceived conflicts should be resolved with NYSDEC before sampling.

f) Spiking for metals, organics, or other parameters must be done before sample preparation (i.e., before digestions, extractions, etc.) unless otherwise stated in the approved plan.

TABLE B-16

SW-846 CRITERIA/CORRECTIVE ACTIONS
SOILS PROGRAM

Analytical Method	Applicable Parameter	Quality Control Check	Frequency	Acceptance Criteria	Corrective Action
"8240"	Volatile Organic Compounds	Tuning: Mass Calibration using 50 ng BFB	Daily prior to sample analysis and/or at the beginning of any 12 hour time period	Must meet following ion abundance criteria: m/z50 - 15-40% of mass 95 m/z75 - 30-60% of mass 95 m/z95 - base peak - 100% relative abundance m/z96 - 5-9% of mass 95 m/z173 - <2% of mass 174 m/z174 - >50% of mass 95 m/z175 - 5-9% of mass 174 m/z176 - 95-101% of mass 174 m/z177 - 5-9% of mass 176	Recalibrate masses and retune Troubleshoot and correct problems Clean source and/or perform maintenance
		Initial Calibration: 5 pt calibration with target and surrogate concentrations at: 20 ppb 50 ppb 100 ppb 150 ppb 200 or 300 ppb	Prior to analysis and whenever continuing calibrations fail	Calibration Check Compounds (CCCs) must have %RSD <30% for these compounds: The CCCs are: 1,1 Dichloroethene Chloroform 1,2 Dichloropropane Toluene Ethylbenzene Vinyl Chloride	1. Recalibrate 2. Investigate and troubleshoot for instrument problem 3. Clean source

TABLE B-16 (Continued)

SW-846 CRITERIA/CORRECTIVE ACTIONS
SOILS PROGRAM

Analytical Method	Applicable Parameter	Quality Control Check	Frequency	Acceptance Criteria	Corrective Action
				System Performance Check Compounds (SPCCs) must have >.30 RF for: Chloromethane 1,1 Dichloroethane 1,1,2,2-Tetrachloroethane Chlorobenzene SPCC must have >.25 RF for: Bromoform	
		Perform a mid-level continuing calibration standard	Daily prior to sample analysis and/or at the beginning of every 12 hour time period	CCCs must have <25% Percent Difference for: 1,1 Dichloroethene Chloroform 1,2 Dichloropropane Toluene Ethylbenzene Vinyl Chloride SPCCs must have >.30 RF for: Chloromethane 1,1 Dichloroethane 1,1,2,2-Tetrachloroethane Chlorobenzene SPCC must have >.25 RF for: Bromoform	1. Retune and rerun the check standard 2. Investigate and troubleshoot for instrument problem 3. Rerun the initial calibration

TABLE B-16 (Continued)

SW-846 CRITERIA/CORRECTIVE ACTIONS
SOILS PROGRAM

Analytical Method	Applicable Parameter	Quality Control Check	Frequency	Acceptance Criteria	Corrective Action
		Method Blank: DI Water	Daily prior to sample analysis and/or at the beginning of every 12 hour time period	All target analytes must be less than the PQL with the exception of Methylene Chloride, Acetone, Toluene, 2-Butanone, all of which must be less than 5 times the PQL	1. Eliminate the source of contamination 2. Rerun 3. Clean the instrument 4. Do not analyze the samples until the contamination is found and removed
		Surrogate standard recovery: Surrogate standard is spiked in all samples at 50 ppb	per sample analysis	Surrogates must be within QC limits for all three surrogates at the following levels: Water 4-Bromofluorobenzene (86-115) 1,2-Dichloroethane-d4 (76-114) Toluene-d8 (88-110) Soil 4-Bromofluorobenzene (74-121) 1,2-Dichloroethane-d4 (70-121) Toluene-d8 (81-117)	1. Reanalyze sample to confirm matrix interferences 2. Troubleshoot system 3. Recalibrate and rerun
		Internal standard	per sample analysis	All internal standard areas must be within a factor of 2 of the most recent continuing calibration internal standard areas Retention times for all internal standard analytes must be within 30 seconds of previous continuing calibration retention times	1. Reanalyze 2. Troubleshoot instrument and reanalyze 1. Troubleshoot equipment and seal any leaks 2. Reanalyze the sample

TABLE B-16 (Continued)

SW-846 CRITERIA/CORRECTIVE ACTIONS
SOILS PROGRAM

Analytical Method	Applicable Parameter	Quality Control Check	Frequency	Acceptance Criteria	Corrective Action
		MS/MSD	per 20 samples for per case	These five compounds are spiked at 50 ppb. % recoveries should meet the criteria set forth in SW 846 Water Benzene (76-127) Chlorobenzene (75-130) 1,1-Dichloroethene (61-145) Toluene (76-125) Trichloroethene (71-120) Soil Benzene (66-142) Chlorobenzene (60-133) 1,1-Dichloroethene (59-172) Toluene (59-139) Trichloroethene (62-137)	Reanalyze the samples both QC analyses demonstrate matrix interferences (MS/MSD)
		BS/BSD	per 20 samples or per case	These five compounds are spiked at 50 ppb. % recoveries should meet the criteria set forth in SW 846 for matrix spike compounds: Benzene (37-151) Chlorobenzene (37-160) 1,1-Dichloroethene (D-234) Toluene (47-150) Trichloroethene (71-157)	Identify cause for poor recovery Reanalyze impacted samples Do not proceed until acceptable BS/BSD obtained

TABLE B-16 (Continued)

SW-846 CRITERIA/CORRECTIVE ACTIONS
SOILS PROGRAM

Analytical Method	Applicable Parameter	Quality Control Check	Frequency	Acceptance Criteria	Corrective Action
"8270"	Semivolatile Organic	Tuning: Mass Calibration using DFPP 50 NG	Daily prior to sample analysis at the beginning of any 12 hour time period	Ion abundance criteria specified in QA/QC Section: m/z 51 = 30-60% of m/z 198 m/z 68 <2% of m/z 69 m/z 70 <2% of m/z 69 m/z 127 = 40-60% of m/z 198 m/z 197 <1% m/z 198 m/z 198 = Base peak, 100% m/z 199 = 5-9% of m/z 198 m/z 275 = 10-30% of m/z 198 m/z 365 >1% m/z 198 m/z 441 - present but <m/z443 m/z 442 >40% of m/z 198 m/z 443 = 17-23% of m/z 442	Recalibrate and 1. Retune by adjusting source parameters 2. Investigate & correct cause 3. Clear system

TABLE B-16 (Continued)

SW-846 CRITERIA/CORRECTIVE ACTIONS
SOILS PROGRAM

Analytical Method	Applicable Parameter	Quality Control Check	Frequency	Acceptance Criteria	Corrective Action
		Initial Calibration: 5 pt calibration with target & surrogate concentrations at 20, 50, 80, 120, and 160 ppm	Prior to sample analysis and whenever continuing calibrations fail to meet continuing calibration criteria	I. Calibration Check Compounds (CCC): must have % RSD <30% these include: 1. Acenaphthene 2. 1,4-Dichlorobenzene 3. Hexachlorobutandiene 4. N-Nitrosodiphenylamine 5. Di-n-octylphthalate 6. Fluoranthene 7. Benzo(a)pyrene 8. 4-chloro-3-methylphenol 9. 2,4-dichlorophenol 10. 2-Nitrophenol 11. Phenol 12. Pentachlorophenol 13. 2,4,6-Trichlorophenol II. All (SPCCs) System Performance check compounds must RF > or = 0.050 1. N-Nitrosodi-n-propylamine 2. Hexachlorocyclopentadiene 3. 2,4-Dinitrophenol 4. 4-Nitrophenol	1. Repeat Calibration 2. Maintenance Cleaning & Repeat Calibration

TABLE B-16 (Continued)

SW-846 CRITERIA/CORRECTIVE ACTIONS
SOILS PROGRAM

Analytical Method	Applicable Parameter	Quality Control Check	Frequency	Acceptance Criteria	Corrective Action
		Continuing calibration target compounds and surrogates at 50 ppm	Daily, prior to sample analysis: every 12 hours of use	Calibration Check Compounds (CCCs) must have %RSD < or = 30% 1. Phenol 2. 1,4-Dichlorobenzene 3. 2-Nitrophenol 4. 2,4-dichlorophenol 5. Hexachlorobutadiene 6. 4-chloro-3-methylphenol 7. 2,4,6-Trichlorophenol 8. Acenapthene 9. N-Nitrosodiphenylamine 10. Pentachlorophenol 11. Fluoranthene 12. Di-n-octylphthalate 13. Benzo(a)pyrene SPCC compounds must RF > or = 0.05 N-Nitroso-di-n-propylamine Hexachlorocyclopentadiene 2,4-Dinitrophenol 4-Nitrophenol	1. Repeat Check 2. Repeat Calibration 3. Clean System
		Method Blank: DI Water	One every 20 samples or per batch	All compounds at level <PQL with the exception of phthalate esters for which each must be less than 5 x PQL	1. Identify and correct source of contamination 2. Reextract and reanalyze impacted samples

TABLE B-16 (Continued)

SW-846 CRITERIA/CORRECTIVE ACTIONS
SOILS PROGRAM

Analytical Method	Applicable Parameter	Quality Control Check	Frequency	Acceptance Criteria	Corrective Action
		Surrogate Recovery: for B/N conc 100 μg/ml acid conc 150 μg/l. Added 1 ml or 0.5 ml into each sample or blank, MS, MSD	Spiked into all samples, blanks, MS, MSD	Matrix % Recovery Limits Water Nitrobenzene-d5 (35-114) 2-Fluorobinphenyl (43-116) P-Terphenyl-d14 (33-141) Phenol-d6 (10-94) 2-Fluorophenol (21-100) 2,4,6-Tribromophenol (10-123) Soil Nitrobenzene-d5 (23-120) 2-Fluorobiphenyl (30-115) P-terphenyl-d14 (18-137) Phenol-d6 (24-113) 2-Fluorophenol (25-121) 2,4,6-Tribromophenol (19-122)	1. Reanalyze samples 2. Reextract and reanalyze samples
		Internal Standard: 1. 1,4-dichlorobenzene-d4 2. Napthalene-d8 3. Acenapthene-d10 4. Phenanthrene-d10 5. Chrysene-d12 6. Perylene-d12	Spike into all standards, samples and blanks	All internal standard areas must be within a factor of 2 of the most recent continuing calibration internal standard areas	1. Reanalyze sample 2. Investigate & correct cause

TABLE B-16 (Continued)

SW-846 CRITERIA/CORRECTIVE ACTIONS
SOILS PROGRAM

Analytical Method	Applicable Parameter	Quality Control Check	Frequency	Acceptance Criteria	Corrective Action
		Matrix spike analysis	Per batch or per 20 samples per matrix	per following criteria: **Water** 1,2,4-Trichlorobenzene (39-98) Acenaphthene (46-118) 2,4-Dinitrotoluene (24-96) Pyrene (26-127) N-Nitroso-Di-n-Propylamine (41-116) 1,4-Dichlorobenzene (36-97) Pentachlorophenol (9-103) Phenol (12-89) 2-Chlorophenol (27-123) 4-Chloro-3-Methylphenol (23-97) 4-Nitrophenol (10-80) **Soil** 1,2,4-Trichlorobenzene (38-107) Acenaphthene (31-137) 2,4-Dinitrotoluene (28-89) Pyrene (35-142) N-Nitroso-Di-n-Propylamine (41-126) 1,4-Dichlorobenzene (28-104) Pentachlorophenol (17-109) Phenol (26-90) 2-Chlorophenol (25-102) 4-Chloro-3-Methylphenol (26-103) 4-Nitrophenol (11-114)	1. Narrative explanation 2. Reextraction

TABLE B-16 (Continued)

SW-846 CRITERIA/CORRECTIVE ACTIONS
SOILS PROGRAM

Analytical Method	Applicable Parameter	Quality Control Check	Frequency	Acceptance Criteria	Corrective Action
"8080"	Pesticide/PCB	Initial 5 point calibration for all analytes of interest	Daily continuing med level prior to sample analysis and after every 10 samples	All initial Calibration Factors (CFs) must be <20% RSD	1. Repeat Calibration 2. Maintenance 3. Investigate and correct cause
	Pesticide PCB	Initial Calibration Target compounds & surrogates at: Level 1 5-50 μg/l Level 2 10-100 μg/l Level 3 20-200 μg/l Level 4 40-400 μg/l Level 5 80-800 μg/l Level 1 125 μg/l Level 2 250 μg/l Level 3 500 μg/l Level 4 1250 μg/l Level 5 2500 μg/l		%RSD <20 for all initial calibration	
		Blank Spike/Blank Spike Duplicate Matrix Spike/Matrix Spike Duplicate	Every batch of 20 samples	Sample recovery as specified in QA/QC section	1. Reanalyze sample if recoveries are outside QC limits 2. Investigate cause and correct. Identify cause low recovery
	Pesticide	Continuing Calibration Check: Target analytes & surrogates 20-200 μg/l	Daily prior to sample analysis and after every 10 samples	Calibration Factor Percent Difference <15 of Initial Calibration for all compounds	1. Repeat Continuing Calibration 2. Repeat Calibration

TABLE B-16 (Continued)

SW-846 CRITERIA/CORRECTIVE ACTIONS
SOILS PROGRAM

Analytical Method	Applicable Parameter	Quality Control Check	Frequency	Acceptance Criteria	Corrective Action
	PCB	Continuing Calibration Check: Target analytes & surrogates 500 μg/l	Daily prior to sample analysis, and every 10 samples	Calibration Factor Percent Difference <15 of Initial Calibration	1. Repeat Continuing Calibration 2. Repeat Calibration
		Surrogate Check	Spiked into all standard, samples and blanks	% Recovery is 60 - 150%	1. Reanalyze Sample 2. Investigate and correct cause
		Method Blank	One every batch of 20 samples	Target analytes found at levels <PQL	1. Identify and correct contamination 2. Reextract and reanalyze impacted samples

TABLE B-16 (Continued)

SW-846 CRITERIA/CORRECTIVE ACTIONS
SOILS PROGRAM

Analytical Method	Applicable Parameter	Quality Control Check	Frequency	Acceptance Criteria	Corrective Action
"6010"	All elements analyzed by ICP	Calibration	Every 24 hrs.	(Compliant CCV)	(see CCV)
		Continuing Calibration Verification (CCV)	At start of analysis; Every 10 samples; At end of analysis	80% - 120% Hg, 90% - 110% other metals	1. Correct problem 2. Recalibrate (if needed) 3. Reanalyze CCV 4. Reanalyze previous 10 samples
		Continuing Calibration Blank (CCB)	At start of analysis; every 10 samples; at end of analysis (following each CCV)	<CRDL	1. Recalibrate (if needed) 2. Reanalyze CCV/CCB 3. Reanalyze previous 10 samples
		Interference Check (ICSAB)	Every 12 hrs. or at start and end of run	Analyte % Rec. 80% - 120%	1. Correct problem 2. Recalibrate (if needed) 3. Reanalyze
		Preparation Blank Duplicate (D) Spike (S) Spike Dupl (SD) Blk Spike (LCSMS) Blk Spk. Dup (LCSMSD) Post Dig. Spike (A)	Every 20 samples Every 20 samples Every 20 samples Every 20 samples Every 20 samples Every 20 samples If needed	<CRDL RPD < 20% %Rec. 75% - 125% RPD < 20% %Rec. 80 - 120% RPF < 20% %Rec. 75% - 125%	Redigest/reanalyze Flag data Post dig spike/Flag data Flag data (if SD required) *Correlate with S *Correlate with S and SD Flag data *Redigest if necessary

TABLE B-16 (Continued)

SW-846 CRITERIA/CORRECTIVE ACTIONS
SOILS PROGRAM

Analytical Method	Applicable Parameter	Quality Control Check	Frequency	Acceptance Criteria	Corrective Action
"7000"	All metals analyzed by GFAA (usually As, Se, Pb, and Tl - and other elements not analyzed by ICP)	Calibration (min. 4 point calibration) Continuing Calibration Verification (CCV)	Every 12 hrs. At start of analysis Every 10 samples At end of analysis	r = > 0.995 90% - 110%	1. Investigate problem 2. Recalibrate 1. Correct problem 2. Recalibrate (if needed) 3. Reanalyze CCV 4. Reanalyze previous 10 samples
		Continuing Calibration Blank (CCB)	At start of analysis, every 10 samples, at end of analysis (following each CCV)	< CRDL	1. Recalibrate (if needed) 2. Reanalyze CCV/CCB 3. Reanalyze previous 10 samples
		Preparation Blank Duplicate (D) Spike (S) Spike Dup. (SD) Blk Spike (LCSMS) Blk Spk. Dup (LCSMSD)	Every 20 samples Every 20 samples Every 20 samples Every 20 samples Every 20 samples Every 20 samples	< CRDL RPD < 20% %Rec. 75% - 125% RPD < 20% %Rec. 80% - 120% RPD < 20%	Redigest/reanalyze Flag data Flag data Flag data (if SD required) *Correlate with S *Correlate with S and SD *Redigest if necessary

TABLE B-16 (Continued)

SW-846 CRITERIA/CORRECTIVE ACTIONS
SOILS PROGRAM

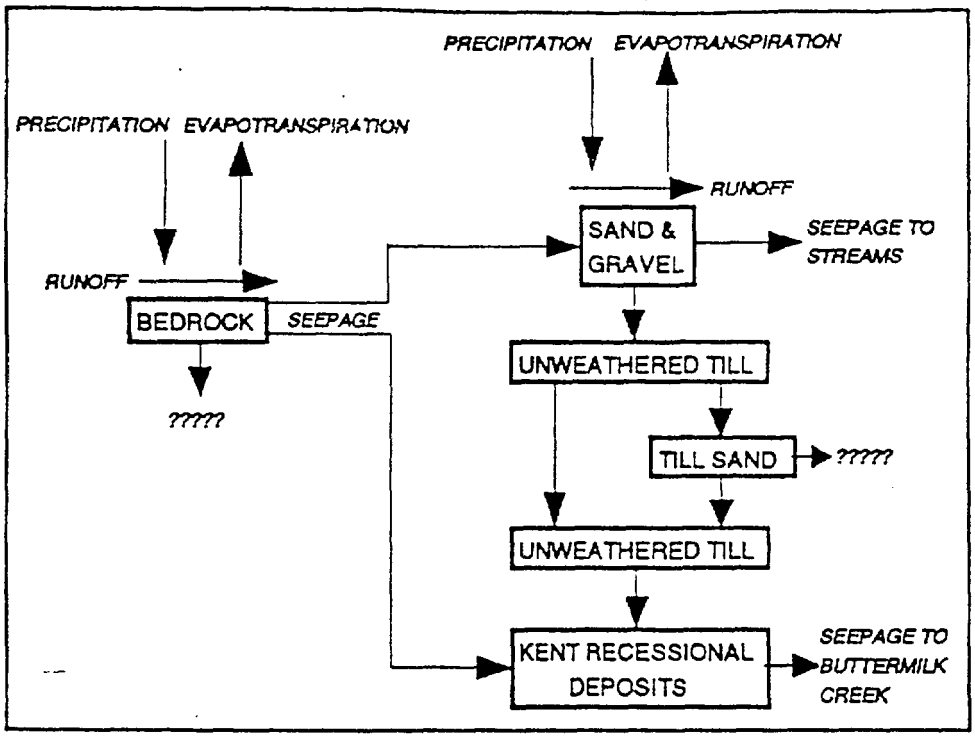
Analytical Method	Applicable Parameter	Quality Control Check	Frequency	Acceptance Criteria	Corrective Action
"7471"	CVAA - Mercury	Calibration (min. of 5 point calibration)	Every 12 hrs.	r = > 0.995	1. Investigate problem 2. Recalibrate
		Continuing Calibration Verification (CCV)	At start of analysis; Every 10 samples At end of analysis	80% - 120%	1. Correct problem 2. Recalibrate (if needed) 3. Reanalyze CCV 4. Reanalyze previous 10 samples
		Continuing Calibration Blank (CCB)	At start of analysis, every 10 samples, at end of analysis (following each CCV)	< CRDL	1. If obviously due to carry over from previous CCV, reanalyze CCB 2. If not carry over from CCV, investigate problem 3. Recalibrate (if needed) 4. Reanalyze CCV/CCB 5. Reanalyze previous 10 samples
		Preparation Blank Duplicate (D) Spike (S) Spike Dup. (SD) Blk Spike (LCSMS) Blk Spk. Dup (LCSMSD)	Every 20 samples Every 20 samples Every 20 samples Every 20 samples Every 20 samples Every 20 samples	< CRDL RPD < 20% %Rec. 75% - 125% RPD < 20% %Rec. 75% - 125% RPD < 20%	Redigest/reanalyze Flag data Flag data Flag data (if SD required) *Correlate with S *Correlate with S and SD *Redigest if necessary

TABLE B-16 (Continued)

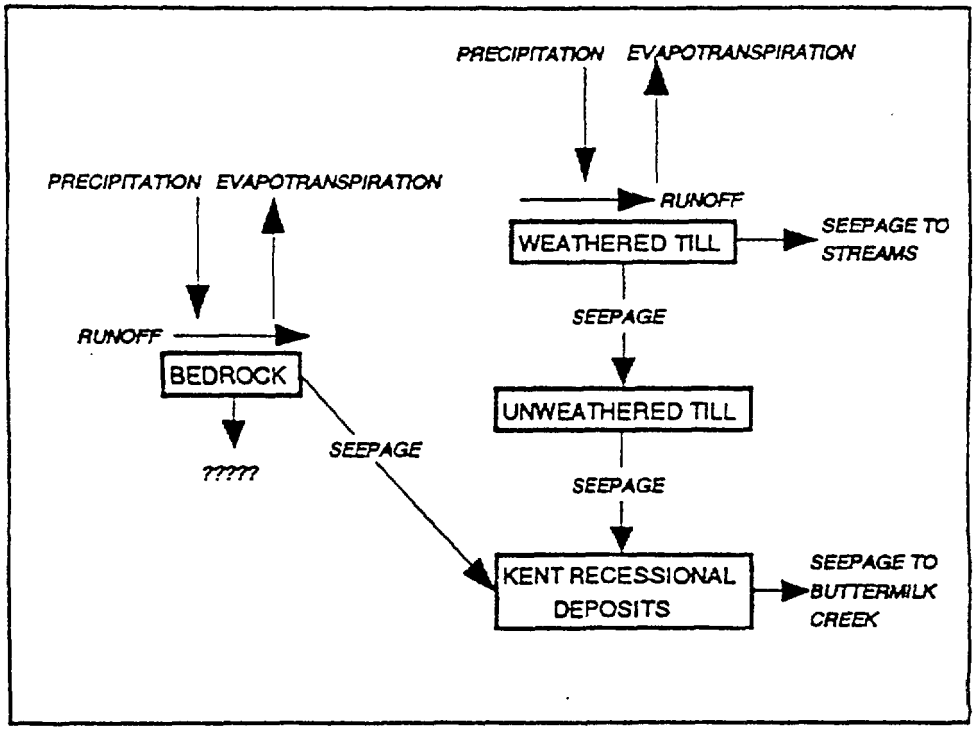
SW-846 CRITERIA/CORRECTIVE ACTIONS
SOILS PROGRAM

Analytical Method	Applicable Parameter	Quality Control Check	Frequency	Acceptance Criteria	Corrective Action
SW846 Method 9012	Total Cyanide	Calibration, 4 pt minimum	12 hours	r > 0.995	Investigate problem Recalibrate
		Preparation Blank	1 per 20	< detection limit	Redigest
		LCS/LCSD	1 per 20	within 20% of true value	Redigest
		Matrix Duplicate	1 per 20	20% RPD	Flag
		Matrix Spike	1 per 20	75 - 125% recovery	Flag
		ICV/CCV	every 15 samples	within 15% of true value	Recalibrate and rerun
		ICB/CCB	every 15 samples	< detection limit	Recalibrate and rerun

FIGURE B-1



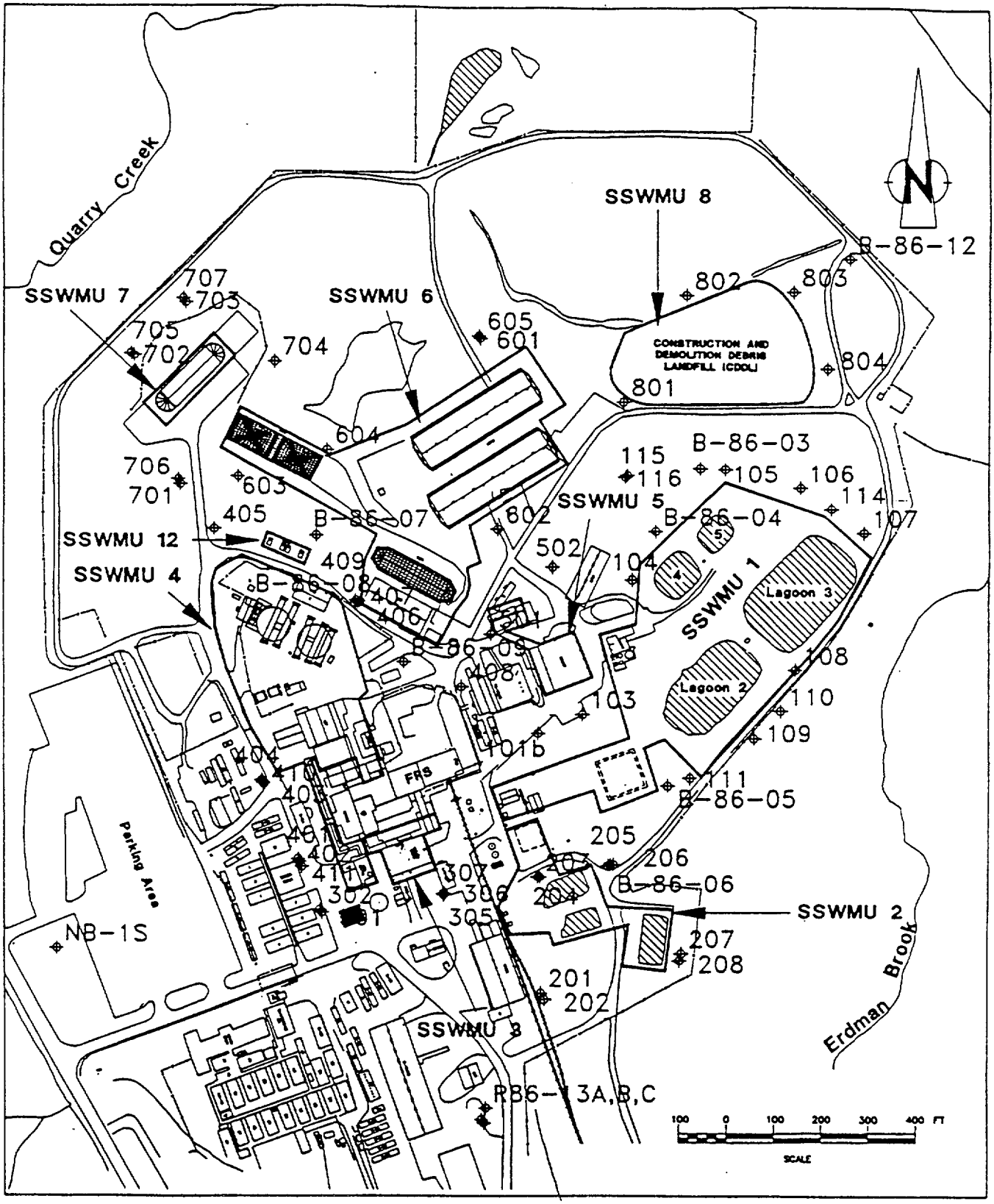
North Plateau Groundwater System



South Plateau Groundwater System

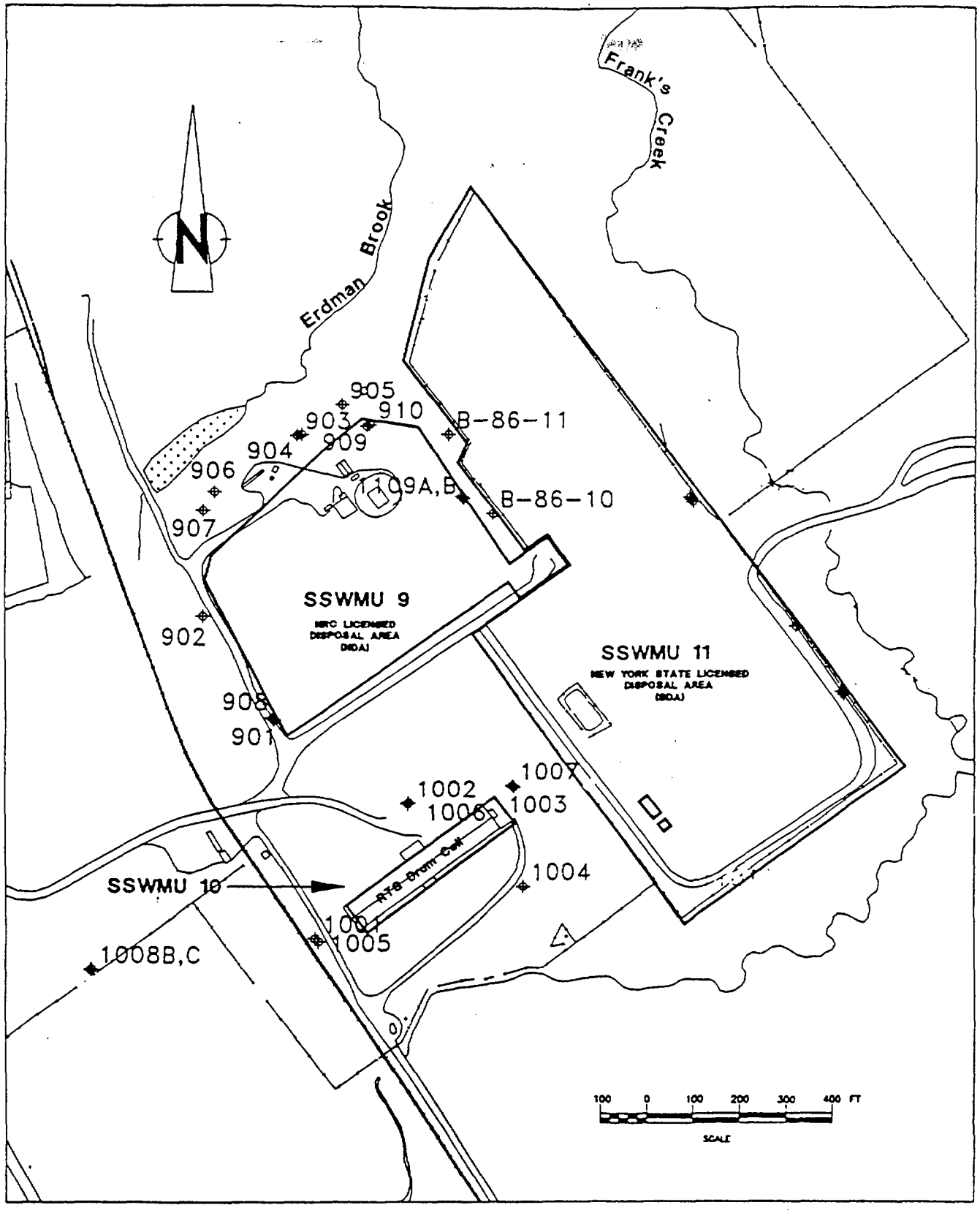
Conceptual Block Model of Groundwater Systems

FIGURE B-2



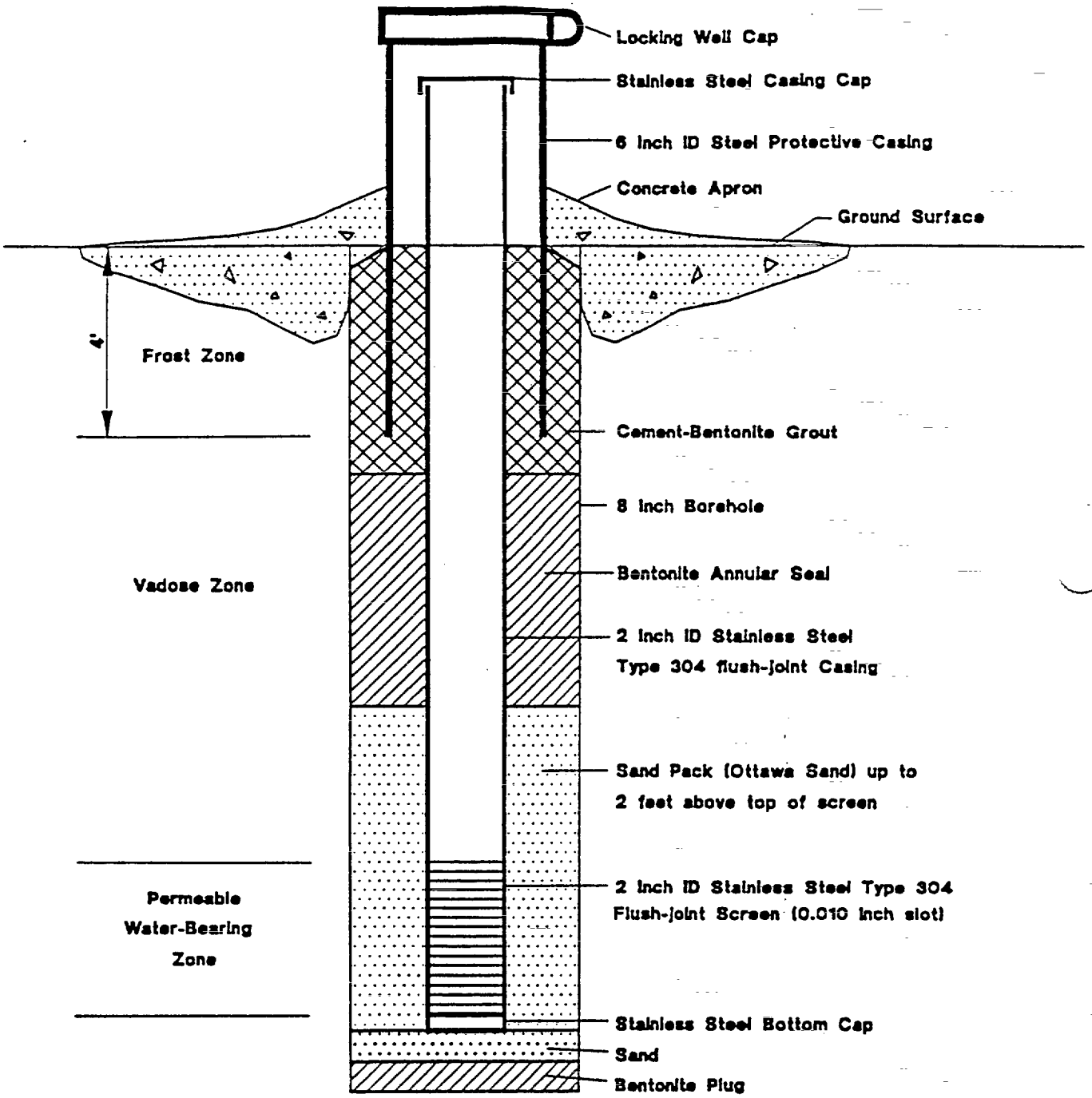
North Plateau Monitoring Well Locations

FIGURE B-3



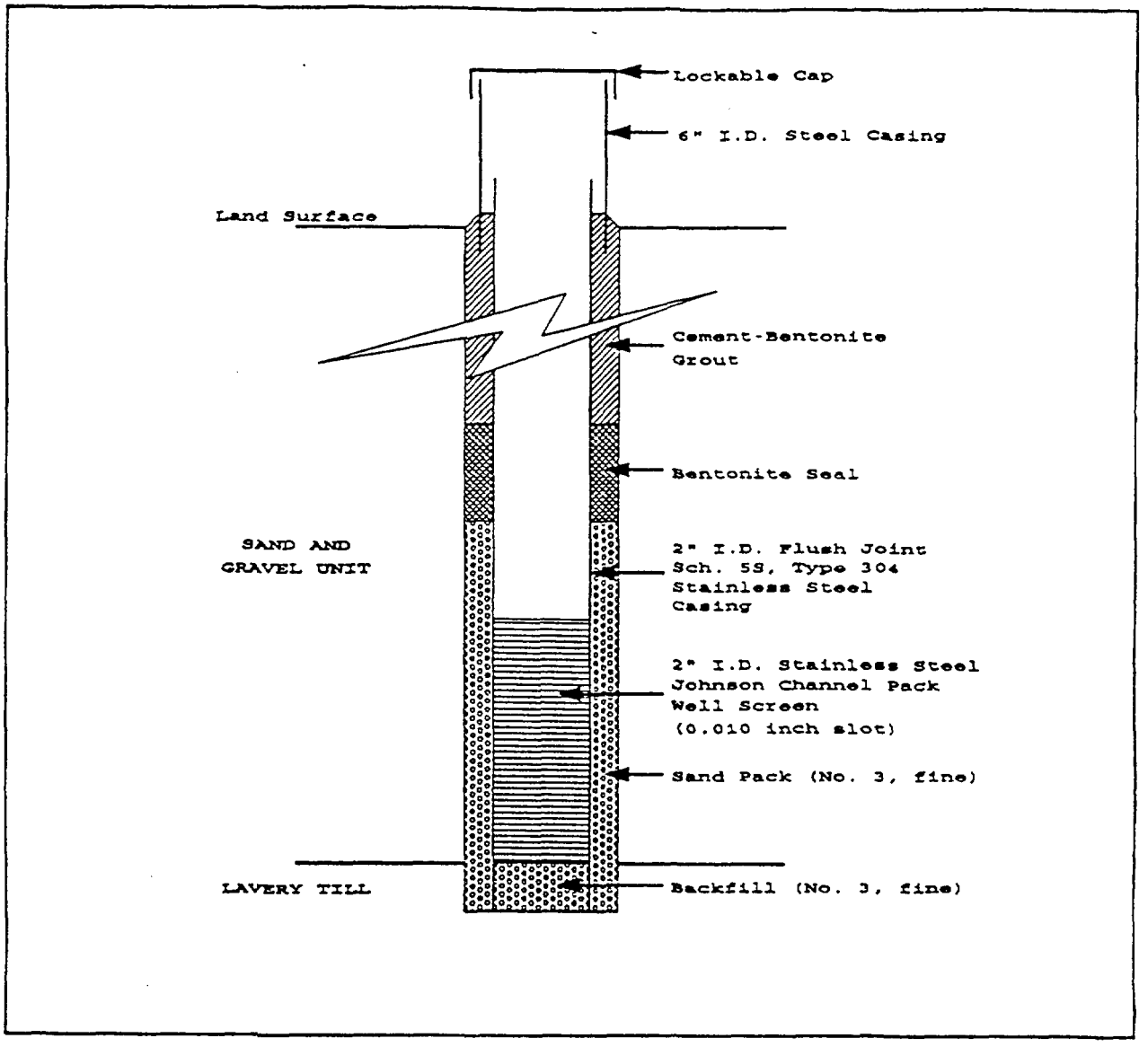
South Plateau Monitoring Well Locations

FIGURE B-4



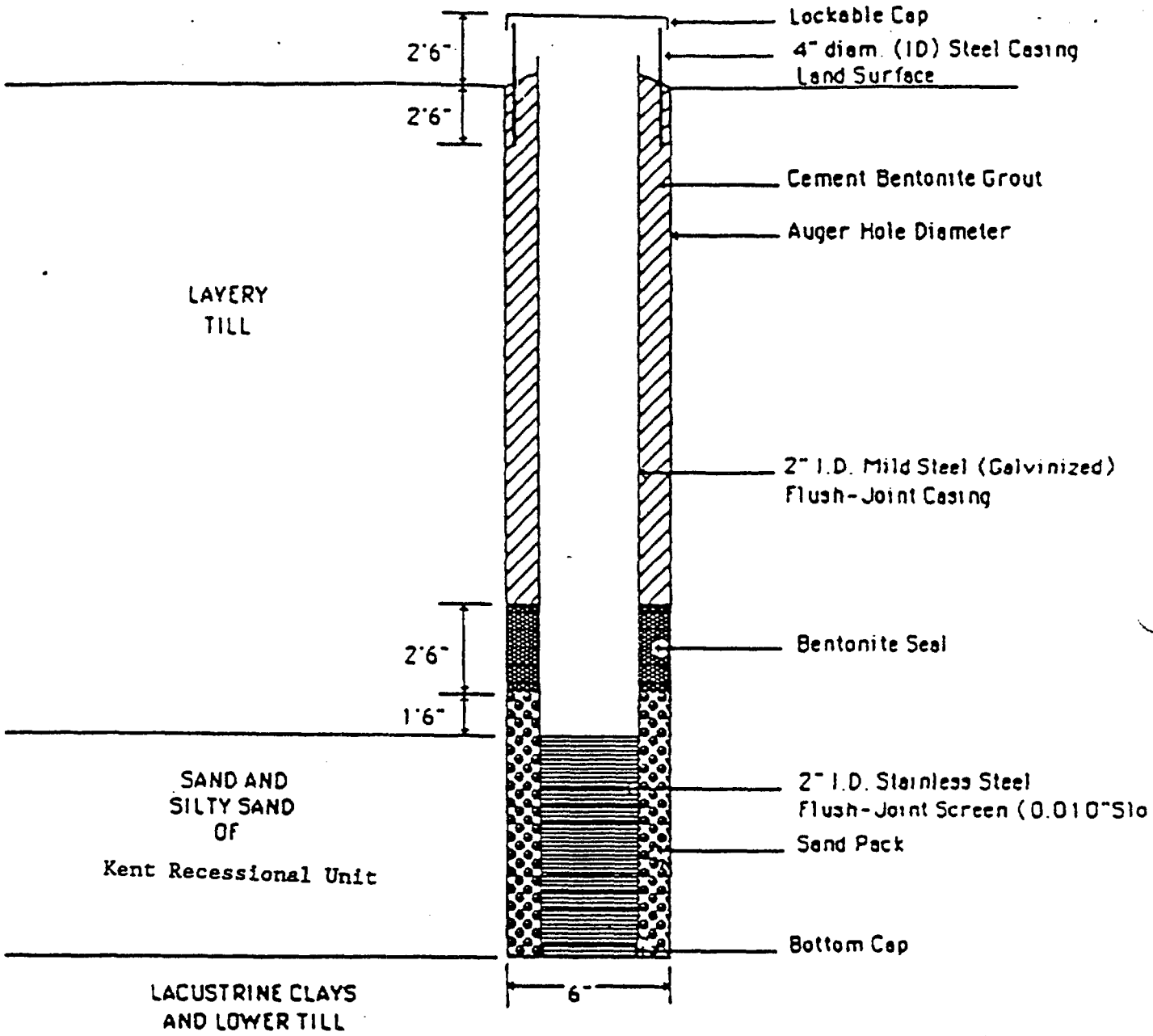
MONITORING WELL CONSTRUCTION DETAILS

FIGURE B-5



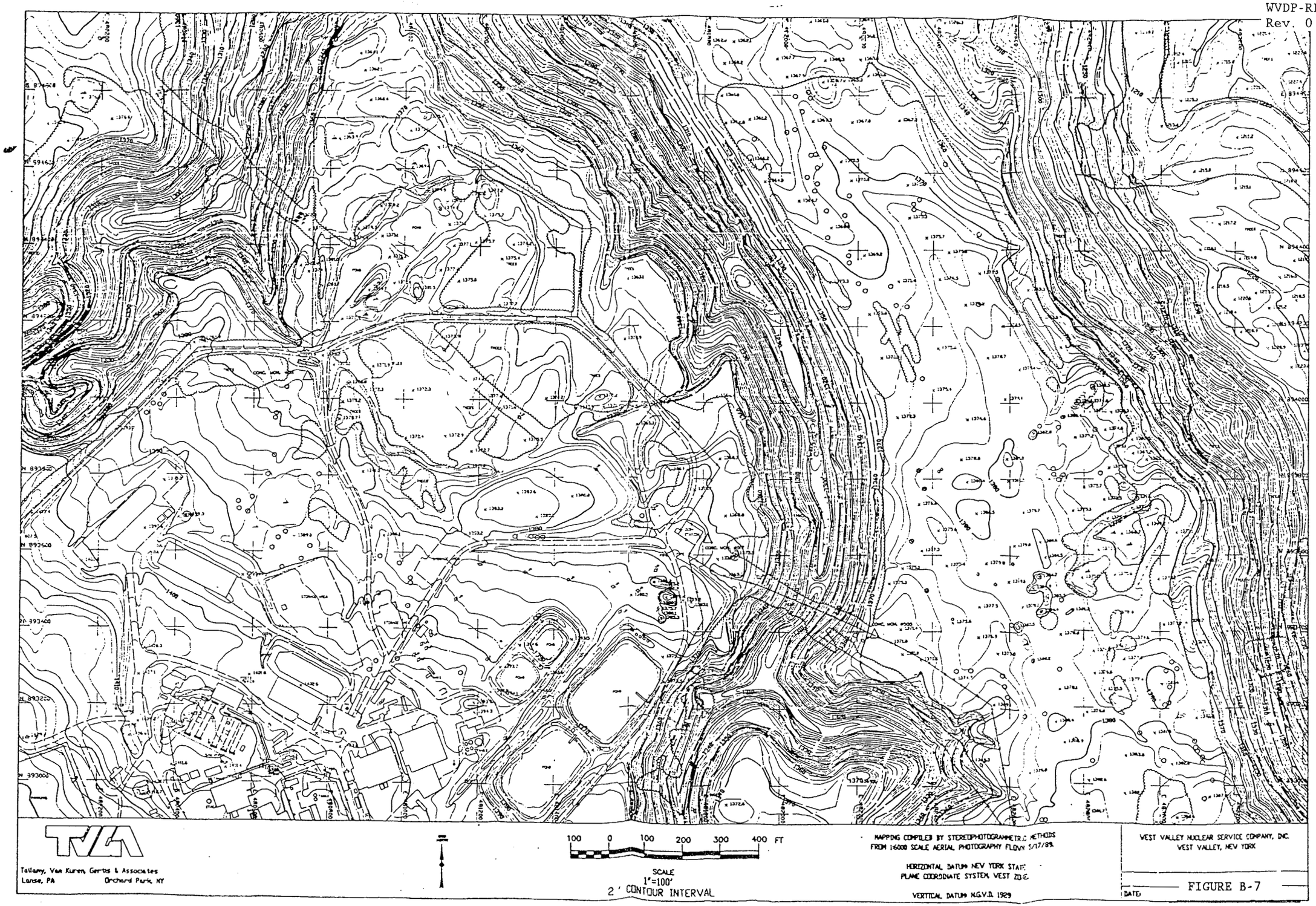
Construction Detail of Typical Monitoring Well Included
In the North Plateau Monitoring Network

FIGURE B-6



NOTE: 1. For Borings B-86-10 and B-86-11
2. Wells were developed by hand bailing. Development was continued for several days but sand and silt continued to be present in the well.

DETAILS OF EXISTING MONITORING WELLS INCLUDED IN THE MONITORING NETWORK (SOUTH PLATEAU)


TVA
Tallamy, Van Kuren, Gertis & Associates
Lanse, PA
Orchard Park, NY
100 0 100 200 300 400 FT
SCALE
1"=100'
2' CONTOUR INTERVAL
MAPPING COMPILED BY STEREOPHOTOGRAMMETRIC METHODS
FROM 16000 SCALE AERIAL PHOTOGRAPHY FLOWN 5/17/89
HORIZONTAL DATUM NEW YORK STATE
PLANE COORDINATE SYSTEM WEST ZONE
VERTICAL DATUM N.G.V.D. 1929
WEST VALLEY NUCLEAR SERVICE COMPANY, INC.
WEST VALLEY, NEW YORK
DATE
FIGURE B-7

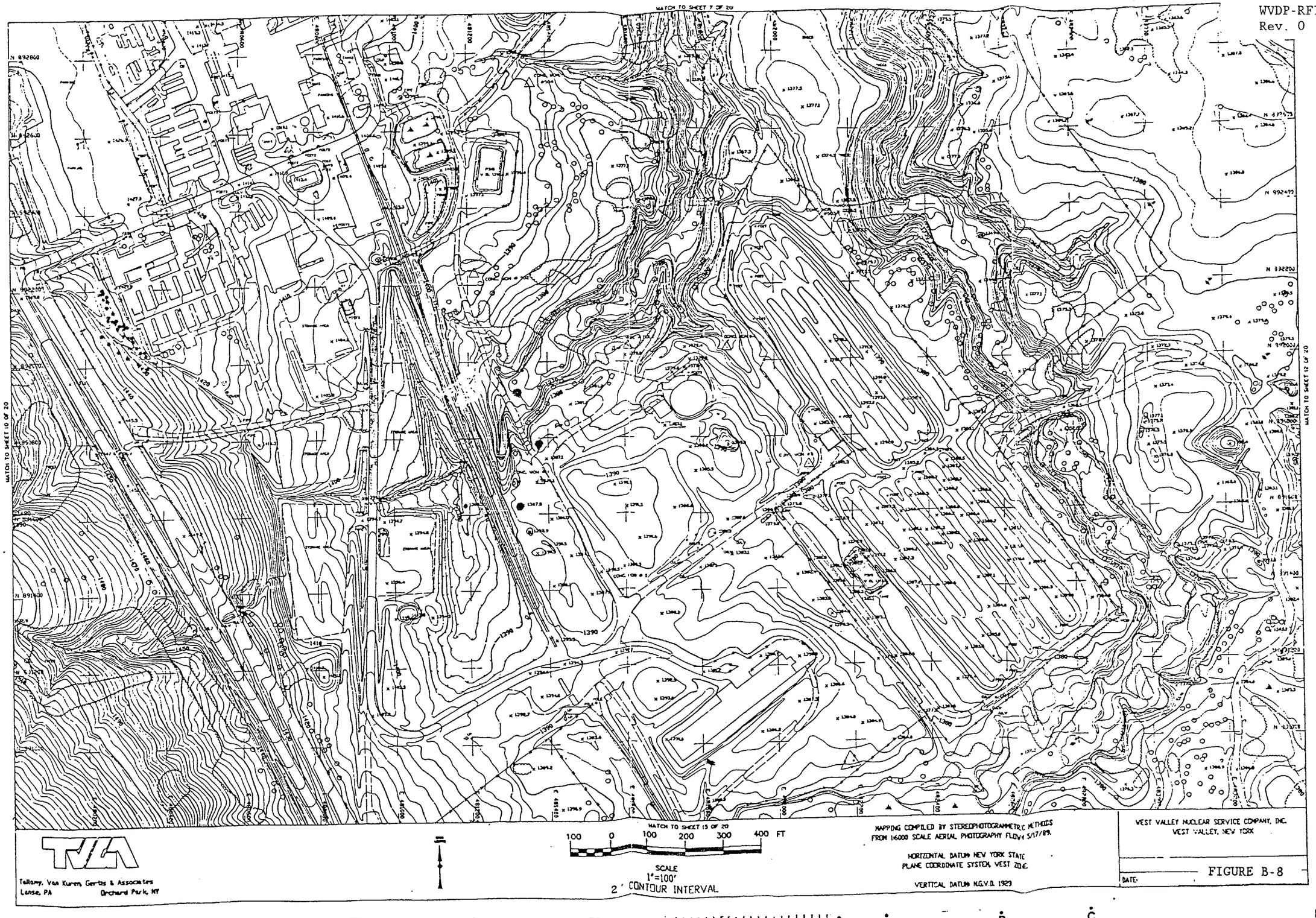

MATCH TO SHEET 7 OF 20
MATCH TO SHEET 10 OF 20
MATCH TO SHEET 12 OF 20
MATCH TO SHEET 15 OF 20
100 0 100 200 300 400 FT
SCALE
1"=100'
2' CONTOUR INTERVAL
MAPPING COMPILED BY STEREOPHOTOGRAMMETRIC METHODS
FROM 1:6000 SCALE AERIAL PHOTOGRAPHY FLOWN 5/17/89.
HORIZONTAL DATUM NEW YORK STATE
PLANE COORDINATE SYSTEM WEST ZONE
VERTICAL DATUM N.G.V.D. 1929
VEST VALLEY NUCLEAR SERVICE COMPANY, INC.
VEST VALLEY, NEW YORK
FIGURE B-8
DATE:
Tallamy, Van Kuren, Gertis & Associates
Lanse, PA
Orchard Park, NY

FIGURE B-9

BOREHOLE SAMPLE SELECTION FLOW CHART FOR LABORATORY ANALYSIS

KEY

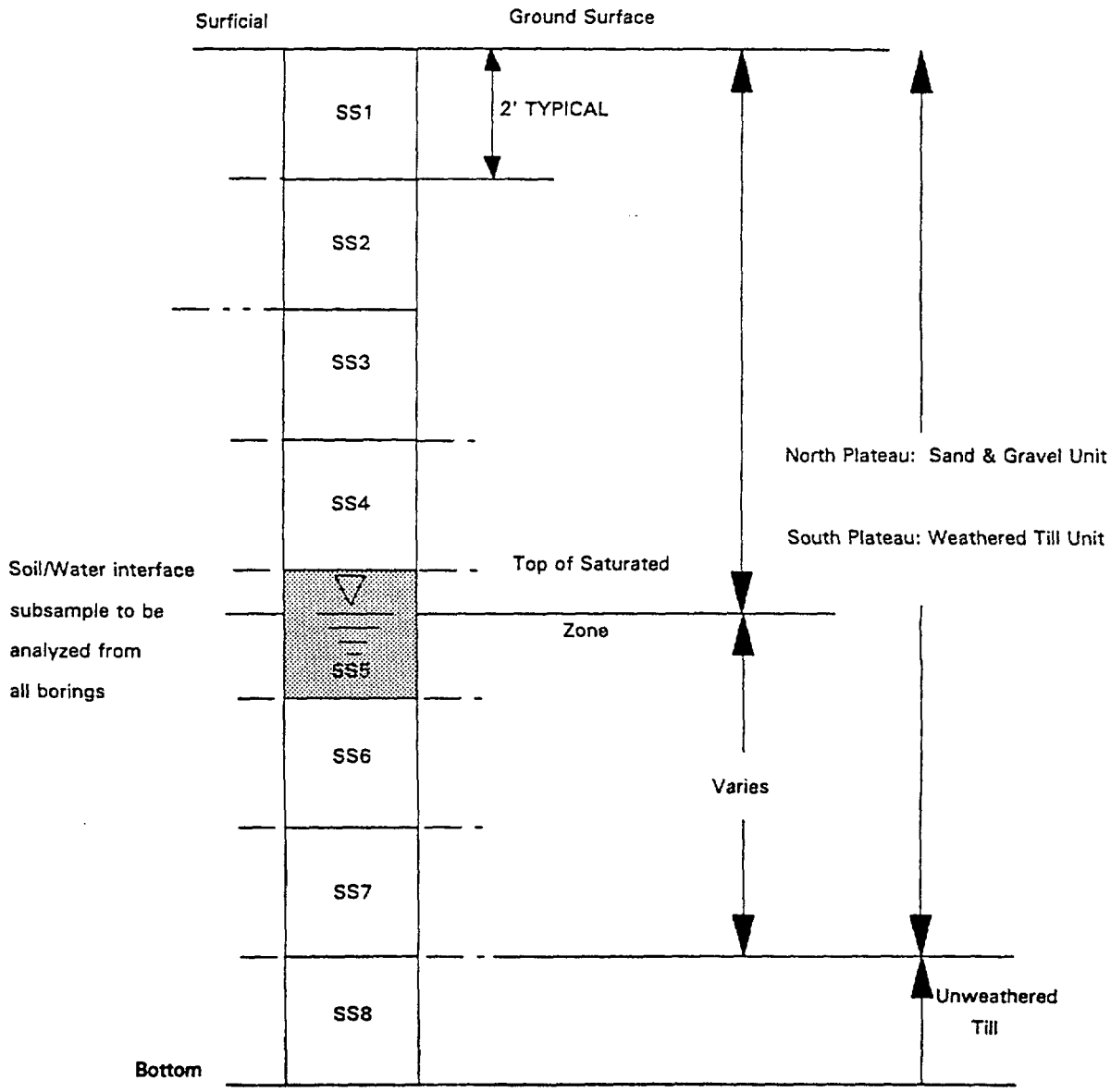
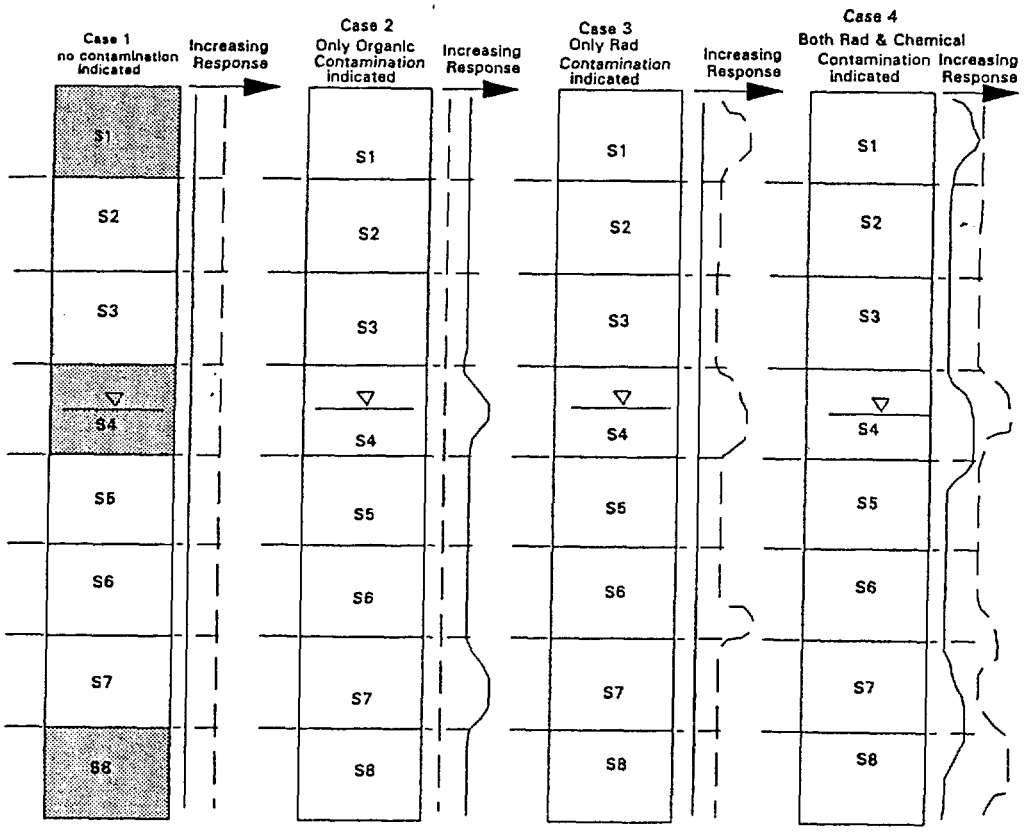


FIGURE B-9 (Continued)

Borehole Sample Selection Flow Chart
For Laboratory Analysis



Samples Selected * for Lab. Analysis	Samples Selected * for Lab. Analysis	Samples Selected * for Lab. Analysis	Samples Selected * for Lab. Analysis
S1 - Analysis of TCL metals	S1 - Analysis of TCL metals	S1 - Analysis of TCL metals	S1 - Analysis of TCL metals, VOCs
S4 - Analysis of TCL VOCs and Metals. Semi-VOCs for specified units	S4 - Analysis of TCL VOCs and Metals. Semi-VOCs for specified units.	S4 - Analysis of TCL VOCs and Metals. Semi-VOCs for specified units.	S4 - Analysis of TCL VOCs and Metals. Semi-VOCs for specified units.
S8 - Analysis of TCL VOCs and Metals. Semi-VOCs for specified units. (see table B-6)	S7 - Analysis of TCL VOCs and Metals. Semi-VOCs for specified units.	S6 - Analysis of TCL VOCs and Metals. Semi-VOCs for specified units.	S6 - Analysis of TCL VOCs and Metals. Semi-VOCs for specified units.
	S8 - Analysis of TCL VOCs and Metals. Semi-VOCs for specified units.	S8 - Analysis of TCL VOCs and Metals. Semi-VOCs for specified units.	S8 - Analysis of TCL VOCs and Metals. Semi-VOCs for specified units.

*SAMPLE SELECTION DECISION PROCESS SHOULD SAMPLES EXCEED NUMBER SPECIFIED IN TABLE B-6 OF RFI WORK PLAN.

Action: Review entire sample selection log for borehole and select specified number based on field instrument readings, visual/odor criteria, and lastly reference horizons. If field decision dictates sample selection in excess of Table B-6, call Site Programs and log reasoning in field log. Action here is to manage sample selection process based on field conditions and against those planned in the RFI Work Plan

NOTES:
FID/PID Response
Rad Meter Response

FIGURE B-10

Maintenance Shop Leach Field and Ancillary Equipment Location.

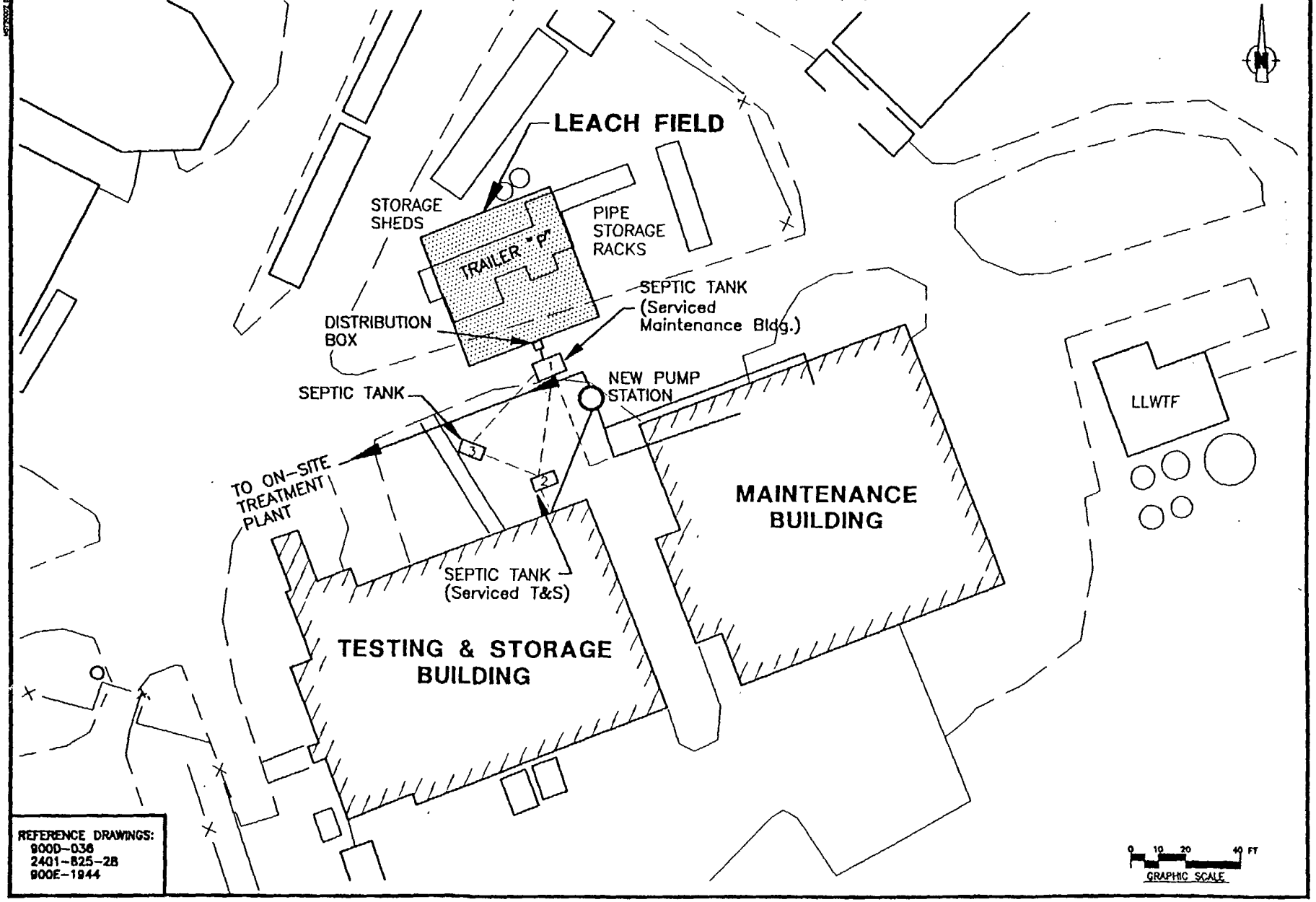
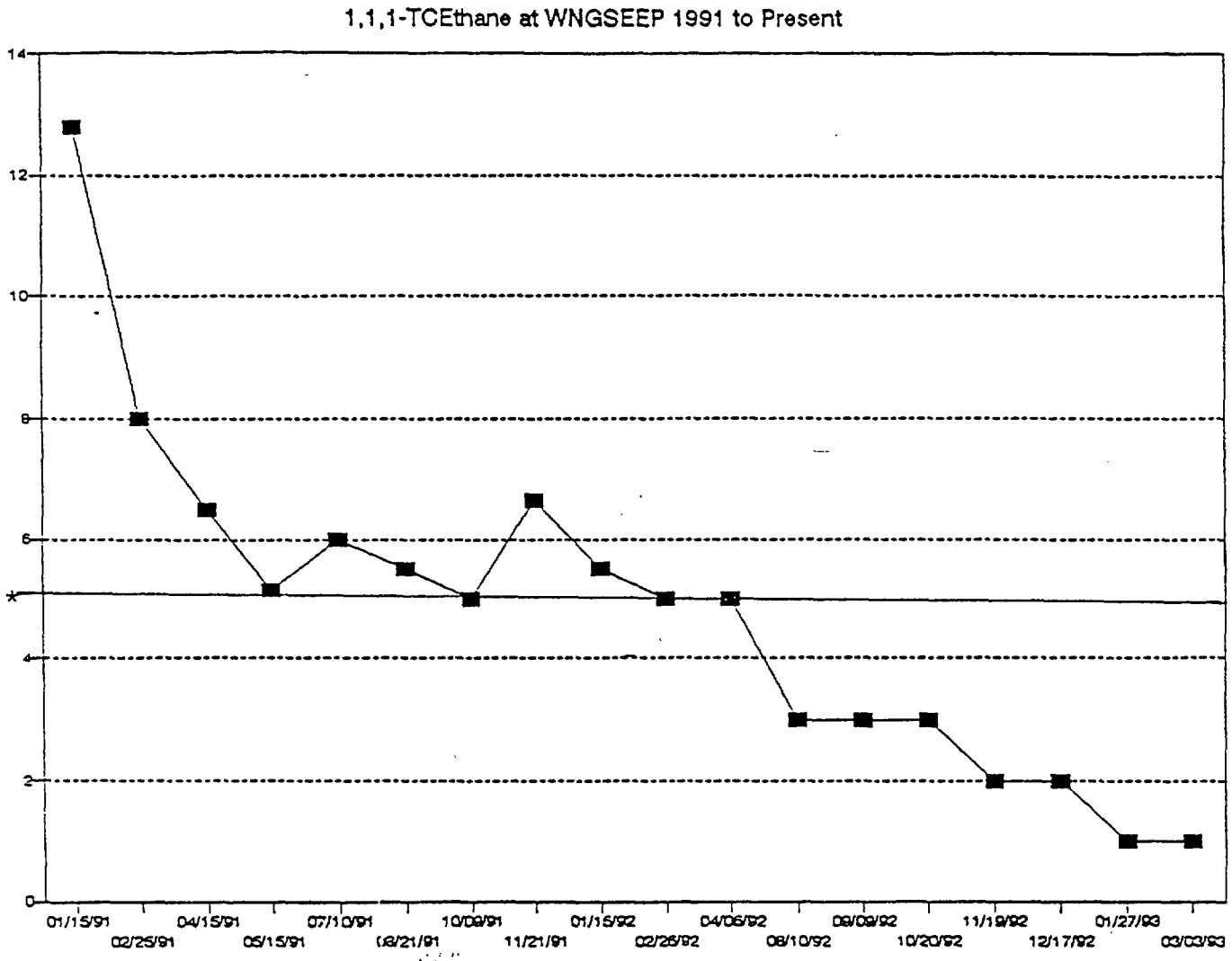


FIGURE B-11



2/26/92 and 4/6/92 results reported at less than 5.0 ppb.

* Represents the Practical Quantitation Limit.

FIGURE B-12

CONTRACTUAL LEVEL II DATA VALIDATION REPORT

Lab:_____ Matrix: Soil__
Release #:_____ Water__
Sample Description:_____ Other__

Analytical Protocol: 40 CFR 136 Appendix A (Organics); SW-846 (Organics/Inorganics); Standard Methods 18th Ed. (Organics/Inorganics); Method for Chemical Analysis of Water and Waste, 3rd Ed., USEPA

Validation Protocol: EM-108 (derived from EPA Region II SOP for "Evaluation of Metals Data for the CLP", HW-2, Rev. 10, 2/90 and "CLP Organics Data Review and Preliminary Review", HW-6, Rev. 8, 2/92).

1.1 The case description and exceptions, if any, are noted below with reason(s) for rejection or qualification as estimated value(s) J.

FIGURE B-12 (Continued)

CONTRACTUAL LEVEL II DATA VALIDATION REPORT

Lab:_____ Matrix: Soil_____
Release #:_____ Water_____
Sample Description:_____ Other_____

DATA ASSESSMENT SUMMARY FORM (ORGANICS)

Analytes Rejected Due to Exceeding Review Criteria: *

	Holding Times	Calibration	Method Blank	Trip/ Field Blank	Surrogates	Spike Recovery	Duplicates		Detection Limits	IS	DDT & Endrin Breakdown	Total Analytes	Rejection
							Lab	Field					
ICP													
Flame AA													
Furnace AA													
Mercury													
Wet Chem													
Other													
Total													

Analytes Flagged as Estimated "J" Due to Exceeding Criteria for: *

	Holding Times	Calibration	Method Blank	Trip/ Field Blank	Surrogates	Spike Recovery	Duplicates		Detection Limits	IS	DDT & Endrin Breakdown	Total Analytes	Rejection
							Lab	Field					
ICP													
Flame AA													
Furnace AA													
Mercury													
Wet Chem													
Other													
Total													

Completness = 100% - $\left(\frac{\text{\# analytes flagged R}}{\text{Total \# of analytes}} \times 100\right)$ = _____%

Note: Asterisk (*) Indicates additional Exceedances of review criteria

FIGURE B-12 (Continued)

CONTRACTUAL LEVEL II DATA VALIDATION REPORT

Lab:_____ Matrix: Soil_____
Release #:_____ Water_____
Sample Description:_____ Other_____

DATA ASSESSMENT SUMMARY FORM (ORGANICS)

Analytes Rejected Due to Exceeding Review Criteria: *

GC/MS	Holding Times	Calibration	Method Blank	Trip/ Field Blank	Surrogates	Spike Recovery	Duplicates		Detection Limits	IS	DDT & Endrin Breakdown	Total Analytes	Rejection
							Lab	Field					
VOA											N/A		
Semi VOA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
GC													
Pesticides													
Herbicides													
Total													

Analytes Flagged as Estimated "J" Due to Exceeding Criteria for: *

GC/MS	Holding Times	Calibration	Method Blank	Trip/ Field Blank	Surrogates	Spike Recovery	Duplicates		Detection Limits	IS	DDT & Endrin Breakdown	Total Analytes	Rejection
							Lab	Field					
VOA											N/A		
Semi VOA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
GC													
Pesticides													
Herbicides													
Total													

$$\text{Completness} = 100\% - \left(\frac{\#\ \text{analytes flagged R}}{\text{Total}\ \#\ \text{of analytes}} \times 100\right) = \_\_\_\_\_\%$$

Note: Asterisk (*) Indicates additional Exceedances of review criteria

ATTACHMENT B-1

STANDARD METHOD FOR PENETRATION TEST & SPLIT BARREL SAMPLING OF SOILS

Standard Method for Penetration Test and Split-Barrel Sampling of Soils[1]

This standard is issued under the fixed designation D 1586; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

This method has been approved for use by agencies of the Department of Defense and for listing in the DOD Index of Specifications and Standards.

1. Scope

1.1 This method describes the procedure, generally known as the Standard Penetration Test (SPT), for driving a split-barrel sampler to obtain a representative soil sample and a measure of the resistance of the soil to penetration of the sampler.

1.2 *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety problems associated with its use. It is the responsibility of whoever uses this standard to consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.* For a specific precautionary statement, see 5.4.1.

1.3 The values stated in inch-pound units are to be regarded as the standard.

2. Referenced Documents

2.1 *ASTM Standards:*

D 2487 Test Method for Classification of Soils for Engineering Purposes[2]

D 2488 Practice for Description and Identification of Soils (Visual-Manual Procedure)[2]

D 4220 Practices for Preserving and Transporting Soil Samples[2]

3. Descriptions of Terms Specific to This Standard

3.1 *anvil*—that portion of the drive-weight assembly which the hammer strikes and through which the hammer energy passes into the drill rods.

3.2 *cathead*—the rotating drum or windlass in the rope-cathead lift system around which the operator wraps a rope to lift and drop the hammer by successively tightening and loosening the rope turns around the drum.

3.3 *drill rods*—rods used to transmit downward force and torque to the drill bit while drilling a borehole.

3.4 *drive-weight assembly*—a device consisting of the hammer, hammer fall guide, the anvil, and any hammer drop system.

3.5 *hammer*—that portion of the drive-weight assembly consisting of the 140 ± 2 lb (63.5 ± 1 kg) impact weight which is successively lifted and dropped to provide the energy that accomplishes the sampling and penetration.

3.6 *hammer drop system*—that portion of the drive-weight assembly by which the operator accomplishes the lifting and dropping of the hammer to produce the blow.

3.7 *hammer fall guide*—that part of the drive-weight assembly used to guide the fall of the hammer.

3.8 *N-value*—the blowcount representation of the penetration resistance of the soil. The *N*-value, reported in blows per foot, equals the sum of the number of blows required to drive the sampler over the depth interval of 6 to 18 in. (150 to 450 mm) (see 7.3).

3.9 ΔN—the number of blows obtained from each of the 6-in. (150-mm) intervals of sampler penetration (see 7.3).

3.10 *number of rope turns*—the total contact angle between the rope and the cathead at the beginning of the operator's rope slackening to drop the hammer, divided by 360° (see Fig. 1).

3.11 *sampling rods*—rods that connect the drive-weight assembly to the sampler. Drill rods are often used for this purpose.

3.12 *SPT*—abbreviation for Standard Penetration Test, a term by which engineers commonly refer to this method.

4. Significance and Use

4.1 This method provides a soil sample for identification purposes and for laboratory tests appropriate for soil obtained from a sampler that may produce large shear strain disturbance in the sample.

4.2 This method is used extensively in a great variety of geotechnical exploration projects. Many local correlations and widely published correlations which relate SPT blowcount, or *N*-value, and the engineering behavior of earthworks and foundations are available.

5. Apparatus

5.1 *Drilling Equipment*—Any drilling equipment that provides at the time of sampling a suitably clean open hole before insertion of the sampler and ensures that the penetration test is performed on undisturbed soil shall be acceptable. The following pieces of equipment have proven to be suitable for advancing a borehole in some subsurface conditions.

5.1.1 *Drag, Chopping, and Fishtail Bits*, less than 6.5 in. (162 mm) and greater than 2.2 in. (56 mm) in diameter may be used in conjuction with open-hole rotary drilling or casing-advancement drilling methods. To avoid disturbance of the underlying soil, bottom discharge bits are not permitted; only side discharge bits are permitted.

5.1.2 *Roller-Cone Bits*, less than 6.5 in. (162 mm) and greater than 2.2 in. (56 mm) in diameter may be used in

[1] This method is under the jurisdiction of ASTM Committee D-18 on Soil and Rock and is the direct responsibility of Subcommittee D18.02 on Sampling and Related Field Testing for Soil Investigations.

Current edition approved Sept. 11, 1984. Published November 1984. Originally published as D 1586 - 58 T. Last previous edition D 1586 - 67 (1974).

[2] *Annual Book of ASTM Standards*, Vol 04.08.

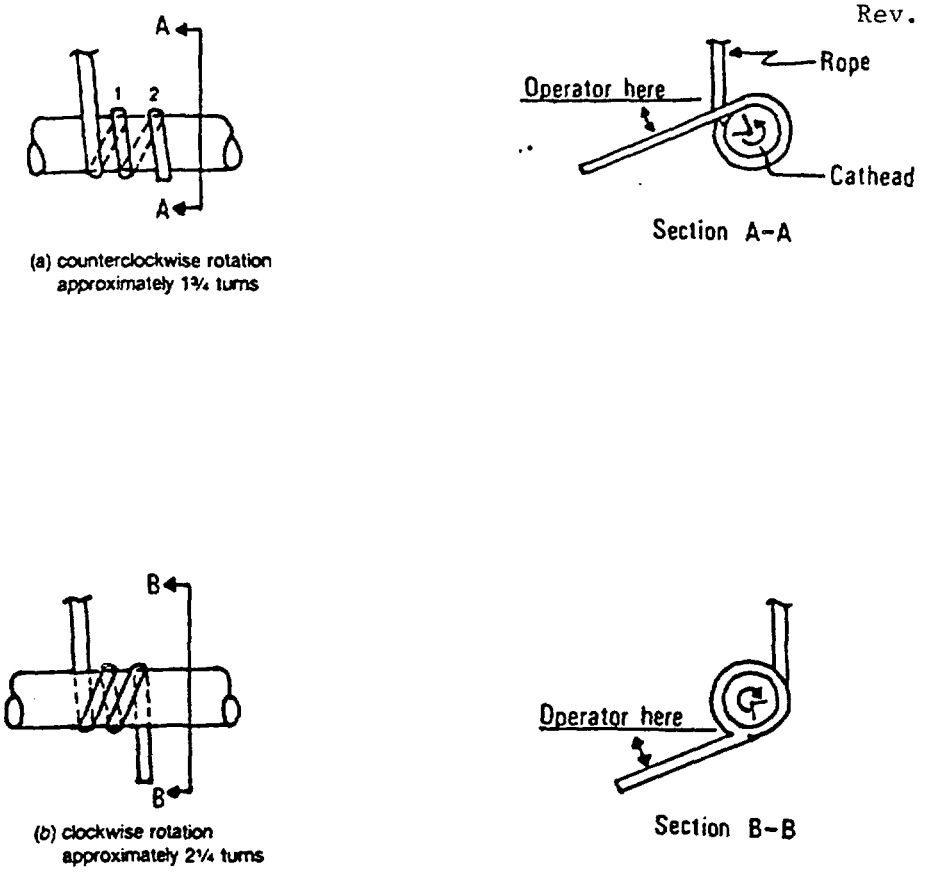


FIG. 1 Definitions of the Number of Rope Turns and the Angle for (a) Counterclockwise Rotation and (b) Clockwise Rotation of the Cathead

conjunction with open-hole rotary drilling or casing-advancement drilling methods if the drilling fluid discharge is deflected.

5.1.3 *Hollow-Stem Continuous Flight Augers*, with or without a center bit assembly, may be used to drill the boring. The inside diameter of the hollow-stem augers shall be less than 6.5 in. (162 mm) and greater than 2.2 in. (56 mm).

5.1.4 *Solid, Continuous Flight, Bucket and Hand Augers*, less than 6.5 in. (162 mm) and greater than 2.2 in. (56 mm) in diameter may be used if the soil on the side of the boring does not cave onto the sampler or sampling rods during sampling.

5.2 *Sampling Rods*—Flush-joint steel drill rods shall be used to connect the split-barrel sampler to the drive-weight assembly. The sampling rod shall have a stiffness (moment of inertia) equal to or greater than that of parallel wall "A" rod (a steel rod which has an outside diameter of 1⅝ in. (41.2 mm) and an inside diameter of 1⅛ in. (28.5 mm).

NOTE 1—Recent research and comparative testing indicates the type rod used, with stiffness ranging from "A" size rod to "N" size rod, will usually have a negligible effect on the *N*-values to depths of at least 100 ft (30 m).

5.3 *Split-Barrel Sampler*—The sampler shall be constructed with the dimensions indicated in Fig. 2. The driving shoe shall be of hardened steel and shall be replaced or repaired when it becomes dented or distorted. The use of liners to produce a constant inside diameter of 1⅜ in. (35 mm) is permitted, but shall be noted on the penetration record if used. The use of a sample retainer basket permitted, and should also be noted on the penetration record if used.

NOTE 2—Both theory and available test data suggest that *N*-values may increase between 10 to 30 % when liners are used.

5.4 *Drive-Weight Assembly:*

5.4.1 *Hammer and Anvil*—The hammer shall weigh 140 ± 2 lb (63.5 ± 1 kg) and shall be a solid rigid metallic mass. The hammer shall strike the anvil and make steel on steel contact when it is dropped. A hammer fall guide permitting a free fall shall be used. Hammers used with the cathead and rope method shall have an unimpeded overlift capacity of at least 4 in. (100 mm). For safety reasons, the use of a hammer assembly with an internal anvil is encouraged.

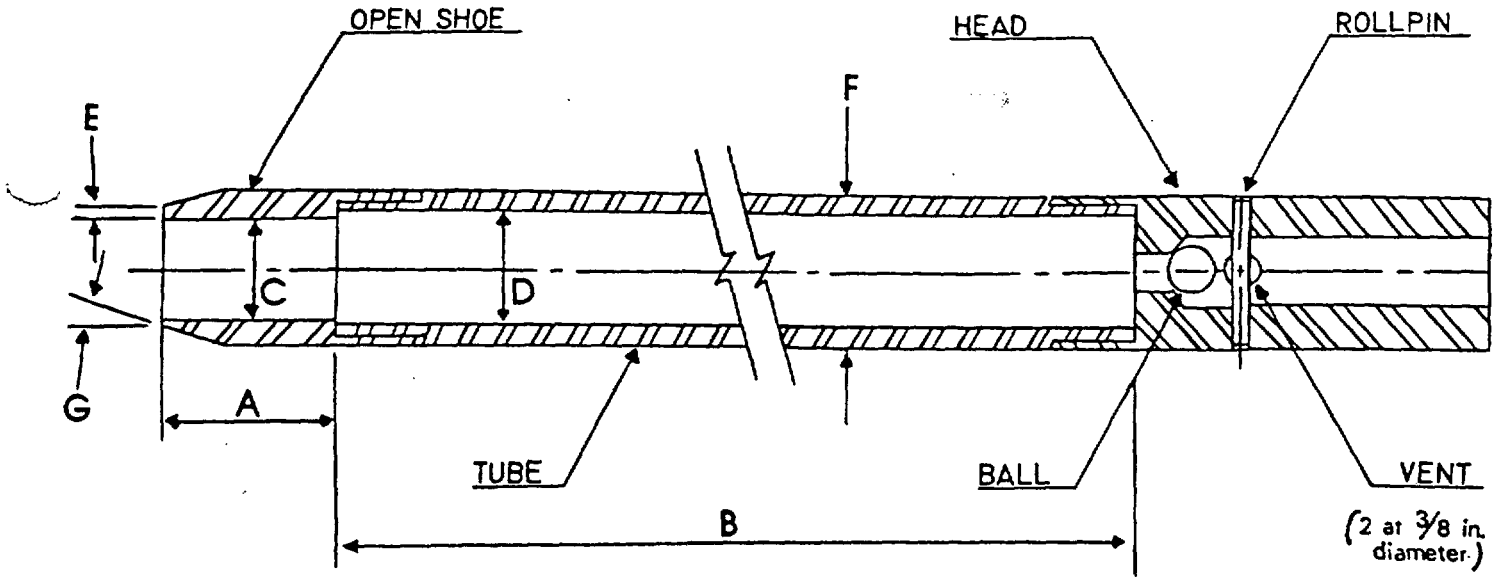
NOTE 3—It is suggested that the hammer fall guide be permanently marked to enable the operator or inspector to judge the hammer drop height.

5.4.2 *Hammer Drop System*—Rope-cathead, trip, semi-automatic, or automatic hammer drop systems may be used, providing the lifting apparatus will not cause penetration of the sampler while re-engaging and lifting the hammer.

5.5 *Accessory Equipment*—Accessories such as labels, sample containers, data sheets, and groundwater level measuring devices shall be provided in accordance with the requirements of the project and other ASTM standards.

6. Drilling Procedure

6.1 The boring shall be advanced incrementally to permit



A = 1.0 to 2.0 in. (25 to 50 mm)
B = 18.0 to 30.0 in. (0.457 to 0.762 m)
C = 1.375 ± 0.005 in. (34.93 ± 0.13 mm)
D = 1.50 ± 0.05 − 0.00 in. (38.1 ± 1.3 − 0.0 mm)
E = 0.10 ± 0.02 in. (2.54 ± 0.25 mm)
F = 2.00 ± 0.05 − 0.00 in. (50.8 ± 1.3 − 0.0 mm)
G = 16.0° to 23.0°

The 1½ in. (38 mm) inside diameter split barrel may be used with a 16-gage wall thickness split liner. The penetrating end of the drive shoe may be slightly rounded. Metal or plastic retainers may be used to retain soil samples.

FIG. 2 Split-Barrel Sampler

intermittent or continuous sampling. Test intervals and locations are normally stipulated by the project engineer or geologist. Typically, the intervals selected are 5 ft (1.5 mm) or less in homogeneous strata with test and sampling locations at every change of strata.

6.2 Any drilling procedure that provides a suitably clean and stable hole before insertion of the sampler and assures that the penetration test is performed on essentially undisturbed soil shall be acceptable. Each of the following procedures have proven to be acceptable for some subsurface conditions. The subsurface conditions anticipated should be considered when selecting the drilling method to be used.

6.2.1 Open-hole rotary drilling method.

6.2.2 Continuous flight hollow-stem auger method.

6.2.3 Wash boring method.

6.2.4 Continuous flight solid auger method.

6.3 Several drilling methods produce unacceptable borings. The process of jetting through an open tube sampler and then sampling when the desired depth is reached shall not be permitted. The continuous flight solid auger method shall not be used for advancing the boring below a water table or below the upper confining bed of a confined non-cohesive stratum that is under artesian pressure. Casing may not be advanced below the sampling elevation prior to sampling. Advancing a boring with bottom discharge bits is not permissible. It is not permissible to advance the boring for subsequent insertion of the sampler solely by means of previous sampling with the SPT sampler.

6.4 The drilling fluid level within the boring or hollow-stem augers shall be maintained at or above the in situ groundwater level at all times during drilling, removal of drill rods, and sampling.

7. Sampling and Testing Procedure

7.1 After the boring has been advanced to the desired sampling elevation and excessive cuttings have been removed, prepare for the test with the following sequence of operations.

7.1.1 Attach the split-barrel sampler to the sampling rods and lower into the borehole. Do not allow the sampler to drop onto the soil to be sampled.

7.1.2 Position the hammer above and attach the anvil to the top of the sampling rods. This may be done before the sampling rods and sampler are lowered into the borehole.

7.1.3 Rest the dead weight of the sampler, rods, anvil, and drive weight on the bottom of the boring and apply a seating blow. If excessive cuttings are encountered at the bottom of the boring, remove the sampler and sampling rods from the boring and remove the cuttings.

7.1.4 Mark the drill rods in three successive 6-in. (0.15-m) increments so that the advance of the sampler under the impact of the hammer can be easily observed for each 6-in. (0.15-m) increment.

7.2 Drive the sampler with blows from the 140-lb (63.5-kg) hammer and count the number of blows applied in each 6-in. (0.15-m) increment until one of the following occurs:

7.2.1 A total of 50 blows have been applied during any one of the three 6-in. (0.15-m) increments described in 7.1.4.

7.2.2 A total of 100 blows have been applied.

7.2.3 There is no observed advance of the sampler during the application of 10 successive blows of the hammer.

7.2.4 The sampler is advanced the complete 18 in. (0.45 m) without the limiting blow counts occurring as described in 7.2.1, 7.2.2, or 7.2.3.

7.3 Record the number of blows required to effect each 6 in. (0.15 m) of penetration or fraction thereof. The first 6 in. is considered to be a seating drive. The sum of the number of blows required for the second and third 6 in. of penetration is termed the "standard penetration resistance," or the "*N*-value." If the sampler is driven less than 18 in. (0.45 m), as permitted in 7.2.1, 7.2.2, or 7.2.3, the number of blows per each complete 6-in. (0.15-m) increment and per each partial increment shall be recorded on the boring log. For partial increments, the depth of penetration shall be reported to the nearest 1 in. (25 mm), in addition to the number of blows. If the sampler advances below the bottom of the boring under the static weight of the drill rods or the weight of the drill rods plus the static weight of the hammer, this information should be noted on the boring log.

7.4 The raising and dropping of the 140-lb (63.5-kg) hammer shall be accomplished using either of the following two methods:

7.4.1 By using a trip, automatic, or semi-automatic hammer drop system which lifts the 140-lb (63.5-kg) hammer and allows it to drop 30 ± 1.0 in. (0.76 m ± 25 mm) unimpeded.

7.4.2 By using a cathead to pull a rope attached to the hammer. When the cathead and rope method is used the system and operation shall conform to the following:

7.4.2.1 The cathead shall be essentially free of rust, oil, or grease and have a diameter in the range of 6 to 10 in. (150 to 250 mm).

7.4.2.2 The cathead should be operated at a minimum speed of rotation of 100 RPM, or the approximate speed of rotation shall be reported on the boring log.

7.4.2.3 No more than 2¼ rope turns on the cathead may be used during the performance of the penetration test, as shown in Fig. 1.

NOTE 4—The operator should generally use either 1¾ or 2¼ rope turns, depending upon whether or not the rope comes off the top (1¾ turns) or the bottom (2¼ turns) of the cathead. It is generally known and accepted that 2¾ or more rope turns considerably impedes the fall of the hammer and should not be used to perform the test. The cathead rope should be maintained in a relatively dry, clean, and unfrayed condition.

7.4.2.4 For each hammer blow, a 30-in. (0.76-m) lift and drop shall be employed by the operator. The operation of pulling and throwing the rope shall be performed rhythmically without holding the rope at the top of the stroke.

7.5 Bring the sampler to the surface and open. Record the percent recovery or the length of sample recovered. Describe the soil samples recovered as to composition, color, stratification, and condition, then place one or more representative portions of the sample into sealable moisture-proof containers (jars) without ramming or distorting any apparent stratification. Seal each container to prevent evaporation of soil moisture. Affix labels to the containers bearing job designation, boring number, sample depth, and the blow count per 6-in. (0.15-m) increment. Protect the samples against extreme temperature changes. If there is a soil change within the sampler, make a jar for each stratum and note its location in the sampler barrel.

8. Report

8.1 Drilling information shall be recorded in the field and shall include the following:

8.1.1 Name and location of job,

8.1.2 Names of crew,

8.1.3 Type and make of drilling machine,

8.1.4 Weather conditions,

8.1.5 Date and time of start and finish of boring,

8.1.6 Boring number and location (station and coordinates, if available and applicable),

8.1.7 Surface elevation, if available,

8.1.8 Method of advancing and cleaning the boring,

8.1.9 Method of keeping boring open,

8.1.10 Depth of water surface and drilling depth at the time of a noted loss of drilling fluid, and time and date when reading or notation was made,

8.1.11 Location of strata changes,

8.1.12 Size of casing, depth of cased portion of boring,

8.1.13 Equipment and method of driving sampler,

8.1.14 Type sampler and length and inside diameter of barrel (note use of liners),

8.1.15 Size, type, and section length of the sampling rods, and

8.1.16 Remarks.

8.2 Data obtained for each sample shall be recorded in the field and shall include the following:

8.2.1 Sample depth and, if utilized, the sample number,

8.2.2 Description of soil,

8.2.3 Strata changes within sample,

8.2.4 Sampler penetration and recovery lengths, and

8.2.5 Number of blows per 6-in. (0.15-m) or partial increment.

9. Precision and Bias

9.1 Variations in *N*-values of 100 % or more have been observed when using different standard penetration test apparatus and drillers for adjacent borings in the same soil formation. Current opinion, based on field experience, indicates that when using the same apparatus and driller, *N*-values in the same soil can be reproduced with a coefficient of variation of about 10 %.

9.2 The use of faulty equipment, such as an extremely massive or damaged anvil, a rusty cathead, a low speed cathead, an old, oily rope, or massive or poorly lubricated rope sheaves can significantly contribute to differences in *N*-values obtained between operator-drill rig systems.

9.3 The variability in *N*-values produced by different drill rigs and operators may be reduced by measuring that part of the hammer energy delivered into the drill rods from the sampler and adjusting *N* on the basis of comparative energies. A method for energy measurement and *N*-value adjustment is currently under development.

The American Society for Testing and Materials takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.

This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, 1916 Race St., Philadelphia, PA 19103.

ATTACHMENT B-2

CURRENT CHARACTERIZATION OF WASTES PLACED IN THE CPC WASTE STORAGE AREA

Attachment B-2
Current Characterization of Wastes Placed in the CPC Waste Storage Area

The Chemical Process Cell Waste Storage Area (CPCWSA) is located 275 m (900 ft) northwest of the process building at the northwestern margin of the WVDP. Stainless steel and carbon steel equipment contaminated with residues of radioactive waste are temporarily stored in the CPCWSA until a dedicated size reduction facility can be built to reduce the volume of this material.

The CPCWSA was built in 1985 as a temporary storage area for radioactively contaminated equipment removed from the chemical process cell. The CPCWSA was built on open ground on an area that was not used previously for disposal or storage activities by either NFS or the WVDP. The CPCWSA is a compacted gravel pad covering an area of roughly 4,310 m^2 (46,400 ft^2). The pad has a minimum 12-inch thickness of compacted clay fill overlain by a minimum of 6-inches of compacted gravel. The pad does not have an engineered drainage system; however, it is sloped so precipitation drains away from the storage area towards the nearby surface drainageways. Radioactive waste is stored in two areas at the CPCWSA, one inside a tent structure and the other outside of the tent.

The CPCWSA tent is a metal and fabric structure measuring 15.2 meters by 57.3 meters by 7.6 meters high (50 ft x 188 ft x 25 ft). The tent is constructed of sprung steel with a self-extinguishing herculite cover. The tent is mounted on wheels that run in tracks in the gravel pad enabling it to be moved out of the way when necessary to allow crane handling of storage boxes inside the tent. The actual storage area within the tent structure measures 6.7 m by 36.3 m (22 ft x 120 ft). The pad is elevated and sloped to allow run-off of any liquids.

There are four distinct storage areas within the tent structure.

Chemical Process Cell (CPC) Waste Storage Box Area

At the center of the tent are twenty-two carbon steel storage boxes identified with a prefix beginning with 3, 7, or J. These boxes are filled with radioactively contaminated stainless steel piping and equipment, such as dissolvers and evaporators, that were removed from the chemical process cell (CPC) during its decommissioning in 1985-1986. The storage boxes, which meet U.S. Department of Transportation requirements for "strong tight" containers (49 CFR 173.24), are sealed with a gasket of Buna-n-rubber and threaded rods and nuts.

Twelve of the storage boxes, labelled J-1 through J-12, are close-fit overpack boxes measuring 1.8 meters x 1.8 meters x 3.6 meters that contain a smaller box holding stainless steel piping or other debris. Seven of these boxes contain piping and hardware while the other five boxes contain miscellaneous waste and equipment removed from the CPC.

The remaining ten boxes, designated with a prefix beginning with 3 or 7, were custom made to accommodate oversized equipment in the CPC such as the dissolvers, evaporators and condensers. These boxes are equipped with trunion stands, saddles, and tie downs to support and secure the enclosed vessels.

The equipment in the 22 CPC waste storage boxes were not chemically characterized or analyzed by the EP-toxicity or the Toxicity Characteristic Leaching Procedure (TCLP) method prior to placement in the storage boxes due to the high radioactive dose rate emitted by this equipment. As a result it is not known whether any residual material associated with this equipment is a RCRA characteristic waste. In lieu of analytical data, the operational and decontamination history of the CPC will be examined to understand the processes and chemicals used in the CPC. Although the vessels may have contained what today would be considered a characteristic/mixed waste (corrosive & TCLP/EP toxic) during operations, the extensive flushing and cleaning of these vessels during decontamination operations in 1972-1974 and 1985-1986 removed most of this waste. Radioactive material etched into the metal surfaces and encrusted radioactive waste in remote areas of the

equipment is believed to account for the current contact dose rate emitted by these vessels.

Concrete Shield Container Area

Forty-five hexagonal-shaped concrete shield containers, labelled 1-45, surround the twenty-two CPC storage boxes. The concrete shield containers are used to reduce radiation exposure levels from the material in the CPC storage boxes which produce a significant radioactive contact exposure rate. The hexagonal containers are 206 cm (6.75 ft) wide and 320 cm (10.5 ft) high, and each contains twenty-one 55-gallon drums filled with radioactive and non-radioactive waste.

The forty-five hexagonal concrete storage containers which encircle the CPC waste storage boxes are each filled with twenty-one 55-gallon drums containing solid low-level radioactive waste or clean non-radioactive material. Low-level waste packaging criteria at the WVDP prohibit packaging of free liquids unless they are immobilized. The material contained in these drums is catalogued in the WVDP Radioactive Waste Inventory Database (RWID).

The RWID identifies the container, waste content, radioactive content, the location or job that generated the waste, and the location of the container. The following types of radioactive and non-radioactive wastes are present in the concrete shielding containers:

The following information is currently under review and may change. Final information will be documented in the RFI Report for this unit. This characterization also supports requirements under the Federal and State Facilities Compliance Agreement (FSFCA).

(Please note that the waste codes described below are RWID waste codes and not RCRA waste codes)

- Content Code A1 - AntiCs, Coveralls, Gloves, Herculite, Shoecovers, Plastic, Wipes.

- 136 drums, 35 of these drums contain one or more additional wastes such as A2 (23), B1 (12), C1 (1), and Q1 (1). Code A1 material includes general waste materials used in routine plant maintenance and decontamination activities including anti-contamination clothing (anti-Cs), gloves, plastic bags, wipes, air hoses, filter can masks, and cleaning supplies.

The cleaning supplies may include Windex™ and paint removers however, a full paper review has not been completed. Although low-level waste packaging criteria prohibit packaging of free liquids unless they are immobilized, it is possible that some partially empty containers of cleaning solutions were placed in these drums. The number of drums containing cleaning supplies is not known at present. Liquids may also be generated from the wipes via evaporation and condensation within the drums.

One of the drums is described as containing 89 pounds of paint chips and general waste. The composition of the paint chips is presently unknown.

- Content Code A2 - Air Hose, Rubber Matting, Roof Material.

- Twenty-three drums of Code A2 material, which includes air hoses, rubber matting, and roof material derived from routine maintenance and decontamination activities. All Code A2 material is stored in drums with Code A1 material.

- Content Code B1 - Metals

- Thirty-four drums contain metal such as grating, pails, paint cans, piping, and pumps removed from the plant during maintenance and decontamination activities. Thirteen of the drums contain additional waste codes such as A1 (12), A2 (1), C1 (1), and C2 (1).

Paint cans and paint trays that were used in the laundry room are present in one drum. The exact number of paint cans in the drum is unknown, but is believed to be few in number as the data sheets indicate that 35-pounds of paint cans, trays, and general waste are present in the drum. The residual paint may be hazardous waste or contain hazardous constituents.

- Content Code C1 - Dirt, Sand, Gravel

- 142 drums of code C1 waste, which includes radioactive and non-radioactive soil, sand, gravel, and mud.

128 of the drums are non-radioactive containing clean gravel mixed with Code C2 dry portland cement. The gravel and cement mixture was used to test material handling systems in the cement solidification system (CSS). Eight contain radioactively contaminated soil, five contain clean soil, and one contains radioactively contaminated soil mixed with plastic, paper, and metal.

- Content Code C2 - Cement, Concrete

- 131 drums of code C2 waste, consisting of dry portland cement or concrete. 128 of these drums also contain C1 material as described above.

Of the remaining three drums: one contains clean dry cement, the second is mixed with B1 waste, and the third contains sampling equipment used in taking samples from the high-level waste tank 8D-2.

- Content Code F1 - Low-level Wastewater Treatment Facility (LLWTF) Sludge

- 551 drums of sludge from the low-level wastewater treatment facility (LLWTF) flocculator. Since 1972, radioactively contaminated wastewater

has been treated by flocculation, clarification, and ion exchange processes in the LLWTF.

Ferrous sulfate or potassium ferrate, clay, and sodium hydroxide is added to the wastewater in the flocculation stage to produce a ferric hydroxide floc which co-precipitates the radionuclides from the water. The floc (sludge) is collected, centrifuged and drummed.

Two sludge samples were analyzed for Target Compound List (TCL) volatile organic compounds, semi-volatile organic compounds, pesticides/PCBs, herbicides, EP-toxicity metals, and Toxicity Characteristic Leaching Procedure (TCLP) metals in late June 1990. TCL Volatile organics were not detected in either sample. The TCL semi-volatile organic compound bis(2-ethylhexyl) phthalate was detected in one of the sludge samples at an estimated concentration of 4200 μg/Kg. This compound is a common plasticizer and did not originate from a listed RCRA waste based on process knowledge (Baker 1990).

All EP-toxicity and TCLP metal extract concentrations were below the RCRA maximum concentration levels specified in 40 C.F.R. 261.24.

- Content Code G1 - Laboratory Waste

- Three drums of waste from the WVDP analytical and process chemistry (A&PC) laboratory. This waste is described as consisting of planchettes, broken glass/plasticware, bench top wipes, failed equipment, disposable lab coats, and gloves.

A fourth drum containing this waste code was removed from extraction cell 3 in January 1984. Anti C's and hoses are the principal contents of this drum.

- Content Code N2 - Lead (Used for Shielding)

- One drum contains lead and radioactively contaminated cutting grit (code V1) used to cut fuel canister assemblies in the FRS. The lead is used for shielding as the grit emits an appreciable dose rate.

- Content Code N4 - Grit Shielding

- One drum contains garnet and radioactively contaminated cutting grit (code V1) used to cut fuel canister assemblies in the FRS. The garnet is used for shielding as the grit emits an appreciable dose rate.

- Content Code O1 - Low-level Wastewater Treatment Facility (LLWTF) Resin

- Eighty-five drums of spent ion exchange resin from the LLWTF. Two types of resin were used in the LLWTF: Duolite ARC-359 and Duolite Cs-100 . The material safety data sheets for these resins are included in Appendix .

Three samples of spent resin were analyzed for Target Compound List (TCL) volatile organic compounds, semi-volatile organic compounds, pesticides/PCBs, herbicides, EP-toxicity metals, and Toxicity Characteristic Leaching Procedure metals in late June 1990.

Volatile organics were not detected in any of the samples. The semivolatile organic bis (2-ethylhexyl) phthalate was positively identified in one of the resin samples at a concentration of 610 μg/Kg. The following semi-volatiles with their estimated concentrations were detected in the other two samples: phenol (25-79 μg/Kg), 4-Chloro-3 Methylphenol (23-72 μg/Kg), and bis (2-ethylhexyl) phthalate (64-93 μg/Kg).

The semi-volatile organics detected in the resin did not originate from a listed RCRA waste based on process knowledge (Baker 1990). The Duolite Cs-100 ion exchange resin, which was used in the LLWTF until December 1988, is a phenolic resin which may be the source of the

detected phenols. Bis (2-ethylhexyl) phthalate is a common plasticizer which may be used in the production of the ion-exchange resin. 4-Chloro-3 Methylphenol (4-Chloro-m-cresol) is a disinfectant which is used as a topical antiseptic.

All EP-toxicity and TCLP metal extract concentrations were below the RCRA maximum concentration levels specified in 40 C.F.R. 261.24.

- Content Code Q1 - Non-Asbestos Insulation

- One drum contains a mixture of non-asbestos insulation, described as ceiling/floor tile and foam, and code A1 material.

- Content Code V1 - FRS Grit and By-Products (Canister Cut-up Operation)

- Two drums of code V1 waste consisting of cutting grits generated from a high-pressure liquid abrasive cutting system used to cut fuel storage canisters in the fuel storage pool. The cutting grit contains the silica or aluminum oxide abrasive, aluminum that was removed from the storage canisters during cutting, and metal oxides which developed on the canisters during the years they spent under water. The grit has an appreciable dose rate and is shielded by lead. The grit itself is not believed to display any hazardous characteristics.

One of the drums contains lead (waste code N2) for shielding purposes and the other contains grit (garnet) shielding (waste code N4).

Northeastern and Southwestern Ends of the Tent Structure

Thirteen steel containers designated by the prefix SR- or SP-, are stored within the tent outside of the concrete shielding in the southwestern and northeastern ends of the tent structure. These containers are filled with size reduced, radioactively contaminated equipment that was removed from the

process building during decommissioning activities. Nine of the containers are located on the southwestern side and the remainder are located on the northeastern side of the tent structure.

The boxes contain large equipment such as manipulators, crane legs, extraction cell columns, and process vessel sections. These wastes are not expected to display any hazardous characteristics. Container SR-034 which contains a transfer box containing sample clean-up from the high-level waste tank 8D-2. The liquid and sludge in tank 8-D2 are classified as a hazardous waste by characteristics with the following applicable waste codes: D005 (Barium), D006 (Cadmium), D007 (Chromium), D009 (Mercury), and D010 (Selenium), however characterization of the clean-up equipment has not been made.

Outside Storage Area

Radioactive and non-radioactive waste is currently stored outside in an area immediately southeast of the tent structure. A total of 198 polyethylene overpack (POP's) drums are arranged in two rows that parallel the long dimension of the tent structure. Currently 198 POP containers are stored on wooden pallets on the compacted gravel storage pad outside the CPC tent structure. The POPs are covered with a cloth tarpaulin. The POPs contains drums of cement-solidified uranyl nitrate hexahydrate solution.

- Content Code T1 - Uranyl Nitrate Hexahydrate (UNH) Flush

  - Cement-stabilized UNH is stored in 195 drums in POP containers outside the CPCWSA tent. The UNH was a 3 molar nitric acid solution containing depleted uranium and transuranic contaminants from the scrap plutonium reprocessed during the last NFS fuel reprocessing campaign. The UNH was the first radioactive solutions to be stabilized in the cement solidification system (CSS) in 1987.

- Content Code T2 - Suspected Uranyl Nitrate Hexahydrate (UNH) Flush.

- Three drums of suspected UNH flush are currently stored on the pad outside the CPCWSA tent structure.

Seven carbon steel storage boxes are stored immediately southeast of the POP's. The steel boxes are also covered with a cloth tarpaulin. These boxes are stored on the gravel pad outside the tent structure. Boxes SR-026 through SR-031 contain radioactively contaminated shield doors and their associated footers that were removed from the equipment decontamination room. The shield doors were of carbon steel, concrete, and rebar construction. The footing was of rebar and concrete construction. The shield doors and footing were each cut into three pieces and placed into individual storage boxes.

Box SR-013 contains steel beam and grating from extraction cell 3 and two demineralizer tanks removed from the utility room.

In addition, a radioactivly contaminated vehicle is also stored on gravel pad outside of the CPC storage tank.

ATTACHMENT B-3

1991 SAMPLING RESULTS OF LAGOON 3 SEDIMENTS

TCLP Metals Results

Metal	Result (mg/L)	MCL* (mg/L)
Arsenic	<0.032	5.0
Barium	2.25	100.0
Cadmium	0.006	1.0
Chromium	0.008	5.0
Lead	0.052	5.0
Mercury	<0.0002	0.2
Selenium	<0.052	1.0
Silver	<0.006	5.0

*MCL - Maximum contaminant level as defined in 40 CFR 261.24 for RCRA hazardous toxicity characteristics.

TCL Metals Results
(mg/kg)

Metal	Top Strata	Bottom Strata
Aluminum	15600	15100
Antimony	<2.07	<1.02
Arsenic	15.1	13.4
Barium	76.7	105
Beryllium	0.912	0.776
Calcium	18100	25600
Cadmium	0.286	<0.114
Chromium	22.0	18.6
Cobalt	12.5	11.6
Copper	22.5	15.6
Iron	30700	29900
Lead	36.0	18.7
Magnesium	10100	11100
Manganese	342	370
Mercury	<0.340	<0.352
Nickel	32.3	27.7
Potassium	3270	2430
Selenium	<5.98	<2.96
Silver	<0.649	<0.341
Sodium	609	794
Thallium	<16.1	<19.9
Vanadium	8.86	8.73
Zinc	89.3	65.5

ATTACHMENT B-4

1988 EPTOX SAMPLING RESULTS OF THE SLUDGE POND

EP-Toxicity Metals, pH, and Major Anion Concentrations from the North Demineralizer Sludge Pond

EPTOX SAMPLE EXTRACTS ---------- (mg/l) ----------

Major Anions ----- PPM (WET WT) -----

SAMPLE ID	SAMPLE DATE	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	pH	F	Cl	NO2	NO3	PO4	SO4
N-35-0-12	10JUN88	<0.5	<10	<0.1	<0.5	<0.5	<0.02	<0.1	<0.5	7.44	<2.0	46	<10	<10	<10	91.1
N-35-12-24	10JUN88	<0.5	<10	<0.1	<0.5	<0.5	<0.02	<0.1	<0.5	7.26	<2.0	216	<10	<10	<10	115.4
N-35-24-36	10JUN88	<0.5	<10	<0.1	<0.5	<0.5	<0.02	<0.1	<0.5	6.82	<2.0	262	<10	<10	<10	57.5
N-55A-0-12	10JUN88	<0.5	<10	<0.1	<0.5	<0.5	<0.02	<0.1	<0.5	7.24	<2.0	395	<10	<10	<10	67.6
N-55A-12-36	10JUN88	<0.5	<10	<0.1	<0.5	<0.5	<0.02	<0.1	<0.5	6.98	<2.0	37	<10	<10	<10	90.2
N-55A-24-36	10JUN88	<0.5	<10	<0.1	<0.5	<0.5	<0.02	<0.1	<0.5	6.86	<2.0	388	<10	<10	<10	65.8
N-55B-0-12	10JUN88	<0.5	<10	<0.1	<0.5	<0.5	<0.02	<0.1	<0.5	7.27	<2.0	88	<10	<10	<10	35.8
N-55B-12-24	10JUN88	<0.5	<10	<0.1	<0.5	<0.5	<0.02	<0.1	<0.5	6.99	<2.0	312	<10	<10	<10	75.6
N-55B-24-36	10JUN88	<0.5	<10	<0.1	<0.5	<0.5	<0.02	<0.1	<0.5	6.87	<2.0	244	<10	<10	<10	536.5
N-55C-0-12	10JUN88	<0.5	<10	<0.1	<0.5	<0.5	<0.02	<0.1	<0.5	7.25	<2.0	395	<10	<10	<10	109.3
N-55C-12-24	10JUN88	<0.5	<10	<0.1	<0.5	<0.5	<0.02	<0.1	<0.5	7.04	<2.0	56	<10	<10	<10	121.4
N-62-0-12	10JUN88	<0.5	<10	<0.1	<0.5	<0.5	<0.02	<0.1	<0.5	7.54	<2.0	59	<10	<10	<10	298.9
N-62-12-24	10JUN88	<0.5	<10	<0.1	<0.5	<0.5	<0.02	<0.1	<0.5	6.95	<2.0	290	<10	<10	<10	118.0
N-62-24-36	10JUN88	<0.5	<10	<0.1	<0.5	<0.5	<0.02	<0.1	<0.5	6.88	<2.0	177	<10	<10	<10	71.8
N-AVG 0-12"	CALCULATED	<0.5	<10	<0.1	<0.5	<0.5	<0.02	<0.1	<0.5	7.35	<2.0	197	<10	<10	<10	120.5
N-AVG 12-24"	CALCULATED	<0.5	<10	<0.1	<0.5	<0.5	<0.02	<0.1	<0.5	7.04	<2.0	182	<10	<10	<10	104.1
N-AVG 24-36"	CALCULATED	<0.5	<10	<0.1	<0.5	<0.5	<0.02	<0.1	<0.5	6.86	<2.0	268	<10	<10	<10	182.9

EP-Toxicity Metals, pH, and Major Anion Concentrations from the South Demineralizer Sludge Pond

	EPTOX SAMPLE EXTRACTS (mg/l)										Major Anions PPM (WET WT)					
SAMPLE ID	SAMPLE DATE	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	pH	F	Cl	NO2	NO3	PO4	SO4
S-25-0-12	10JUN88	<0.5	<10	<0.1	<0.5	<0.5	<0.02	<0.1	<0.5	6.74	<2.0	<10	<10	<10	<10	80.1
S-25-12-24	10JUN88	<0.5	<10	<0.1	<0.5	<0.5	<0.02	<0.1	<0.5	6.72	<2.0	22	<10	<10	<10	84.8
S-29-0-12	10JUN88	<0.5	<10	<0.1	<0.5	<0.5	<0.02	<0.1	<0.5	6.67	<2.0	193	<10	12	<10	46.0
S-29-12-24	10JUN88	<0.5	<10	<0.1	<0.5	<0.5	<0.02	<0.1	<0.5	7.05	<2.0	88.9	<10	<10	<10	252.7
S-37-0-12	10JUN88	<0.5	<10	<0.1	<0.5	<0.5	<0.02	<0.1	<0.5	6.84	<2.0	<10	<10	<10	<10	137.4
S-37-12-24	10JUN88	<0.5	<10	<0.1	<0.5	<0.5	<0.02	<0.1	<0.5	6.88	<2.0	<10	<10	<10	<10	225.2
S-44-0-12	10JUN88	<0.5	<10	<0.1	<0.5	<0.5	<0.02	<0.1	<0.5	6.42	<2.0	240	<10	<10	<10	200.1
S-52-0-12	10JUN88	<0.5	<10	<0.1	<0.5	<0.5	<0.02	<0.1	<0.5	7.01	<2.0	42	<10	<10	<10	52.8
S-AVG 0-12	CALCULATED	<0.5	<10	<0.1	<0.5	<0.5	<0.02	<0.1	<0.5	6.73	<2.0	99	<10	<10	<10	103
S-AVG 12-24	CALCULATED	<0.5	<10	<0.1	<0.5	<0.5	<0.02	<0.1	<0.5	6.88	<2.0	40	<10	<10	<10	188

NOTES: 10ppm NO3 = 2.26 NO3-N; 10ppm NO2 = 3.04 NO2-N

ATTACHMENT B-5

CDDL Closure Plan

Dr. W. H. Hannum, Director
West Valley Demonstration Project
U. S. Department of Energy
P. O. Box 191
West Valley, NY 14171-0191

Attention: Dr. Hannum

Subject: Solid Waste Landfill Leachate Breakout Evaluation

Reference: Letter DW:85:0382, R. C. Wozniak to W. H. Hannum, dated July 25, 1985, subject "Leachate Breakouts of Solid Waste Landfill".

Dear Dr. Hannum:

The referenced letter identifies the need for preparation of a plan to address the suspected breakouts by the construction landfill site. The purpose of this letter is to transmit a copy of the analysis of the samples taken at each breakout for EP Tox Metals and a total Halogenated Organic Scan and to transmit the containment plan. The results of the analysis (attached) show that the EP Tox Metals are well below the EPA allowable maximum concentrations and that total Organic Halogens are at only trace levels. WVNS is continuing with closure of the construction landfill site.

Prepared by:

Charles R. Nawrot

C. R. Nawrot
Facilities Engineering
West Valley Demonstration Project

Approved by:

Paul N. Standish

Paul N. Standish, Manager
Facilities Engineering
West Valley Demonstration Project

ED:85:0117

clh

Attachments

cc: E. Maestas, DOE-WV

CLH00189

West Valley Demonstration Project
Construction Landfill
Supplement to Closure Plan

I. Background

Operation of the construction debris landfill was terminated in March, 1985. Interim cover was placed over the last of the exposed wastes during spring of 1985 and the entire area was graded to improve drainage. A detailed engineered final closure plan meeting the requirements of the State Regulation 6 NYCRR 360 was submitted to NYDEC for their approval (Reference letter WD:85:0434).

A preliminary inspection of the construction landfill was requested by the NYDEC to be completed prior to the approval of the final cover closure plan. This inspection was held on July 23, 1985 and revealed three possible leachate breakouts on the north and east slopes of the landfill. Letter DW:85:0382 identified that NYDEC approval of the final cover closure plan is contingent upon leachate analysis and containment of these breakouts.

II. Present Status

Suspected Soil Leachate Analysis

The suspected soil sample collection and analysis taken in areas of concern around the landfill, has been completed by the Safety and Environmental Assessment Department through EAL Corporation (California). The results are attached and indicates that the suspected soil EP toxicity are well below the EPA allowable maximum concentrations and total Halogen Organics are at only trace levels.

Suspected Soil Leachate Containment

As a result of the above analysis and conversation between Mr. Maestas (DOE) and Mr. Wozniak (NYDEC), it was determined to proceed with the engineered closure plan for the termination of the construction landfill site. The suspected areas appear to be caused by water run off and/or stains that were initially deposited during the earlier period of landfill use. No other remedial schemes are planned for the questionable areas other than more emphasis will be placed in these areas when the final cover is placed.

An additional specification to the engineering closure plan will be added to provide a minimum four (4) horizontal to one (1) vertical slope around the perimeter of the construction landfill.

In order to meet this requirement a two (2) foot diameter culvert will be installed in the drainage ditch that runs along the north side of the landfill. The culvert will be used to drain surface water from the northwest area of the landfill and divert it into Frank's creek. This culvert will be covered with on-site material and the proposed slope will be established.

Schedule

		Start	Finish
1)	Surveying and soil sampling of the present construction landfill.	10/7	10/18
2)	Soil sampling of on-site material to be used for final cover of the construction landfill.	10/9	10/18
3)	Develop detail requirements for the Final Cover of the Landfill site.	10/2	10/11
4)	Issued purchase order to contractors for bid.	10/21	10/25
5)	Award contract to contractor.	10/28	10/31
6)	Placement of final cover.	11/4	~~11/22~~

Thermo Electron Corporation

EAL Corporation

2030 Wright Avenue
Richmond, California 94804
(415) 235-2633
(TWX) 910-382-8132

West Valley Nuclear
P.O. Box 191
West Valley, NY 14171
Attn: Ed Picazo

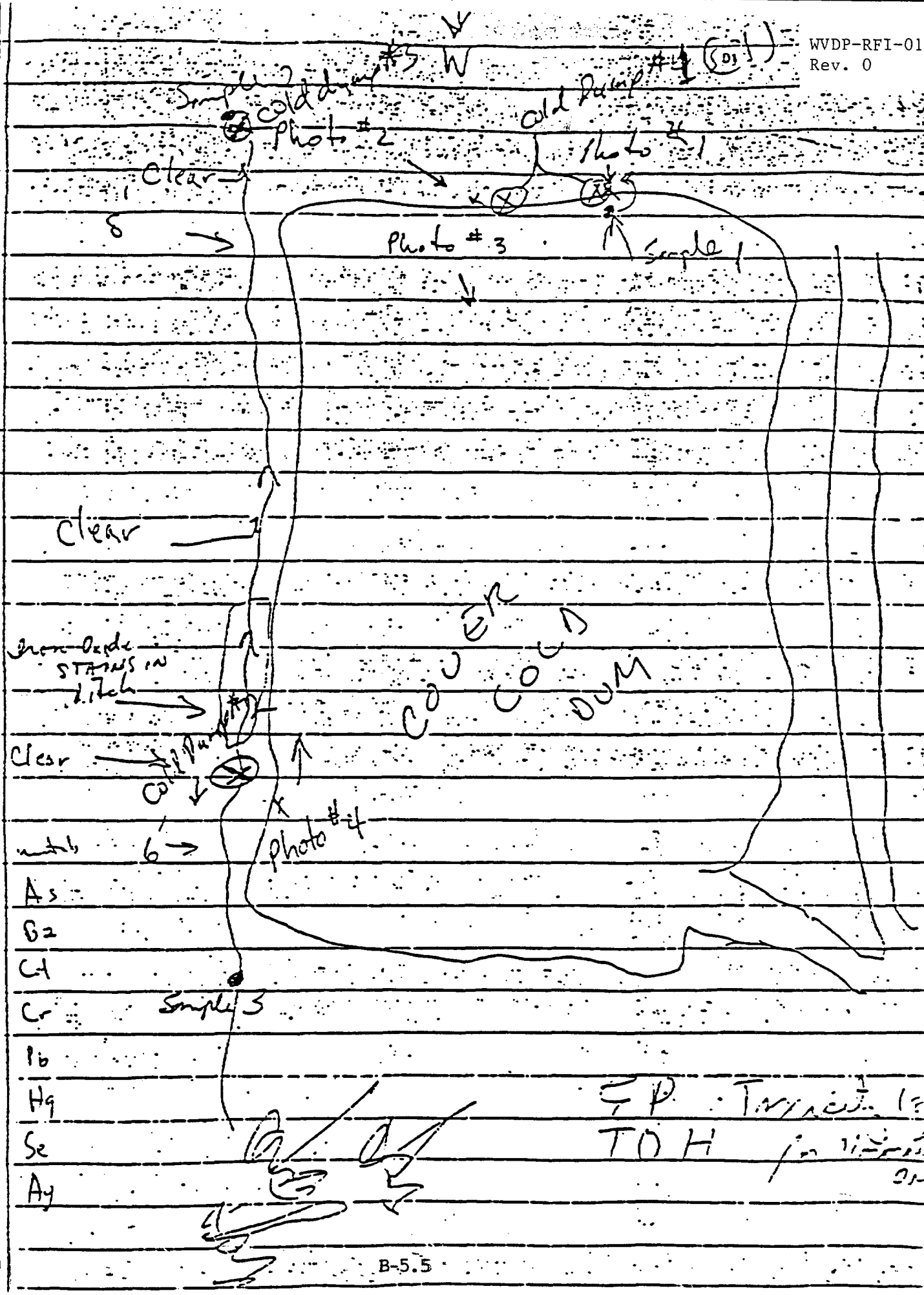
September 6, 1985
Samples Received: 8/16/85
EAL Lab No.: 2473-80

Sample Identification Analysis	Units	2473-80-1 Cold Dump #1	EPA Max. Concentration of Containments for Characteristics of EP Toxic
EP Toxicity Results			
Arsenic	mg/L	<0.01	5.0
Barium	mg/L	<0.5	100.0
Cadmium	mg/L	<0.04	1.0
Chromium	mg/L	<0.1	5.0
Lead	mg/L	<0.1	5.0
Mercury	mg/L	<0.001	0.02
Selenium	mg/L	<0.003	1.0
Silver	mg/L	<0.1	5.0

Sample Identification Analysis	Units	2473-80-2 Cold Dump #2	2473-80-3 Cold Dump #3	2473-80-1 Cold Dump #1
Arsenic	mg/L	<0.005	<0.005	—
Barium	mg/L	0.2	0.1	—
Cadmium	mg/L	<0.005	<0.005	—
Chromium	mg/L	<0.01	<0.01	—
Lead	mg/L	<0.02	<0.02	—
Mercury	mg/L	<0.001	<0.001	—
Selenium	mg/L	<0.003	<0.003	—
Silver	mg/L	<0.01	<0.01	—
Total Organic Halogen	ug/L	27	30	23 (ug/kg)

Mary Gray
Program Manager

MG/dss


Sample 2
cold dump #3
W
cold Dump #1
Photo #2
Photo #1
Clear
δ
Photo #3
Sample 1
Clear
Iron Oxide STAINS IN ditch
COVER COLD DUM
Clear
Cold Dump #2
6
Photo #4
As
Ba
Cd
Cr
Pb
Hg
Se
Ag
Sample 3
TOH

CORRESPONDENCE CONTROL SHEET

USE ONLY

WVNS CORRESPONDENCE DESIGNATOR

Subject Codes

1. THE AUTHORIZING ORGANIZATION ALPHA-NUMERIC DESIGNATOR ED:85:0117 DATE 9/30/85
2. SUBJECT (Max. of 50 Char.) Solid Waste Landfill Leachate Breakout Evaluation
3. THIS DOCUMENT HAS BEEN CHECKED FOR PROPRIETARY AND PATENTABLE INFORMATION [X]
4. ENTER APPROPRIATE WORK BREAKDOWN STRUCTURE (WBS) NO. 1.3.2.
5. THIS CORRESPONDENCE COMPLETES COMMITMENT NOS. none
6. DOES THIS CORRESPONDENCE REQUIRE AN ACTION RESPONSE? YES ☐ NO ☒
7. APPROVAL SIGNATURES. . . NOTE – MUST INCLUDE ALL INTERFACING SECTIONS/DEPTS.

REVIEWER (PRINTED OR TYPED)	SIGNATURE	Approve	Approve but with Comments	Do not Concur Supply Comments	DA
J. Englert		☐	☐	☐	
R. F. Gessner		☐	☐	☐	
C. L. Roberts		☐	☐	☐	
P. J. Valenti		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	

COMMENTS:

8. P.O. # (If applicable, Max. 8 Char.) n/a
9. DOES THIS CORRESPONDENCE RELATE TO OTHER CORRESPONDENCE/DOCUMENTS?
☒ YES ☐ NO IF YES, ENTER THE WVNS CORRESPONDENCE DESIGNATOR FROM THOSE DOCUMENTS HERE DW:85:0382

NAME OF COGNIZANT PERSON: Chester R. Nawrot EXT. 596

SIGNATURE OF NEXT HIGHER MGR. OF SIGNER: H. F. Daugherty DATE

SIGNATURE OF PERSON SIGNING CORRESPONDENCE: P. N. Standish — PN Standish — 10/4/

DOC. NUMBER WVNS-CM-137
REVISION NUMBER 0
REVISION DATE 3/31/86
BASELINED ☐ YES ☒ NO

West Valley Demonstration Project

CLOSURE OF THE CONSTRUCTION LANDFILL

PREPARED BY [signature] 3/31/86
COGNIZANT ENGINEER - DATE

APPROVED BY [signature] 3/31/86
COGNIZANT MANAGER - DATE

West Valley Nuclear Services Co.
P.O. Box 191
West Valley, N.Y. 14171-0191

WVNS-CM-137, Rev. 0

PROJECT TITLE: CLOSURE OF THE CONSTRUCTION LANDFILL

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01400 - Quality Control
01500 - Facilities

DIVISION 15 - SITE WORK

SECTION

02200 - Earthwork

WVNS-CM-137, Rev. 0

DIVISION 1

SECTION 01010

SUMMARY OF WORK

1.0 INTRODUCTION

1.1 West Valley Nuclear Services Co. Inc., hereafter abbreviated WVNS, as contractor for the U.S. Department of Energy, West Valley Demonstration Project, is planning to close the Construction Landfill; located at the WVDP site in West Valley, New York.

1.2 The purpose of this specification is to present the basis upon which all activities shall be governed.

1.3 The Subcontractor shall be responsible for all aspects associated with the closing of the Construction Landfill, in accordance with New York State Regulation 6 NYCRR 360. Subcontractor shall supply a Registered Professional Engineer, in the state of New York, with minimum five (5) years Civil Engineering practice, to supervise and follow all work included in this specification.

1.4 In particular, it shall be the subcontractor's responsibility to insure that the supervision and work forces of both theirs and subtier-contractors, who are assigned to work on this project, have the capability to provide the care and workmanship defined by this specification.

1.5 The present facilities are essentially as illustrated on the reference drawings of this section in Paragraph 5.1.1.

2.0 SCOPE OF WORK

2.1 The Subcontractor shall furnish, in complete conformity with this specification, full-time supervision, all labor, tools, equipment (eg., air compressors, electrical power generators, excavating equipment, compaction equipment, trucks, loaders, etc.) and all other materials, to totally complete the desired Scope of Work.

2.2 The Subcontractor shall attend a pre-bid tour for an evaluation of the Construction Landfill existing conditions. The Contractor shall evaluate and consider in his bid package 1) use of on-site fill material (NYSERDA designated area)* and 2) use of off-site fill material meeting acceptable criteria as defined in this specification.

* On-site fill material must be surveyed/released by Radiation and Safety prior to removal.

2.3 The Subcontractor shall be responsible for performing the following work.

2.3.1 Perform a survey of the area to be capped, to verify the area and present elevations.

2.3.2 Along the north edge of the landfill, install a 2' diameter x approximately 250' long corrugated culvert in the existing drainage ditch. Cover with approximately 2' of bank run gravel and backfill with existing material.

2.3.3 Spread and compact a 12 inch cover over the landfill to 91% modified proctor density.

2.3.4 Place six (6) inches of high quality top soil and seed all areas disturbed by construction.

2.3.5 Provide a 4 to 1 (horizontal-vertical) slope around the entire landfill perimeter for proper drainage.

2.3.6 Resurvey the area and prepare a topographic map showing the detail contour of the final grading.

2.3.7 Use of the NYSERDA borrow area as the source of fill material (see NYS, 20 Acre Site Map) will require that the subcontractor regrade and restore the area to its original slope to minimize erosion and seed the area disturbed by Construction.

3.0 CONSTRUCTABILITY REVIEW BY THE SUBCONTRACTOR

3.1 The Subcontractor shall be responsible for review and complete concurrence with this specification and drawings. The Subcontractor shall advise WVNS, in writing of any design, material or installation procedural deficiencies which would detract from the desired construction results, are contradictory to New York State Regulation, 6 NYCRR 360 and/or schedule prior to commencement of the work.

4.0 SCHEDULE

4.1 The contractor shall submit a bar chart time schedule, for review and approval. The chart shall include scheduling of all significant activities, including material ordering and deliveries.

4.2 The project shall be completed within 30 calendar days after issuance of the notice to proceed with the work.

5.0 REFERENCES

5.1 The following drawings/sketches are included. To the knowledge of WVNS, these are sufficient for the purposes of this project.

5.1.1 Existing Facilities

a. NYS, 20 Acre Site Map
b. 900E-037 Rev. 1

6.0 CONSTRUCTION SAFETY AND HEALTH REQUIREMENTS

6.1 The subcontractor shall submit a descriptive outline of the programs encompassing Occupational Safety, in compliance with applicable OSHA regulations. The outline shall include, but not be limited to the following.

6.1.1 Adequate provisions for emergency response (i.e., first aid, fire protection).

6.1.2 Worker training.

6.1.3 Job site safety.

6.1.4 Accident investigation and reporting.

6.1.5 All excavation/construction equipment shall be in good working order and shall comply with all OSHA Requirements.

6.1.6 Protective equipment to be supplied by the subcontractor for his work force.

6.2 The subcontractor shall follow the rules as set forth in the WVNS "Safety, Health, and Security Rules for On-site Services" WV-19012 in performing work on the WVNS site. Subcontractor is to carefully review the subject document to ensure full compliance.

6.3 The name of the job site subcontractor management official who is responsible for overall project direction, supervision and implementation of the above cited safety and health programs shall be submitted.

6.4 WVNS shall monitor the actual practices of the subcontractor to assure that the subcontractor's Safety and Health programs, as well as the applicable OSHA regulations and WVNS site practices are being fully complied with. Any violations will be brought to the attention of the subcontractor for his immediate remedial action. WVNS reserves the right to issue stop work orders, at the subcontractors expense, until such remedial action has been executed. Any rework required as a result of non-conformance to this specification, and or applicable OSHA/WVNS regulations shall be done at the subcontractors expense, not the U.S. Department of Energy (DOE) or WVNS.

7.0 WORK PERMITS

Any digging/excavation work on the WVDP site requires a Radiation Work Permit (RWP). All work as described in WVNS Form WV-19012 (Safety, Health and Security Rules for On-site Services), Section 4.1.7 and 4.2.8 will require an Industrial Work Permit (IWP).

8.0 RADIOLOGICAL CONSIDERATIONS

8.1 This project has not been classified as a Radiological Work Permit project.

NOTE: Although an RWP is required (see Work Permits) it is expected that no radiological controls will be necessary. Radiation and Safety will dictate when controls are needed or when the RWP requirement will no longer be necessary.

9.0 DISPOSAL OF MATERIAL

9.1 The subcontractor shall be responsible for removing all miscellaneous non-radioactive construction wastes and debris from the work site.

9.2 Upon award of contract, one or two waste containers shall be assigned for use by the subcontractor. These waste containers shall be used for the disposal of non-radioactive wastes only.

9.3 All construction wastes/debris shall be monitored by WVNS Radiation and Safety prior to disposal and/or removal from the WVDP site premises.

10.0 JOINT USE OF AREAS

10.1 WVNS will maintain paved and surfaced roads inside the security fence areas.

10.2 Paved access areas and roads are joint use areas for WVNS operations and subcontractors. All activities requiring use of these areas shall be scheduled and coordinated with the cognizant engineer and WVNS operations.

END OF SECTION

DIVISION 1

SECTION 01400

QUALITY CONTROL

1.0 REFERENCES STANDARDS AND SPECIFICATIONS

1.1 Work performed shall be in compliance with the applicable requirements of this specification, codes, standards and contract documents. The applicable standards for inspection, testing, and certification will be the most recent revision as of the bid due date.

2.0 DOCUMENT CONTROL

2.1 Submittals required by this specification shall be submitted by the subcontractor at such time as designated in this Section in Paragraph 5.0. In addition, each item proposed to be incorporated into the project shall be clearly marked and identified in the submittal and shall be cross-referenced to the purchase order, drawings and specifications; so as to identify clearly the use for which it is intended. The subcontractor shall maintain, at the job site, an up to date submittal status log; showing the status of all submittals required by this specification.

2.2 Submittals for WVNS approval shall be transmitted to WVNS, on an AR, a minimum of 5 days prior to the scheduled need, for approval. One of the five (5) copies will be returned to the subcontractor with WVNS approval and/or comments. The required submittals are itemized in Paragraph 5.0, at the end of this Section and are identified by submittal number and title. Identify each submittal by submittal number noted on the schedule.

3.0 INSPECTION

3.1 The subcontractor shall perform the inspections or have inspections for in-process work and for acceptance performed by qualified independent inspection personnel; qualifications to be submitted to WVNS for approval prior to commencing work. The inspectors shall have Stop-Work authority where quality requirements are not being met or work is not being performed in a competent manner to assure quality work.

3.2 Independent inspections may be performed by WVNS or their designated agent on any quality related activity performed by the subcontractor or his subtier-contractor(s) during the performance of the work. Such inspections and tests shall not relieve the subcontractor of his obligation to perform his own inspection operations within the scope of work.

3.3 WVNS Construction Management, Facilities Engineering, and/or Quality Assurance can initiate a Stop-Work action if the subcontractor is not meeting the quality requirements of this specification.

4.0 SPECIFICATION AND DESIGN CHANGES

4.1 Deviations from technical specifications and drawings will be authorized by Design Field Change (DFC) notices (Exhibit 01400-I). DFCs can be initiated by the subcontractor or WVNS, and require subcontractor and WVNS approval prior to the initiation.

4.2 Clarification from WVNS will be transmitted by a Technical Advisory (TA) (Exhibit 01400-III).

5.0 SCHEDULE OF SUBMITTALS

5.1 All submittals shall be transmitted for approval on an Approval Request (AR) (Exhibit 01400-III).

5.2 Schedule:

Submittal No.	Submittal Title	Qty.	For Approval	For Record
01010-6.0	Occupational Safety and and Health Program	5	1 week prior to start of work	Prior to commencing work
02200-1.2.1	Independent Testing Laboratory(s)	5	1 week prior to start of work	Prior to commencing work
02200-1.2.2	Source of fill, gravel and topsoil	5	1 week prior to start of work	Prior to commencing work
02200-1.2.3	Results of hydraulic conductivity tests of fill material	5	Prior to fill removal	Prior to fill removal
02200-1.2.4	Results of modified proctor compaction tests	5	Prior to topsoil placement	Prior to topsoil placement
02200-1.2.5	Topographic map of the area	5	1 week after job completion	1 week after job completion

END OF SECTION

1. SUBCONTRACT No. _____ Seq. DFC No. ___

DESIGN/FIELD CHANGE

Sh. ___ of ___

2. CCB LOG
DFC. No. _____
Rev. No. _____

3. DFC-TYPE
[ ] Routine
[ ] Urgent
[ ] Emerg.

5. FACILITY/SYSTEM

6. SUBCONTRACTOR

4. DFC-CLASS
1. [ ]
2. [ ]
3. [ ]
4. [ ] N/A

7. SCOPE OF WORK CHANGE ONLY [ ] Explain:

8. DOCUMENTS BEING CHANGED

9. REASON FOR DESIGN CHANGE
[ ] Safety
[ ] Functionally Necessary
[ ] Significant Design Improvement
[ ] Cost Reduction
[ ] Not Applicable

10. DESCRIPTION OF CHANGE/SCOPE OF WORK ADDITION

REQ'D. APPROVAL DATE _____

11. JUSTIFICATION FOR CHANGE (Not Required for Scope of Work Additions-Authorization per PRCN)

[ ] Revise Document/Drawing [ ] Revision to Document/Drawing NOT Required

12. COGNIZANT ENGINEER DATE

13. COGNIZANT MGR. DATE

14. TECHNICAL CONCURRENCE

	Signature Req. Yes	No	SIGNATURE/DATE
QA	[ ]	[ ]	
Rad/Safety Com.	[ ]	[ ]	
Radiation and Safety Dept	[ ]	[ ]	
Tech. Serv.	[ ]	[ ]	
Const. Proj.	[ ]	[ ]	
Facilities	[ ]	[ ]	
Project Control	[ ]	[ ]	
Cog. Des. Mgr.	[ ]	[ ]	
Const. Eng.	[ ]	[ ]	
_____	[ ]	[ ]	

17. SUBCONTRACTOR

A. Tech. Concurrence
[ ] Yes [ ] No

B. Cost Impact
Amount $_____

C. Schedule Impact
Time _____

D. Comments _____

Subcontractor acknowledges that this document is not a release to proceed.

_____
Signature/Date

15. COST IMPACT
[ ] Yes [ ] No

16. SCHEDULE IMPACT
[ ] Yes [ ] No
Master Schedule [ ]
Project Schedule [ ]
Mfg./Const. Sch. [ ]

18. CCB ACTION:
[ ] Approved
[ ] Approved as Modified
[ ] Disapproved

REMARKS:

_____
CCB Chairman/Date

WV-1803 Rev. 5

APPROVAL REQUEST
19010

WEST VALLEY NUCLEAR SERVICES CO. INC.
BOX 191
WEST VALLEY, NY 14171-0191

PAGE 1 OF

AMENDMENT NO.	WVNS REFERENCE NO.

SUPPLIER AND ADDRESS

TYPE OF REQUEST
☐ APPROVAL ☐ COMMENTS ☐ INFORMATION

PURCHASE ORDER NO.

REQUIREMENTS

TYPE OF ATTACHMENT
☐ DRAWINGS ☐ DATA SHEETS
☐ SPECIFICATIONS ☐ OTHER (DESCRIBE)
☐ MANUALS

SUPPLIER AUTHORIZED SIGNATURE TITLE DATE

DESCRIBE REQUEST IN DETAIL: INCLUDE TITLE, NUMBER AND REVISION TO ALL ATTACHMENTS

REQ	WVNS DISPOSITION			WVNS COMMENTS
	COGNIZANT ENGINEER	DATE	APPROVED COND. APP. DISAPPROVED	
	QUALITY ASSURANCE	DATE	APPROVED COND. APP. DISAPPROVED	
	OTHER	DATE	APPROVED COND. APP. DISAPPROVED	
	OTHER	DATE	APPROVED COND. APP DISAPPROVED	
	OTHER	DATE	APPROVED COND. APP. DISAPPROVED	
	OTHER	DATE	APPROVED COND. APP. DISAPPROVED	

FINAL DISPOSITION: ☐ APPROVED ☐ CONDITIONALLY APPROVED ☐ DISAPPROVED

E TO SUPPLIER: CONDITIONAL APPROVAL GRANTS AUTHORIZATION
ROCEED PROVIDED WVNS COMMENTS ARE INCORPORATED AND AN
AMENDMENT TO THIS APPROVAL REQUEST IS SUBMITTED STATING THE
SAME SO THAT AN UNCONDITIONAL APPROVAL CAN BE OBTAINED.

THIS FORM IS AN OFFICIAL DOCUMENT WHEN SIGNED BY THE PURCHASING AND CONTRACTS MANAGER AND NEED NOT BE FOLLOWED BY A CHANGE NOTICE TO THE PURCHASE ORDER.

AUTHORIZED BY _____
Manager, Purchasing and Contracts DATE

TA NO. AND DATE OF RELEASE

FROM: WEST VALLEY NUCLEAR SERVICES CO. INC.
P.O. BOX 191
WEST VALLEY, NY 14171-0191

TA NO. DATE OF RELEASE

TO:

PURCHASE ORDER NO. DATED

BUYER LETTER LOG N

SUBJECT

ATTENTION:

"If information contained herein doe involve a change in price, delivery, or terms and conditions, you are not to proceed with the work, but immedi ately notify the Buyer, Purchasing Dept. at the above address."

ATTACHMENTS:

WRITTEN BY:	DATE	APPROVED BY:	DATE	APPROVED BY:	DATE	PAG
						OF

CONFIRMING: WIRE [ ] VERBAL [ ] TO: ON:

TAs are numbered consecutively. Please notify Buyer if TA Numbers are not sequential.

MARK FOR ATTENTION OF

Purch. Dept.

AUTHORIZED BY

DISTRIBUTION WITH ATTACHMENTS:
DISTRIBUTION WITHOUT ATTACHMENTS: (*)
QA
R/S
Facilities
Proj. Control
Eng. Services Mgr.
Originator
Eng. & Cnst. Serv. Mgr
Facility & Sys. Des. Mgr.
S. Marchetti
Eng. Doc. Control
Signing Manager(s

WV-1801, Rev. 4

DIVISION 1
SECTION 01500
FACILITIES

1.0 GENERAL

1.1 Drawing number 900-E-037 is included to show the subcontractor his defined work area relative to the overall site layout. This drawing shall be used for reference only.

2.0 SECURITY

2.1 The area enclosed by the security wire fence is the area where the subcontractor's personnel cannot go unescorted. If it is necessary to obtain access outside of this area, and into the plant facilities, arrangements must be made through WVNS Security Department.

2.2 Access into the work area will be through a security station and all personnel will be badged in and out.

3.0 PARKING

3.1 Subcontractor personnel shall be allowed to park vehicles in the designated subcontractor parking areas at the far north end of the parking lot.

4.0 RELEASES

4.1 No material, equipment, tools or waste in any form is to leave the project site on the property of the U.S. DOE/WVDP without first obtaining a written release from the Cognizant Engineer and/or his designee, and Radiation and Safety.

5.0 USE OF WVDP FACILITIES AND SERVICES

5.1 The subcontractor shall not be allowed to use any of the WVDP facilities, equipment or services unless specifically made a part of this specification under this Section in Paragraph 5.2.

5.2 WVDP furnished facilities and services:

5.2.1 Lunchroom facilities from 1:00 to 2:00 p.m.

5.2.2 Restrooms located in the Main Process Plant, Test and Storage Building and the Maintenance Shop.

END OF SECTION

DIVISION 2

SECTION 02200

EARTHWORK

1.0 GENERAL

1.1 Work Included

1.1.1 Excavation.

1.1.2 Backfilling.

1.1.3 Compaction.

1.2 Submittals

1.2.1 Independent testing laboratory(s).

1.2.2 Source of fill, gravel, and topsoil

1.2.3 Results of hydraulic conductivity tests of fill material.

1.2.4 Results of modified proctor compaction tests.

1.2.5 Topographic map of the area.

2.0 PRODUCTS

2.1 Materials

2.1.1 Fill - material free of boulders, rocks, vegetation, and/or refuse.

2.1.2 Gravel - Bank Run per NYSDOT 203-202E, maximum size six ~~(6)~~ 2 inches.

2.1.3 Culvert pipe 2' diameter approximately 250' long 12 gauge, galvanized steel corrugated culvert with standard type single piece or two piece corrugated bands, shall conform to NYSDOT 707-02.

2.1.4 Topsoil - high quality, per NYSDOT 713-01.

3.0 INSTALLATION

3.1 Survey

3.1.1 Prior to commencing the work, the area shall be surveyed by a Professional, Registered Land Surveyor to determine the extent of material and work required.

3.1.2 Upon completion of the work, the area shall again be surveyed by a Professional, Registered Land Surveyor and a topographic map prepared.

3.2 Culvert Installation

3.2.1 Drainage ditch preparation shall proceed in advance of culvert installation.

3.2.2 Culvert shall be laid true to lines and grades. Culvert pipe shall be placed on gravel bedding to provide uniform support. Slope from west to east shall be 2% (minimum).

3.2.3 Culvert pipe shall be covered with bank run gravel, per NYSDOT 203-202E to a depth of two (2) feet over the crown of the culvert. Gravel shall be placed in lifts of eight (8) inch loose thickness and compacted to 85% of Modified

Proctor Maximum Density (ASTM D-1557) as verified by field testing. At least one test shall be performed per 100 feet of pipe per lift.

3.2.4 A corrugated, metal, flared, galvanized head section shall be placed at culvert inlet and outlet. Inlet shall have bar screen covering with three (3) inch size openings. One (1) foot nominal size stone riprap shall be hand placed over steel headwall section to a height of six (6) feet above crown of pipe or top of slope.

3.3 Fill and Compaction

3.3.1 The surface of the existing soil cover shall be thoroughly scarified to a depth of approximately six (6) inches prior to the placement of additional fill material.

3.3.2 Prior to spreading, the hydraulic conductivity of the fill material shall be verified by testing a remolded sample by the Falling Head Method per Appendix VII, Section 4, Labortory Soils Testing, Engineer Manual 1110-2-1906, U. S. Army Corps of Engineers, 1970 pp. VII-13 to VII-16, to be no greater than 1.0×10^{-5} cm/sec. These tests will also determine optimum moisture content. All fill material is to be obtained from the same source.

3.3.3 Fill placement and compaction shall conform to NYSDOT Sec. 203. Fill material shall be spread evenly and compacted in eight (8) inch lifts (loose) and compacted to 91% of Modified Proctor Maximum Density (ASTM D-1557). Compaction shall be verified by field testing at every intersecting point of a 60 foot grid layout, plus additional tests in areas that appear suspect. Fill shall be placed on the dry side of optimum moisture content. Fill shall not be placed in freezing weather.

3.4 Grading and Landscaping

3.4.1 Provide a 4 to 1 (horizontal-vertical) slope around the entire landfill perimeter for proper drainage.

3.4.2 Rake the area free of all debris. Remove surface stones larger than two (2) inches in any dimension.

3.4.3 Place a minimum of six (6) inches of topsoil. Rake, fertilize, seed, and mulch all areas disturbed by construction. Crop cover to be developed within four (4) months after final closure, weather permitting.

3.4.4 If the NYSERDA borrow area was used as the source of fill, restore the NYSERDA borrow area to original slope and seed all areas disturbed by construction.

END OF SECTION

3.4 Grading and Landscaping

3.4.1 Provide a 4 to 1 (horizontal-vertical) slope around the entire landfill perimeter for proper drainage.

3.4.2 Rake the area free of all debris. Remove surface stones larger than two (2) inches in any dimension.

3.4.3 Place a minimum of six (6) inches of topsoil. Rake, fertilize, seed, and mulch all areas disturbed by construction. Crop cover to be developed within four (4) months after final closure, weather permitting.

3.4.4 If the NYSERDA borrow area was used as the source of fill, restore the NYSERDA borrow area to original slope and seed all areas disturbed by construction.

END OF SECTION

ATTACHMENT B-6

Radiological Control Procedure RC-ADM-27

WEST VALLEY
NUCLEAR SERVICES COMPANY
INCORPORATED

RADIOLOGICAL CONTROL PROCEDURES

NO: RC-ADM-27 REV: 2 DATE: 06-22-93

SUBJECT: Determining Radioactivity Concentrations in Solid and Bulk Samples

APPROVED: M. E. Crotzer
Radiological Engineering Manager

GENERAL REVISION

CONTROLLED COPY

1.0 Purpose

The purpose of this procedure is to provide a consistent methodology for the determination of gross alpha and gross beta-gamma radioactivity concentrations in solid and bulk material samples at the West Valley Demonstration Project (WVDP).

2.0 Scope

This procedure applies to Radiation and Safety Department personnel who are tasked with analyzing solid or bulk materials for volumetric contamination for activities at the WVDP.

3.0 Responsibilities

3.1 Radiation and Safety (R&S) Manager, or designee, - is responsible for ensuring that analyses conducted by R&S Department personnel represent conditions that exist at the time of sampling and are performed according to standard analytical protocols.

3.2 Radiological Engineering (RE) Manager, or designee, - is responsible for ensuring that R&S Department radiation instrumentation is calibrated and maintained and that procedures for performing radiological analyses comply with standard protocols.

3.3 Radiological Controls Operations (RCO) Supervisor, or designee, - is responsible for ensuring that radiological control technicians performing radiological analyses on solid and bulk material samples comply with this procedure and for reviewing the results from sample analyses.

3.4 Radiological Control Technicians (RCTs) - are responsible for performing solid and bulk material analyses according to this procedure.

3.5 Work Group - is the department or group that has collected a sample and/or is responsible for properly disposing of waste material as specified in a work document (i.e., Work Order, SOP, etc.) for the activity in which the sampling occurs.

4.0 General

4.1 Solid and bulk material samples are collected during activities to determine if radioactive contamination exists volumetrically in the material. This procedure provides a screening method and a low level analytical method for assessing whether solid or bulk materials are contaminated and for determining the concentrations of any residual radioactive material.

4.2 Solid and bulk material samples should be placed in plastic bags, whenever possible, and homogenized by hand-massaging the bag and mixing the material. Alternative methods for homogenizing the sample are acceptable and should be reviewed with the RCO Supervisor. Representative aliquots may then be taken of the solid or bulk material and placed in planchets for counting. If the solid or bulk material reads greater than 300 net counts per minute (cpm) with a G-M detector or if the solid or bulk material represents a respiratory hazard (e.g., asbestos), then the material shall be handled and prepared inside a fume hood.

4.3 This procedure does not apply to the analysis of solid or bulk material samples for environmental release from the WVDP facility per DOE Order 5400.5. This procedure is used to assist R&S personnel in determining the amount of radioactive contamination in solid or bulk materials for appropriate disposition, use, or shipment per applicable DOE orders and WVDP-010.

4.4 Records generated by this procedure shall be handled in accordance with WVDP-010 and WV-730.

4.5 All data from this procedure shall be recorded on the Solid and Bulk Sample Analysis Data Sheet, Form WV-3108 (Attachment A). The RCO Supervisor shall review the completed data sheet to ensure that the information provided is accurate, complete, and correct.

4.6 The preferred method for determining the efficiency of a counting machine for solid or bulk material samples is to use "spiked" standards with the type of solid or bulk material being analyzed. A spiked standard in the solid or bulk material being analyzed may not be available; therefore, electroplated sources or liquid "boiled-down" plated standards (per RC-ADM-17) may be used instead. Material-specific attenuation factors may also be obtained from the use of spiked standards.

4.7 Sample materials will indicate background levels of alpha and beta-gamma radioactivity. Background radioactivity in soil material has been determined with the average and ± 2σ results listed in Attachment B. Soil with radioactivity concentrations greater than the 2σ control levels should be considered contaminated.

5.0 Procedure

This procedure is divided into three sections for material analysis: soil sample material screening, low level soil sample counting, and bulk material counting. The screening counting method is used for fast determinations or where low sensitivity for the activity of the material is not required. The low level counting method is used for determining activity of samples at or near the onsite control levels. The bulk material method may used for screening or low sensitivity counting of solid materials (e.g., asbestos, fiberglass, etc.).

5.1 Soil Sample Material Screening

5.1.1 The technician should obtain a 10 milliliter (ml) ridged planchet and petri dish for the samples to be analyzed.

A. A background count for each planchet and holder should be performed on the counting machine (i.e., gas proportional counter) using the same counting time as for the samples, e.g., 10 minutes.

B. The planchets should be removed from the counting machine, and the planchets and petri dishes with covers weighed to obtain a tare weight. These values should be recorded on the data sheet.

5.1.2 The technician should determine the efficiency for the counting machine and type of planchet by either preparing a standard or using an existing standard for the type of planchet being used. The efficiency should be used in the calculations described in Section 5.4 of this procedure.

NOTE: Spiked standards used to determine efficiencies are boiled down water sample standards. These were prepared in the development of this procedure. See the RCO Supervisor to obtain the standards.

5.1.3 After homogenizing the sample (whenever possible), the technician should unbag the sample (in the fume hood, when required, see section 4.2) and place approximately 1 gram of the solid in a 10 ml planchet.

A. The material should be as evenly distributed in the bottom of the planchet as possible. The sample must not extend higher than the height of the planchet.

B. Dry the material under a heat lamp or on a hot plate (for 2 to 3 minutes) with any larger chunks of material reduced to as small as possible with a laboratory spoon as directed by the RCO Supervisor.

NOTE: Any "non-soil" debris such as rocks or twigs should be removed from the sample.

5.1.4 The technician should transfer the planchet(s) to the petri dish. Cover the petri dish and reweigh the petri dish and sample together. The net weight of the sample should be between 0.5 and 1.5 grams. If outside these levels, add or remove material as necessary to obtain between a 0.5 and 1.5 grams per planchet sample.

5.1.5 The technician should transfer the encapsulated samples to the gas proportional counter for analysis. The same counter and holders should be used as in steps 5.1.1 and 5.1.2.

5.1.6 The technician should remove the sample from the petri dish and insert into the counting machine. Count the sample for 10 minutes unless the following conditions apply:

A. The technician should not use the proportional counter if the background is greater than 0.3 cpm alpha or 10.0 cpm beta-gamma or the efficiencies are less than 0.08 counts per disintegration (c/d) alpha or 0.30 c/d beta. If this occurs, the technician should try another counting machine onsite that meets these requirements or contact the RCO Supervisor for approval for continued use of the counter.

B. The technician should calculate the lower limit of detection (see step 5.4.5) based on the background count, efficiency, and sample count time to ensure that the required sensitivity is being achieved. A longer counting time may be required and should be reviewed and approved by the RCO Supervisor on a case-by-case basis.

C. If the sample read greater than 100 net cpm with a G-M detector in step 4.2, then the technician may count each sample for 1 minute.

NOTE: If the sample in the planchet reads greater than 1000 cpm per probe area with a G-M detector, the gas proportional counter should not be used without approval from the RCO Supervisor.

5.1.7 After the sample is counted, the technician should return the planchet to the petri dish and have the sample(s) transferred to the responsible work group or Analytical Chemistry group, as applicable, for storage or disposal according to existing work documents (i.e., Work Order, SOP, etc.) for the activity in which the sampling occurs. The sample material should be stored or archived for future reference and released to the responsible work group for disposal when indicated by the RCO Supervisor.

5.1.8 The technician should calculate the results per Section 5.4 and record the results per Step 4.5.

5.2 Low Level Soil Sample Counting

5.2.1 The technician should obtain 10 milliliter (ml) ridged planchets and petri dishes for the samples to be analyzed.

A. A background count for each planchet and holder should be performed on the counting machine to be used using the same counting time as for the samples, e.g., 30 minutes.

B. The planchets should be removed from the counting machine, and the planchets and petri dishes with covers weighed to obtain a tare weight for each. These values should be recorded on the data sheet.

5.2.2 The technician should determine the efficiency for the counting machine and type of planchet by either preparing a standard or using an existing standard for the type of planchet used. The efficiency should be used in the calculations described in Section 5.4 of this procedure.

5.2.3 After homogenizing the sample (whenever possible), the technician should unbag the sample (in the fume hood, when required, see Section 4.2) and place approximately 1 gram of the solid in a 10 ml planchet. Repeat this for a total of 5 planchets per sample of material (if available).

A. The material should be as evenly distributed in the bottom of the planchet as possible. The sample must not extend higher than the height of the planchet.

B. Dry the material under a heat lamp or on a hot plate (for 2 to 3 minutes) with any larger chunks of material reduced to as small as possible with a laboratory spoon.

NOTE: Any "non-soil" debris such as rocks or twigs should be removed from the sample.

5.2.4 The technician should transfer the planchets to their petri dishes. Cover the petri dishes and reweigh the petri dishes and sample together. The net weight of the sample should be between 0.5 and 1.5 grams. If outside these limits, add or remove material as necessary to obtain between a 0.5 and 1.5 grams per planchet sample.

5.2.5 The technician should transfer the encapsulated samples to the same gas proportional counter for counting as used in steps 5.2.1 and 5.2.2.

5.2.6 The technician should remove the samples from the petri dishes and insert into the counting machine. Count the samples for 30 minutes each unless the following conditions apply:

A. The technician should not use the proportional counter if the background is greater than 0.3 cpm alpha or 10.0 cpm beta or the efficiencies are less than 0.08 c/d alpha or 0.30 c/d beta. If this occurs, the technician should try another counting machine onsite that meets these requirements or contact the RCO Supervisor for approval for continued use of the counter.

B. The technician should calculate the lower limit of detection (see Section 5.4.6) based on the background count, efficiency, and sample count time to ensure that the required sensitivity is being achieved. A longer counting time may be required and should be reviewed and approved by the RCO Supervisor on a case-by-case basis.

C. If the sample read greater than 100 net cpm with a G-M detector in step 4.2, then the technician may count the planchet for 1 minute.

NOTE: If the sample in the planchet reads greater than 1000 cpm per probe area with a G-M detector, the gas proportional counter should not be used without approval from the RCO Supervisor.

5.2.7 After the samples are counted, the technician should return the planchets to the petri dishes and have the sample(s) transferred to the responsible work group or Analytical Chemistry group, as applicable, for storage or disposal according to existing work documents (i.e., Work Order, SOP, etc.) for the activity in which the sampling occurs. The sample material should be stored or archived for future reference and released to the responsible work group for disposal when indicated by the RCO Supervisor.

5.2.8 The technician should calculate the results per Section 5.4 and record the results per Step 4.5.

5.3 Bulk Material Counting

5.3.1 The technician should obtain 10 milliliter (ml) ridged planchets and petri dishes for the samples to be analyzed.

A. A background count for each planchet and holder should be performed on the counting machine to be used using the same counting time as for the samples, e.g., 10 minutes.

B. The planchets should be removed from the counting machine, and the planchets and petri dishes and covers weighed to obtain a tare weight for each. These values should be recorded on the data sheet.

5.3.2 The technician should determine the efficiency for the counting machine and type of planchet by using an existing soil standard for the type of planchet being used or electroplated source (depending on the type of bulk material being analyzed), per the direction of the RCO Supervisor. The efficiency should be used in the calculations described in Section 5.4 of this procedure.

5.3.3 After homogenizing the sample (whenever possible), the technician should unbag the sample (in the fume hood, when required, see section 4.2) and place approximately 1 gram of the bulk material in a 10 ml planchet. If placing 1 gram of material into the planchet is not possible, the technician should place as much material as possible in the planchet.

A. The material should be as evenly distributed in the bottom of the planchet as possible. The sample must not extend higher than the height of the planchet.

B. Dry the material under a heat lamp or on a hot plate (for 2 to 3 minutes) with any larger chunks of material reduced to as small as possible with a laboratory spoon as directed by the RCO Supervisor.

5.3.4 The technician should transfer the planchet to their petri dish. Cover the petri dish and reweigh the petri dish and sample together.

5.3.5 The technician should transfer the encapsulated samples to the same gas proportional counter for analysis. The same counter and holders should be used as in steps 5.3.1 and 5.3.2.

5.3.6 The technician should remove the sample from the petri dish and insert into the counting machine. Count the sample for 10 minutes each unless the following conditions apply:

A. The technician should not use the proportional counter if the background is greater than 0.3 cpm alpha or 10.0 cpm beta or the efficiencies are less than 0.08 c/d alpha or 0.30 c/d beta. If this occurs, the technician should try another counting machine onsite that meets these requirements or contact the RCO Supervisor for approval for continued use of the counter.

B. The technician should calculate the lower limit of detection (see step 5.4.6) based on the background count, efficiency, and sample count time to ensure that the required sensitivity is being achieved. A longer counting time may be required and should be reviewed and approved by the RCO Supervisor on a case-by-case basis.

C. If the sample read greater than 100 net cpm with a G-M detector in step 4.2, then the technician may count each sample for 1 minute.

NOTE: If the sample in the planchet reads greater than 1000 cpm per probe area with a G-M detector, the gas proportional counter should not be used without approval from the RCO Supervisor.

5.3.7 After the samples are counted, the technician should return the planchets to the petri dishes and have the sample(s) transferred to the responsible work group or Analytical Chemistry group, as applicable, for storage or disposal according to existing work documents (i.e., Work Order, SOP, etc.) for the activity in which the sampling occurs. The sample material should be stored or archived for future reference and released to the responsible work group for disposal when indicated by the RCO Supervisor.

5.3.8 The technician should calculate the results per Section 5.4 and report the results per Step 4.5.

5.4 <u>Data Analysis</u>

5.4.1 The technician should obtain the results of the planchet samples from the counting machine print-out. The results should be in counts per minute. The following calculation should be used to determine the activity of each sample:

$$C_p = \left[\frac{(S - B)}{(E) * (W)} \right] * (A_b)$$

where,

C_p	-	Concentration of material in the planchet in disintegrations per minute per gram (dpm/g)
S	-	Sample results in gross counts per minute (cpm)
B	-	Background of the counter in counts per minute (cpm)
A_b	-	Attenuation factor (see Attachment B)
E	-	Efficiency in counts per disintegration (c/d)
W	-	Weight of the sample in grams (g)

5.4.2 When performing low level soil sample counting per Section 5.2, the the average of the results from the five planchets using the dpm/g should be calculated from step 5.4.1 (alpha and beta-gamma results) and recorded on the data sheet. Calculate the value for 20 percent of the average.

5.4.3 When performing low level soil sample counting per Section 5.2, the technician should use the following criteria in determining if more sample aliquots are needed to assess the average concentration within the entire solid sample:

A. If the results from all five aliquots are below the appropriate onsite control levels (i.e., 2σ above background), then go to Step 5.4.4.

B. If any single result from the original five aliquots is greater than ±20 percent of the average and greater than the onsite control levels, then obtain an additional five aliquots and repeat the low level counting procedure ensuring that the sample is homogenized as described in step 4.2 and evaluate the results per item C below.

NOTE: The RCO Supervisor may discontinue this step or subsequent steps at their discretion if they are satisfied with the results.

C. If 2 or more results from 10 aliquots are greater than ±20 percent of the average and greater than the onsite control levels, then obtain an additional five aliquots and repeat the low level counting procedure. The technician should ensure the sample is homogenized as described in step 4.2 and evaluate the results per item D below.

D. If 3 or more results from 15 aliquots are greater than ±20 percent of the average and greater than the onsite control levels, discontinue and notify the RCO Supervisor. The contamination in the bulk or solid sample may not be homogeneous; therefore, the desired accuracy may not be able to be achieved. The material should be considered radiologically contaminated.

NOTE: The type of analysis should be recorded in the comments section on the data sheet (i.e., soil sample screening, low level soil sample counting, bulk sample counting). The technician should record "N/A" in the sample averaging portion of the data sheet if not being used.

5.4.4 The technician should calculate the lower limit of detection (LLD) as follows and record on the data sheet:

$$LLD = \frac{4.66\ (Y)^{\frac{1}{2}}\ (A_b)}{(T)\ (E)\ (W)}$$

where:

Y - Background count obtained from the planchet blank
E - Efficiency in counts/disintegrations obtained by dividing the results of a calibration source (cpm) by its known activity (dpm) for alpha or beta activity (c/d)
T - Counting time of the planchet blank (min)

If the calculated LLD (dpm/g) is greater than the sample result, then the concentration reported on the data sheet shall be recorded as less than ("<") the LLD result.

6.0 Authority

6.1 DOE Order 5400.5, "Radiation Protection of the Public and the Environment," February 1990.

6.2 WVNS Service Document WVDP-010, "Radiological Controls Manual."

7.0 References

7.1 Environmental Protection Agency, "Eastern Environmental Radiation Facility (EERF) - Laboratory Procedures Manual."

7.2 WVNS Policy and Procedure WV-730, "Records Management and Storage."

7.3 WVNS Radiological Control Procedure RC-ADM-17, "Operating Procedure for the Determination of Gross Alpha and Gross Beta Particle Activity in Water."

8.0 Attachments

All attachments are the latest revision unless otherwise specified.

Attachment A - Solid and Bulk Sample Analysis Data Sheet, Form WV-3108, (latest revision)

Attachment B - Attenuation Factors for Solid and Bulk Samples and Background Soil Concentrations

NO: RC-ADM-27	REV: 2

Attachment A

Solid and Bulk Sample Analysis Data Sheet

Sample I.D.					
Instrument I.D.					
Date					
Gross wt. (grams) - Tare wt. (grams) Net wt. (grams) (W)					
Background (cpm): alpha / beta-gamma					
Efficiency (%): alpha / beta-gamma					
LLD (dpm/g): alpha / beta-gamma					
Alpha net dpm					
Beta-gamma net dpm					
Alpha attenuation factor (A_b)					
Beta attenuation factor (A_b)					
Alpha results (dpm/g) (C_p)					
Beta-gamma results (dpm/g) (C_p)					

Sample Averaging

	Sample I.D.	Alpha Results (dpm/g)	Beta-gamma Results (dpm/g)
1.			
2.			
3.			
4.			
5.			
Ave. ± 20 percent:			

Comments: _____

Technician signature: _____ Date _____

RCO Supervisor: _____ Date _____

Attenuation Factors* for Solid and Bulk Samples
and Background Soil Concentrations

Sample Weight (g)	Alpha Attenuation Factors	Beta Attenuation Factors
0.1	5.0	1.50
0.2	5.3	1.55
0.3	5.6	1.60
0.4	6.0	1.65
0.5	6.4	1.70
0.6	6.8	1.80
0.7	7.3	1.85
0.8	7.8	1.95
0.9	8.3	2.00
1.0	8.9	2.10
1.1	9.6	2.20
1.2	10.2	2.30
1.3	10.9	2.35
1.4	11.8	2.45
1.5	12.6	2.55

* Site-specific determined values using ridged planchets.

Background Soil Concentrations for the WVDP:

Average gross alpha (± 2σ):	0.457 ± 0.345 cpm/g or 30.1 ± 22.7 dpm/g
Average gross beta-gamma (± 2σ):	13.7 ± 7.0 cpm/g or 87.1 ± 44.7 dpm/g

NOTE: The upper control levels for background soil concentrations are:

- 53 dpm/g alpha, and
- 132 dpm/g beta-gamma.

ATTACHMENT B-7

Groundwater and Soils Sampling Procedures

WEST VALLEY
NUCLEAR SERVICES COMPANY
INCORPORATED

ENVIRONMENTAL MONITORING
PROCEDURES

NO: EM-6 REV: 7 DATE: 09-03-92

SUBJECT: Groundwater Sampling

APPROVED: Safety & Environmental Assessment Manager

UNCONTROLLED

GENERAL REVISION

1.0 PURPOSE

This procedure sets forth the methodology to be used for collection of groundwater samples for radiological and chemical constituents.

2.0 SCOPE

Groundwater wells near the Project site, both inside the perimeter fence and in the environs around the site are routinely sampled for radiological and chemical parameters. This procedure covers the use of equipment required to collect representative groundwater samples for analysis. Routine on site sampling involves monitoring for water quality around waste management units. Attachment C shows locations sampled routinely on site. Other locations (on and off site) may be sampled, if necessary, using this procedure. Sampling frequency is documented in the Site Environmental Monitoring Plan, WVDP-098.

3.0 DEFINITIONS

3.1 Bailer - A thin tube used as a sampling device which is lowered into a well (like a bucket) to remove a sample.

3.2 Bladder Pump - A sampling device which uses compressed air and a squeezing motion to remove a sample.

3.3 Dedicated Equipment - Equipment that is used only at one location.

3.4 Peristaltic Pump - Self priming vacuum pump is operated at ground surface and is attached to sampling tubing, which is lowered to the desired sampling depth.

3.5 Purge Water - Water removed from a well immediately prior to sampling.

3.6 RCRA - Resource Conservation & Recovery Act 1976.

3.7 Bottom Emptying Device - Device used with a bailer to obtain a sample with minimal agitation. It is equipped with a stopcock to regulate sample flow.

4.0 RESPONSIBILITIES

4.1 Environmental Laboratory Personnel

4.1.1 It is the responsibility of personnel collecting groundwater samples to ensure that representative samples are collected. Containers appropriate for the analytes of interest must be used, and samples must be preserved appropriately, if required, to maintain representativeness. (See EM-19, EPA SW-846 (latest revision); and RCRA Groundwater Monitoring Technical Enforcement Guidance Document, 1986 for information on sample types not discussed within this procedure.)

4.1.2 Sampling personnel are required to note any inadequacies regarding well installation, i.e., well locking, physical threat, etc. All deficiencies will be noted on the Groundwater Sampling Record (Attachment A).

4.1.3 Sampling equipment will be provided by Environmental Laboratory personnel. Delivery of collected samples to the Environmental Laboratory for sample logging is the responsibility of the personnel collecting the samples.

4.1.4 Personnel collecting samples are required to adhere to the quality assurance requirements of EM-101 "Quality Assurance for the Environmental Laboratory and Safety and Environmental Assessment".

4.1.5 For locations that are non-routine or that have not been previously sampled, collection of screening samples prior to actual sample collection may be required for wells from which samples will be shipped off-site to verify that purge water may be pumped to the ground. Sufficient screening water ($\geq$ 100 mL) must be collected from all waste management unit wells using dedicated equipment, bailers, or other equipment as outlined in this procedure.

4.1.6 The criteria for disposal of purge water to the ground shall be obtained from WVDP-010, "Radiological Controls Manual". For chemical criteria, certain 300 series SOP's will be referenced along with guidance from Environmental Compliance. Analytical data used for comparison to the limits in WVDP-010 shall include past analytical data and the results of the above mentioned screening samples (gross alpha, beta and tritium).

5.0 EQUIPMENT AND TECHNICAL REQUIREMENTS

5.1 Equipment

5.1.1 Dedicated sampling equipment is preferable to nondedicated equipment to avoid the necessity of cleaning reusable equipment and to minimize the risk of well-to-well cross contamination.

Dedicated equipment includes either: a) A dedicated bailer with nylon line; or b) a bladder pump as well as the following:

A. electronic water level indicator;

B. measuring tape;

C. purge pump (if different than sampling device);

D. field water quality meter;

E. disposable gloves;

F. deionized Water;

G. skindex Gloves;

H. purge Bucket and Barrel if water is to be contained;

I. wipes.

J. dedicated electric water level indicator probe (for use on wells fitted with dedicated water level indicator probes).

NOTE: Additional equipment (carboys for pumping deionized water, detergent solution and 0.1 N HCl) may be required if using nondedicated sampling equipment.

5.2 Sample Containers and Preservative

Refer to EM-19 or EPA SW-846 "Test Methods for Evaluating Solid Waste -Physical/Chemical Methods", and NYSDOH ELAP for other appropriate containers, preservatives (including requirements for cooling) and volumes.

6.0 QUALITY REQUIREMENTS

6.1 Quality Control

Field duplicates along with field and trip blanks will be submitted along with investigatory samples in order to assess the quality of data resulting from the field sampling program. Filled VOA vials must contain zero head space. To monitor for possible contamination, a trip blank (two 40 mL amber, VOA bottles) prepared with deionized water and preserved with HCL should be carried throughout the sampling, storage, and shipping process. A field blank consists of either two 40 mL amber VOA bottles or one set of documented manufacturer-cleaned sample containers each with the appropriate preservative. The field blanks are filled with demonstrated deionized analyte-free water while in the field. Prepare at least one trip blank and one field blank per sampling day. Note that sample and blanks must not be filled near a running motor or any type of exhaust system emitting fumes and vapors which could contaminate the sample. Volatile organic samples must not be collected using any type of device which creates a vacuum on the sample (i.e. a peristaltic pump is not acceptable).

6.1.1 Full field duplicates will be scheduled and collected at a frequency of 1 to 20, duplicates to samples.

6.1.2 Full field blanks will be scheduled and collected at a frequency of 1 to 20, blanks to samples.

6.1.3 All Groundwater Sampling Records (Attachment A) will be stored in a fire proof file cabinet until transferred to the MRC as scheduled in EM-105.

6.2 Chain of Custody

Samples remain with samplers from time of collection (see Form WV-1154 "Groundwater Sampling Record") until being released to the Environmental Laboratory for analysis. Transfer of samples to the Environmental Lab shall be documented on "LIMS" worklists. For all samples being sent off site for analysis, a formal Chain of Custody (WV-1155, Attachment B) is generated, as per EM-52.

7.0 PRECAUTIONS

7.1 It is imperative that cross contamination of wells does not occur. Do not reuse any sampling materials unless they have been cleaned in accordance with the RCRA Quality Assurance Project Plan Guidance, "Cross Contamination and Decontamination Procedures" (March 29, 1991 or latest revision), or are dedicated to that particular well.

7.2 Keep all loose objects away from the well opening.

7.3 Use caution when using the bladder pump air compressor. If an air line ruptures, turn off the air supply immediately.

7.4 When using portable electric power generating equipment, use only grounded extension cords rated for outdoor use. WVNS safety requirements mandate the use of a GFCI (Ground Fault Circuit Interrupter), refer to SOP 00-11.

7.5 Provide a chafing pad, if needed, over the top of the casing to prevent damage to sampling hoses.

8.0 PROCEDURE

Attachment D illustrates the installation of a typical monitoring well. Obtain the location of the screened interval and maintain on file.

8.1 Bladder Pump Sampling

Equipment

- o dedicated Bladder Pump;
- o gas Engine Driven Oil-less Compressor;
- o controller;
- o two compressed air lines (10 ft., 25 ft.);
- o inline filters (0.45 micron).

8.1.1 Remove Well Cap

8.1.2 Record static water level using a clean electric water level indicator. Reference measurement to specific reference mark (on well closure or inner riser as appropriate). Record well depth to nearest 0.01 foot and well diameter on the Groundwater Sampling Record, WV-1154 (Attachment A).

For wells fitted with dedicated water level indicator probes: Connect meter to dedicated probe. Lower probe to top of water in well; record water level as stated above. Record well depth as stated above. Disconnect probe from meter. Raise level of probe approximately one to two feet above level of water in well, keeping the probe inside the well riser and coiling the rest of the cable outside the well. Fasten with Velcro to keep in place.

8.1.3 Clean the portion of the water level indicator in contact with well water with distilled (or deionized) water and blot dry.

8.1.4 Calculate water volume in well as follows:

$$\text{Volume (gal)} = \frac{(.5 \times \text{diameter in inches})^2 \times (3.1) \times (\text{water column in inches})}{231\ \text{in}^3/\text{gallon water}}$$

Record information on WV-1154 Groundwater Sampling Record (Attachment A).

8.1.5 Attach the 10 foot airline from the controller to the pump tubing (quick connect couplings on well closure)

8.1.6 Start Compressor. Compressor is powered by a 3 horsepower Briggs and Stratton engine (see owners manual for operating and maintenance instructions).

8.1.7 Attach the 25 foot airline from the controller to the compressor (be sure to have the inline air filter attached to the controller).

There is no on/off switch for the controller. It will automatically begin to cycle air to and from the pump once it receives compressed air from the compressor. The discharge and refill timers can now be adjusted to efficiently control the pumping rate.

Initially, set the discharge time knob to the 9 o'clock position and the refill time knob to the 7 o'clock position. Allow the pump to go through 5 to 6 complete cycles to fill the water discharge tubing. When water begins to flow, each timer can then be adjusted to the optimum setting to produce maximum flow rate.

The flow control adjustment is the large knob on the lower right corner of the controller panel labeled "Flow Control" which is used to regulate the pressure of the drive air to the pump.

NOTE: 0.5 psi is required per foot of pumping depth to develop flow. For maximum flow and pressure, rotate flow control knob fully clockwise. Maximum flow may be desired during well purging. However, when sampling for sensitive parameters where sample agitation or aeration must be avoided, or when pumping sample through a sample chamber, the flow may be decreased by rotating the flow control knob in a counterclockwise direction. The output pressure gauge on the panel indicates the pressure within the airline to the pump and operates only when the controller is in the discharge mode.

8.1.8 For high-yield wells, purge at least three well volumes using the volume calculated in 8.1.4. This purging process draws fresh water into the well through the screen and provides for removal of stagnant water inside the well casing. Fill out labels to show location, date, time, test analysis and preservative for each bottle. Before sample collection, verify that the labeling on bottles is correct, and that sample date/time and the initials of the sample collector are completed. Begin sample collection by collecting a sample for pH and conductivity (the field water quality monitor is used, either running sample through the sample chamber or by placing the probes in an appropriate sample bottle, see EM-55 for YSI water quality monitor operation). Collect the remainder of required samples in order of decreasing volatility. If there is sufficient volume, finish by collecting a final sample for pH and conductivity as a measure of purging efficiency and as a check on the stability of water samples over time.

NOTE: For samples requiring filtration when using a bladder, an in line 0.45 micron membrane filter can be placed on the end of the dedicated sample hose. This may require a slight increase in pressure to maintain the same flow rate.

8.1.9 For low-yield wells (wells that are incapable of yielding three well volumes) evacuate the well to dryness by withdrawing water from the bottom of the screened interval or <u>if using a bladder pump</u>, monitor the pH and conductivity for constant values after purging one well volume (using the field water quality monitor). A +/- 10% change in pH/conductivity is sufficient to ensure complete well purging. As soon as the well recovers sufficiently verify that the labeling on the bottles is correct and that sample date/time and initials of sample collector are completed. Next collect a sample for pH and conductivity as a measure of purging efficiency and as a check on the stability of water samples over time. If full recovery exceeds two hours, extract sample as soon as sufficient volume is available for a sample for each parameter (if possible).

8.1.10 If a turbidity measurement is required, refer to EM-56 for procedure.

8.1.11 Collect purge water if necessary for proper disposal. Purge water will be contained in a 55 gallon drum with an inner poly liner with locking ring. When the drum becomes full, appropriate sections of SOP 300-7 will be prepared and forwarded within two weeks of filling the drum.

8.1.12 Do not overfill sample bottles if preservatives have been added.

8.1.13 Shut down compressor.

8.1.14 Detach air hoses from well head.

8.1.15 Insure sampling record indicates which samples were filtered at time of collection.

8.1.16 At the time of collection, place samples in coolers with "blue" ice if cooling is required. For non-routine sample types "Test Methods for Evaluating Solid Wastes" (SW-846) specifies requirements for cooling.

8.1.17 Cap the well, and lock the protective casing.

8.1.18 Dispose of waste materials in accordance with WVDP-010.

8.1.19 If samples were not preserved in the field, preserve them upon returning to the Environmental Laboratory.

8.1.20 Transfer of samples to the Environmental Lab shall be documented on "LIMS" worklists.

8.2 <u>Dedicated Bailer Sampling</u>

8.2.1 Equipment

A. a clean bailer and nylon line;

B. a clean plastic sheet;

8.2.2 Perform Steps 8.1.1 - 8.1.4: Provide a new or dedicated bailer, or one which has been thoroughly washed in accordance with the RCRA Quality Assurance Project Plan Guidance, "Cross Contamination and Decontamination Procedures" (March 29, 1991 or latest revision).

<u>NOTE</u>: Well may be purged following steps 8.1.8 or 8.1.9, purging from the top of the water column.

8.2.3 Using appropriate line, lower the bailer to the bottom of the well screen and collect the sample (using a bottom emptying device). Repeat as needed to collect the required volume of sample. Filtering of the radiological and soluble metal samples may take place either in the field (using an in-line membrane filter) or in the Environmental Lab. If done in the Lab, suction filtration with 47mm, type A/E, glass fiber filters will be used. Use the size and type of container dictated by the desired analyses.

NOTE: Ensure that the bailer line does not contact the ground surface. Bailer line may be coiled on the clean plastic sheet as bailer is withdrawn from the well.

8.2.4 Follow steps 8.1.15 to 8.1.20.

8.2.5 If using a dedicated bailer, rinse with deionized water and return to dedicated case, or store in the riser pipe of the well.

NOTE: If using a nondedicated bailer, see decontamination procedure referenced in 7.1.

8.3 Peristaltic Pump Sampling

8.3.1 Equipment

A. peristaltic pump, 0.75 gpm or equivalent;

B. polyethylene Tubing

C. in line filters (0.45 micron)

8.3.2 Follow steps 8.1.1 - 8.1.4.

8.3.3 Set peristaltic pump suction line near the top of the water column.

8.3.4 Run the pump for the length of time required to purge the well as in 8.1.8 or 8.1.9. Use a suitable device (bucket) to collect and measure purged volume.

8.3.5 Record total purge volume if applicable.

8.3.6 Following the completion of purging, collect the samples needed for analysis using the appropriate container (labeled with the correct time, date, location, test and preservative). Place the discharge line near the bottom of the container and withdraw the line in a manner which minimizes turbulence but does not allow the sample to contact the outside of the line. Cap the container.

8.3.7 Follow steps 8.1.15 to 8.1.20.

8.4 Groundwater Sampling of Radiologically Contaminated Wells

8.4.1 Notify Radiation and Safety at least 24 hours in advance of sampling. Radiation and Safety will set up a temporary controlled area around the well or wells to be sampled.

8.4.2 Obtain an RWP from Radiation and Safety (R/S). Don personal protective equipment according to the RWP.

8.4.3 Remove well cap or cover.

8.4.4 Lay down sufficient yellow herculite for use in setting down equipment and samples necessary to be within the controlled area. Minimize generation of excessive waste.

8.4.5 Position purge drum near well casing.

8.4.6 Position a small piece of yellow herculite between well casing and drum to control any dripping water.

8.4.7 Sound well with electronic sounder. Record water level, well depth and well diameter as in steps 8.1.2-8.6.3. Calculate water volume in well, step 8.1.4.

8.4.8 Retrieve sounder probe (post beeping) while wiping down the cable with a wet wipe (moistened with distilled water). Bag for Radiation and Safety (R/S) radiological survey when rewind is completed.

NOTE: This step may not be necessary if a dedicated sounding line is used.

8.4.9 Hook-up compressed air line from compressor to Bladder Pump (BP).

8.4.10 Purge required volume from well into purge drum.

8.4.11 Working over the open purge drum, fill a 250 mL bottle for pH, temperature, and conductivity measurements.

8.4.12 Take required readings using the water quality monitor. Move sample near boundary for measurement only when it is double-contained (e.g. single wall bottle in a plastic tray).

8.4.13 Rinse and wipe probes with distilled water, lay on herculite for R/S radiological survey. (After R/S survey, be sure to keep probes moist while waiting for R/S clearance.)

8.4.14 Fill the first prelabeled sample bottle while working over the purge drum.

8.4.15 Cap bottle, wipe (with distilled water moistened wipe), and place inside yellow bag (inside cooler with ice) pending R/S radiological survey.

8.4.16 Repeat steps 8.4.14 and 8.4.15 until all the required samples are collected.

8.4.17 Secure lid on drum after performing any necessary final equipment rinses into drum.

8.4.18 Secure well and close and lock protective casing.

8.4.19 Radiation and Safety will survey area, purge drums, and equipment for release. Samples and cooler (if used) will be tagged.

8.4.20 Hazardous Waste Operations will remove purge drum from area for storage/disposition as per SOP 300-15.

8.4.21 Follow steps 8.1.18 - 8.1.20.

8.5 Monitoring of Off-Site Wells

Steps 8.1.1 - 8.1.4 are not required for water supply wells that are in frequent use. The installed water supply system may be used in lieu of equipment identified in 5.0. Run the water for several minutes and then collect a 1 liter (minimum) sample. For pH and conductivity measurement, remove faucet aerators before collecting sample. Collect sample before chlorination system (if applicable) if other than radiological parameters are to be determined.

9.0 MAINTENANCE

Some equipment used for sampling on site such as the Bladder, Peristaltic, and generator, require routine maintenance. See appropriate owners manual for proper maintenance.

10.0 AUTHORITY

10.1 DOE/EH-0173T Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance, January 1991.

10.2 DOE 5400.1 Chapter IV General Environmental Protection Program, November 1988.

11.0 REFERENCES

11.1 FA:82:0043, Monitoring Well Characterization letter, dated May 12, 1982.

11.2 DOE/EP-0023, 4.3

11.3 HE:86:0027, Proposed Groundwater Monitoring Program Expansion, dated March 1986.

11.4 RCRA Groundwater Monitoring Technical Enforcement Guidance Document. September 1986. USEPA, OSWER-9950.1

11.5 Statistical Analysis of Ground-water Monitoring Data at RCRA Facilities. Interim final Guidance. February 1989. USEPA, EPA/530-SW-89-026.

11.6 Test Methods for Evaluating Solid Waste(SW-846). USEPA, 1986.

11.7 RCRA Quality Assurance Project Plan Guidance, dated March 29, 1991

11.8 WVDP-010, Radiological Controls Manual

11.9 SOP 00-11, Troubleshooting and Maintenance of Electrical Equipment

11.10 NYSDOH Environmental Laboratory Approval Program Certification Manual. (ELAP).

11.11 EM-19, Sample Container Preparation and Sample Preservation

11.12 EM-52, Environmental Sample Receipt, Handling, Storage and Shipment

11.13 EM-55, Measuring pH, Conductivity and Temperature of Field Samples

11.14 EM-56, Turbidity of Water Samples

11.15 WVDP-103, WVDP Environmental Compliance Manual

12.0 ATTACHMENTS

Attachment A - Groundwater Sampling Record, WV-1154 (Latest Revision)

Attachment B - Chain of Custody Record, WV-1155 (Latest Revision)

Attachment C - Location of Groundwater Monitoring Locations on Site (1991)

Attachment D - Typical Monitoring Well Installation

NO.	REV.	DATE
EM-6	7	09-03-92

Attachment A

GROUNDWATER SAMPLING RECORD - EM 6 (WVDP)

SAMPLE ID

WELL LOCATION CODE:_____ SAMPLERS:_____

SAMPLE DATE/TIME:_____ REPLICATE NUMBER:_____

SOUNDING INFORMATION

WELL SIZE (DIA): 2" 4" 6" OTHER:_____ ; SOUNDING DATE:_____
TOTAL DEPTH OF WELL (TO MP) :_____
DEPTH TO WATER (TO MP) :_____
WATER COLUMN (WC) THICKNESS :_____ STANDING VOLUME:_____
(CASINGS: 1" = .04g/ft; 2" = .16g/ft; 4" = .65g/ft)
(STANDING VOL(g) = (DIA * 0.5)^2 * 3.14 * (WC * 12/231)
SCREENED INTERVAL EXTENDS FROM ____ TO ____ ft BELOW TOC; or __ UNKNOWN
MP=Measuring Point

PURGING

METHOD: [] PERISTALTIC PUMP [] BAILER []BLADDER PUMP
[] OTHER _____
_____ TOTAL PURGE VOL.

SAMPLING METHOD

METHOD: [] PERISTALTIC PUMP [] BAILER []BLADDER PUMP
[] OTHER _____

SAMPLES COLLECTED:
[] VOLATILES - HCL/COOL
[] NPOC - H2SO4/COOL
[] TOX - H2SO4/COOL
[] RADIOLOGICAL- FILTER/HNO3
[] ANIONS - COOL
[] PHENOLS - H2SO4/COOL
[] AMMONIA - H2SO4/COOL
[] OTHER :_____
[] TOTAL METALS - HNO3
[] SOLUBLE METALS -FILTER/HNO3
[] HERBICIDES -COOL
[] PESTICIDES - COOL
[] RADIUM - HNO3
[] NO2/NO3 - H2SO4/COOL
[] OTHER :_____
[] OTHER :_____

SAMPLE DESCRIPTION: COLOR:_____
ODOR :_____
SOLIDS:_____
OTHER:_____

FIELD TESTS

DAILY CALIBRATION: SEE YSI ____ OR _____ TURBIDITY LOG BOOK

	TEMP (C)	COND (uMHOS/cm)	pH	TURBIDITY (NTU)	Eh (mV)	
1						
2						

CHECKED BY:_____DATE/TIME_____

FIELD ANALYSIS ID NUMBER: _____
COND/pH/TURB/_____/_____ ENTERED INTO LIMS ____.

NOTE DEFICIENCIES WITH WELL INSTALLATION (LOCKING CAP, PROTECTION, ETC.):

COMMENTS

_____
_____
_____
_____
_____
_____
_____

West Valley Nuclear Services, Inc. PO. Box 191, 10282 Rock Springs Rd, West Valley, NY 14171
CHAIN-OF-CUSTODY / REQUEST-FOR-ANALYSIS / PACKING SHEET

☐ SPDES ☐ GROUNDWATER ☐ POTABLE WATER ☐ OTHER ELECTRONIC DISK - YES ☐ NO ☐

External Lab Destination:	Purchase Order #:	Analysis Requested	Report Format Level: 1 2
Charge #_____	Release #_____		Priority Code: 1 2
Sample Custodian Signature:_____ C-O-C Reviewed By :_____			Report Data To: _____ _____

SAMPLE I.D.#	DATE	TIME	LOCATION CODE	PRES	# CONT								

RELEASED BY	RECEIVED BY	RELEASED BY	RECEIVED BY	Sample Receipt:
DATE/TIME_____	DATE/TIME_____	DATE/TIME_____	DATE/TIME_____	Cool: YES____ NO____ Temp C

WV-1155, Rev. 3

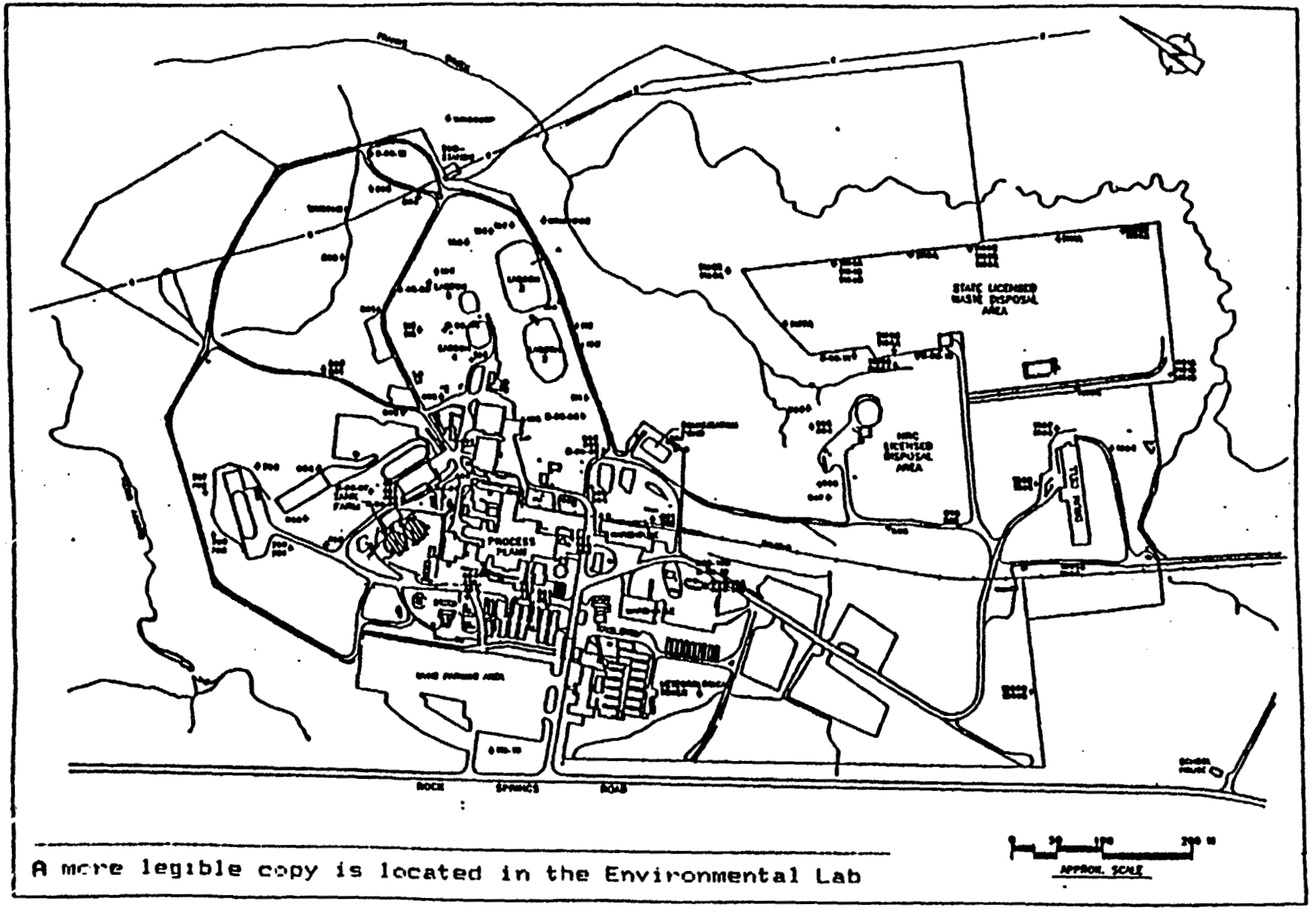
NO.	REV.	DATE
EM-6	7	09-03-92

Attachment B

WVDP-RFI-014 Rev. 0

NO.	REV.	DATE
EM-6	7	09-03-92

Attachment C



A more legible copy is located in the Environmental Lab

Expanded Monitoring Program Sampling Loco" (SWMUs).

NO.	REV.	DATE
EM-6	7	09-03-92

Attachment D

West Valley Nuclear Services Co. Inc.
West Valley, New York

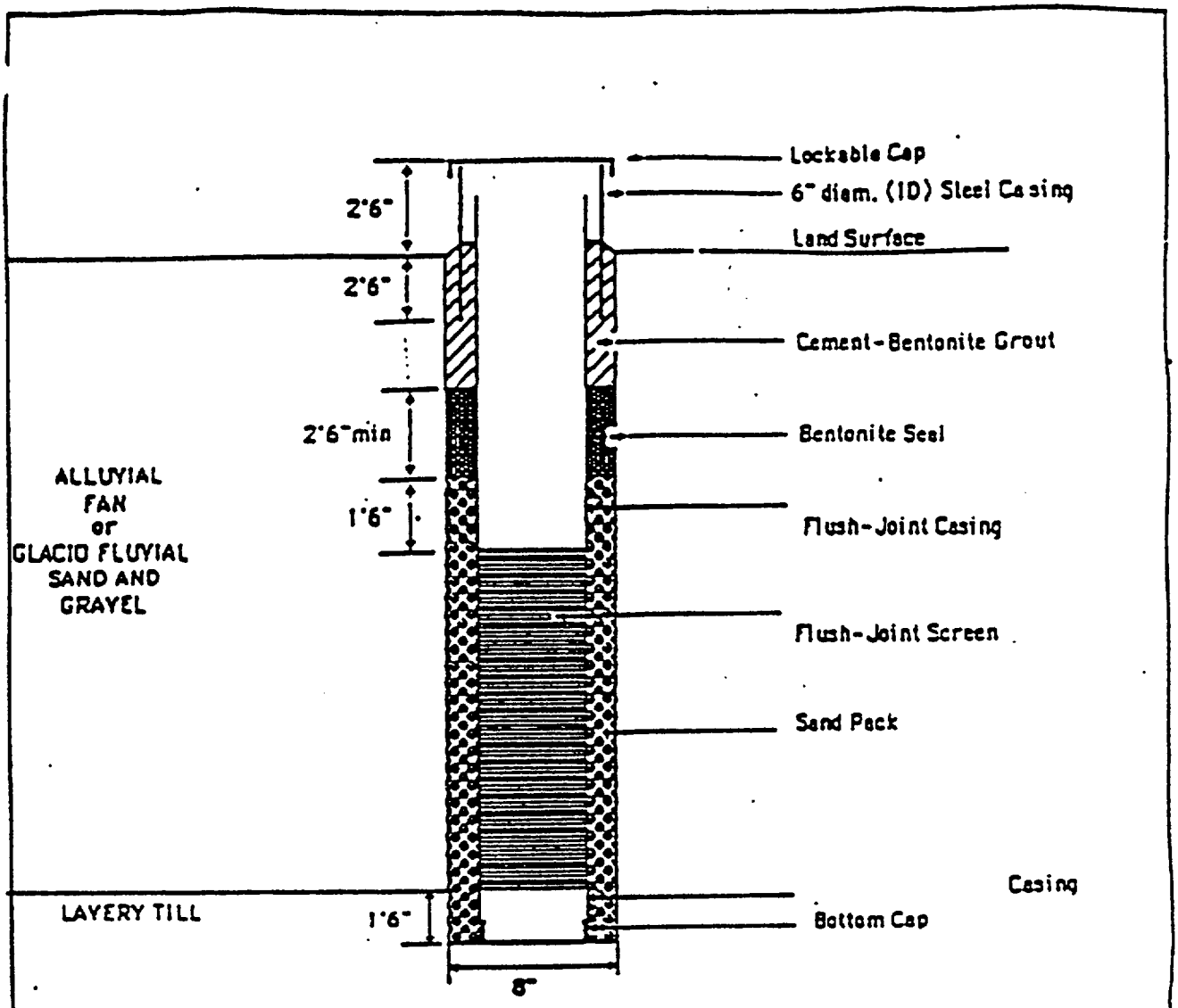


Figure 2

SUBJECT TYPICAL MONITORING WELL INSTALLATION

ATTACHMENT B-8

Soil and Sediment Sampling Procedures

COPY

No. WV-111	Rev. 2	Date 12-16-92

J-3 Field Changes

1. Field Change Number (Entered by WCC Only): ATTACHMENT J
9 3 0 2 3 5 3 . 1 FC 1

2. Originator	Date	Organization	Extension
R. Teifke	2 SEP 93	SE&A	9734

3. Priority	4. Quality Level	5. Est. Accum. Dose (100 Mrem)	6. Responsible Work Group
4N	C	Below X Above ___ N/A ___	SE&A

7. Estimated Manhours	8. Work Control Number	9. Notified Work Group Supervisor
Operations 40 Rad & Safety 30 Maint. ___ NA Qual. Assur. 40 Other RC 40 waste gen 40	9302353	Yes X No ___

10. Safety Review Screen:	11. Originator Mgr.	Approval/Date
Completed and attached NA	P Gorton	9-2-93

12. Description of Change

Page 1 of 1

Task Number	Description of Field Change	Signature/Date
9B	delete	
10	delete	
	ADD:	
	Collect a sample to archive at the direction	
	of the field geologist, for future geologic study	
	Non-radioactive samples will be stored with	
	other archived samples at the BSW, radioactive	
	samples will be stored in a suitable	
	Radioactive Materials Storage Area.	

13. Reason for Change

RECEIVED SEP 3 1993 WORK CONTROL CENTER

14. Review/Approvals

Work Group	Signature/Date	Work Group	Signature/Date
Operations (MPO)	9/3/93	WMO	9-3-93
Maintenance	NA	RC	9/3/93
Rad & Safety	9/3/93	IH&S	9-3-93
Qual. Assurance	9/2/93		

9302353 [redacted] WVDP RPI-014 Rev. 0

FC 1

WV-914	2

Attachment D

Safety Review Screen

USE BLACK INK OR TYPE

Page 1 of 2

I. Responsibility [redacted]	A. Date: 16 Sept 93

B.1 Title of Proposed Change or Discovery:

B.2 Reference Document (affected document - e.g. work order no. " ")
9302353 [redacted]

C. Cognizant Department: Safety & Environmental Assessment

D. Cognizant Manager (Typed/Printed): C.J. Roberts

E. Prepared by (Typed/Printed): P.M. Vlad

II. Safety Exclusion Screen (Complete either A or B, not both)

A. Discovery Process (Occurrence Reports, Non Conformance Reports, and RCA's only)

1. Does the facility configuration or operation differ from that described in the approved safety analysis or authorization basis? ☐ No ☐ Yes ☐ Maybe

2. Is there an error, omission, or inadequacy in the safety analysis which could reduce margin of safety in the SAR or an OSR/TSR? ☐ No ☐ Yes ☐ Maybe

B. Change Process:

1. Will the proposed change be a change in a facility described in an approved safety analysis? ☒ No ☐ Yes ☐ Maybe

2. Will the proposed change make changes in procedures described in the approved safety analysis? ☒ No ☐ Yes ☐ Maybe

3. Will the proposed change involve tests or experiments affecting a facility or operation described in the approved safety analysis? ☒ No ☐ Yes ☐ Maybe

If any of the questions in A or B above were answered with "Yes" or "Maybe" then complete the remainder of the Safety Review Screen.

If all of the questions in A or B above were answered "No" then provide the basis in Section V, sign the form where indicated, and attach this copy with the change or discovery documentation per the governing procedure (see WV-914, Att. B).

III. Safety Research and Conclusions (attach additional pages if needed):

SAFETY REVIEW SCREEN

IV. Safety Questions:

A. Will the probability of an accident previously evaluated in approved safety analyses be increased? ☑ No ☐ Yes ☐ Maybe

B. Will the consequences of an accident previously evaluated in the approved safety analyses be increased? ☑ No ☐ Yes ☐ Maybe

C. Will the probability of a malfunction of equipment important to safety be increased? ☑ No ☐ Yes ☐ Maybe

D. Will the consequences of a malfunction of equipment important to safety be increased? ☑ No ☐ Yes ☐ Maybe

E. Will the possibility of an accident of a different type than any previously evaluated in approved safety analyses be created? ☑ No ☐ Yes ☐ Maybe

F. Will the possibility of a malfunction of a different type than any previously evaluated in the approved safety analyses be created? ☑ No ☐ Yes ☐ Maybe

G. Will the margin of safety as defined in the basis for any technical specification or safety analysis report be reduced? ☑ No ☐ Yes ☐ Maybe

H. Name (Typed/Printed) and Signature:

1. _____ Safety Reviewer _____ Date

2. _____ Independent Reviewer _____ Date

V. Basis (attach additional pages as needed): see attached sheet

VI. Manager Recommendation and Signoff

A. Recommendation (Either 1, 2, or 3 shall be answered "Yes"):

1. It is recommended that the change or discovery is not a potential USQ. [✓] Yes
2. It is recommended that the change or discovery is a potential USQ to be transmitted to the Radiation and Safety Committee for further review. [ ] Yes
3. Terminate the proposed change activity. [ ] Yes

B. Signoff:

1. C J Roberts Cognizant Manager 9/16/93 Date

VII. Radiation and Safety Committee Recommendation:

Recommendation (circle choice): Not USQ Probable USQ

_____ Chairman, R&SC _____ Date

COPY
C.3

9302353

V. BASIS (for SAFETY REVIEW SCREEN for STREAM, IMPOUNDMENT & SEPTIC TANK SEDIMENT SAMPLING)

On site stream, impoundment and septic tank sediment sampling is a routine operation adequately covered by administrative procedures. R&D technicians and Waste Operations will provide support, as needed. An RWP will be obtained daily and an IWP will be obtained weekly. Protective equipment will be used as specified on the RWP/IWP. All personnel directly involved in the stream, impoundment and septic tank sediment sampling will have received hazardous and rad-worker training and be respirator qualified as required per procedures. There will be no off-site impacts from this activity.

[illegible]
7/15/93

R. Joe Johnson
8/18/93

COPY

WVDP-RFI-014 Rev. 0

Work Orde[illegible] Shop Orders Only (Others Use J-2) | [illegible]V-111 | Rev. 2 | Date: 12-16-92

ATTACHMENT B

J1 - Work Authorization

1. Work Control Number (Used By WCC): EM-9362353-I/WO

Originator: R. Tiefke | 8/18/93 | S&EA | Z-05 | 4734

Name | Date | Organization | Mailstop | Extension

3. Charge No. (Labor) WH 6100001 (M & S) WH 6100003

4. System ~~site~~ HO

5. Equip. No. E | I | V | N/A

6. Location 303

7. Performance Code

A. ___ Special Preparation

B. ✓ Normal Preparation

System: 0 ___ May be shut down; 1 ___ Must be shut down; 2 ___ Must be operating; 3 ✓ N/A

Equipment: 0 ___ May be shut down; 1 ___ Must be shut down; 2 ___ Must be operating; 3 ✓ N/A

8. Estimated Manhours

ACTIVITY	MH
Waste Ops	40
Maint N/A	—
QA ✓	40
RS Tech ✓	80
~~EOT~~ IRC	40

CORRECTIVE MAINTENANCE: Yes ___ No ___

S&EA 80

9. Dwg./Sk. Yes ___ No ✓ Attached ___

10. Does/Dwgs Required Revs Yes ___ No ✓ ECN No. ___

11. Required Document(s) As-Built ___ D-Spec ___ N/A

12. Type of Work Item: W.O

13. Internal ___ External ✓

14. Priority: 4N

15. Document Ref. No.: Soils : SAP

16. Qual. Level: C

17. Safety Class: N

18. Est. Accumulated Dose (100 mRem) Below ✓ Above ___ N/A ___

19. Eng. Approval Required Yes ___ No ✓

20. IWP Required? Yes ✓ No ___ RWP Required? Yes ✓ No ___

21. High Consequence Lift? Yes ___ No ✓ If yes, rigging sketch required.

22. QA Inspection Required? Yes ✓ No ___

23. Welding or Spec Process Req.? Yes ___ No ✓ Cite ___

24. Special Qualification Req.? Yes ___ No ✓

Note: A Yes to any of Item 21 thru 24 requires a QA approval.

25. Quality Related Material Req.? Yes ✓ No ___

26. Safety Review Screen: Completed and Attached ✓

27. Environmental Checklist: Yes ✓ No ___ Attached ✓

28. Reqd. Finish Date: 10/30/93

29. Originator's Manager: R. Blickwedehl [signature] Approval/Date: 8/19/93

TITLE: Stream, Impoundment and Septic Tank Sediment Sampling

OBJECTIVE:

___ FAB.
___ INSTALL
___ MOD./REPAIR
___ INSP.
✓ TEST
___ CALIB.

31. Description of Work

Task	Description	Signature/Date
1	Stream, Impoundment and Septic Tank sediment sampling in accordance with the attached steps	

SSNED AUG 30 1993 WORK CONTROL CENTER

32. Responsible Work Group: R. Tiefke S&EA

33. Work Group Supervisor: R. Tiefke

34. Work Group Manager: C. Robert

35. Review/Approvals

WORK GROUP	SIGNATURE/DATE	WORK GROUP	SIGNATURE/DATE
WMO Ops	[signature]	Ind. Hyg. & Safety	M.F. Schmit 8-23-93
Maintenance	N/A	___ Eng	N/A
Radiation & Safety	[signature] 8/26/93	~~EOT~~ MPO	[signature] 8/26/93
Quality Assurance	[signature] 8/26/93	Rec Cmp	[signature] 8/20/93

36. Documentation of Work Completion

Work Group Supervisor | Date | Originator | Date

WV-1080, Rev. 7
WV:0000426.RM

WO-EM-930-2353-IWO

STREAM, BASIN AND SEPTIC TANK SEDIMENT SAMPLING

A log book will be maintained of all activities that occur during shallow soil sampling. Sample locations can be found on the Plate 4 of the Amendment to the RFI Work Plan, Draft B, June 1993.

Notify Facility Managers at least 24 hours in advance of initiation of activities at each sample location. RMF 8/22/93

1 Obtain an RWP and IWP.

2 Contact all personnel to be involved in the field sampling. (S&EA, RC, R&S, QA, RP)

3 Obtain field sampling equipment (dedicated sampling equipment will be used).

- A. Pre-cleaned stainless steel trowels, spoons, sterile tongue depressors, long handle dippers or ladles.
- B. Pre-cleaned stainless steel mixing trays or bowls.
- C. Pre-cleaned plastic, glass or stainless steel tubing.
- D. Tape measure or distance measuring device.
- E. Brunton compass.
- F. Stakes.
- G. Plastic waste bags.
- H. Plastic or herculite sheeting.
- I. Pre-labeled sample jars.
- J. Sampling shipping container, lined with a plastic bag and containing enough ice to cool the samples to 4°±2°C.
- K. Personnel protective equipment as prescribed by the RWP.

4 With all personnel involved in the sampling exercise hold a 'tail gate' safety meeting.

5 With all necessary personnel to complete sampling, proceed to the designated sampling location.

6 Near the designated sediment sampling location place plastic sheeting or herculite on the ground as a work area. Minimize the spread of sampling media and equipment as much as possible.

3

7 At the designated sediment sampling location remove all large surface debris and vegetation if needed, and place adjacent to the sample area. RMT 8/27/93

8 Using the appropriate sampling device and technique collect a sediment sample from the upper portion at the sample location. Samples to be collected will be directed by the Sample Coordinator.

A. For samples being collected from shallow stream sediments the sampling technique will utilize trowels or spoons to collect the sample into a mixing bowl or tray.

B. For samples being collected from an impoundment the sampling technique will utilize ladles or dippers or tubing to collect the sample into mixing bowls or trays.

C. For samples being collected from septic tanks long handled dippers or tubing will be utilized to collect the sample into a mixing bowl or tray.

9 As each sample is collected allow the sediment to settle and decant the excess water from the sample being careful to decant downstream of the sample point.

A. VOC samples: Place a portion of the sediment sample into an appropriate sample jar until the jar is full. If the New York State Department of Environmental Conservation (NYSDEC) representative requests and provides a sample jar, split the sample with him. Seal the jar, record the pertinent data on the label and the chain of custody form and place the jar into the storage container. The NYSDEC representative will take custody of the sample containers they provided after the sample containers are checked and cleared of lose surface contamination by the R & S technician.

B. Continue to collect sediment from the location into the pre-cleaned mixing bowl (tray), until enough sample is collected to satisfy the requirements of the contract laboratories.

10 Mix the sample by quartering and combining the soil until a homogeneous mixture is achieved.

11 At the direction of the Sample Coordinator spoon the sample into jars until the requisite sample jars are filled. If the New York State Department of Environmental Conservation (NYSDEC) representative requests and provides a sample jar, split the sample with him. This is accomplished by placing half of a sample aliquot into each jar from each location until the jars are filled. The NYSDEC representative will take custody of the sample containers they provided after the sample containers are checked and cleared of lose surface contamination by the R & S technician.

12 Seal the jars and record the pertinent data on the label and chain of custody forms, as directed by the sample coordinator. RMG 8/27/93

13 Place the jars into a pre-cooled (4°±2°C) sample storage container.

14 At the direction of the R & S Technician collect enough sample to satisfy the screening analysis needs.

15 The R & S technician will make the determination if the sample will be controlled as radioactive material on a case by case basis. All samples considered to be radioactive material will be handled and stored per WVDP-010, Rad Con Manual. Any material exceeding 150 cpm/probe area will have to be analyzed in accordance with RC-ADM-27. Results of the field check will be recorded on the attached "SOIL SAMPLE FIELD RADIOACTIVITY CHECK" form. The form may be used for more then one sample. If the sample results are less then 150 cpm/probe area, beta-gamma then the sample can be considered to be less then 0.002 μcuries/gram gross alpha and beta for shipping purposes.

16 Packaging and shipment will be performed in accordance with Work Order EM-930-1971.

17 ~~With the concurrence of the R & S Technician~~ Dispose of the excess sample media ~~will be returned to~~ at the sample location, RMG 8/23/93

18 Place all of the sampling equipment into a plastic bag at the direction of the R & S Technician.

19 Allow the R & S Technician to survey and label the bag or materials as needed.

20 Start a SOP 300-07 Attachment A form and inform WMO of the waste ~~materials~~ containers. RMG 8/23/93

To be retrieved.

21 Allow the R & S Technician to survey the sample jars and storage container at the work site or at the sample storage area at his(her) discretion. Decontamination of these containers will be conducted as required.

22 Stake the position of the sample and using the Brunton compass and measuring device determine the location of the sample in relationship to a fixed landmark on the WVDP site.

23 Transport the samples and storage container to the designated storage location and secure the samples to await the results of the screening analysis.

24 Sample packaging and shipment will be performed at the direction of work order 930-1971.

9302353 .01

No.	Rev.	Date
WV-111	2	12-16-92

J1A - Work Authorization
(Continuation)

1. Work Control Number: 9 - / ATTACHMENT C

2. DESCRIPTION OF WORK

Page 6 of 6

Title: Stream Improvement w/ Septic Tank Sediment Sampling

TASK	DESCRIPTION	SIGNATURE/DATE

3. BRIEF DESCRIPTION OF COMPLETED WORK:

Actual Hours Worked:

ACTIVITY	MH
_____ Ops	_____
Maint _____	_____
QA _____	_____
RS Tech _____	_____
_____	_____

9302353

A.1

Soil Sample Field Radioactivity Check.

DATE	SAMPLE LOCATION	SAMPLE NUMBER	RESULTS (cpm above background)	INSTRUMENT SERIAL NUMBER	TECHNICIAN	REMARKS

NEPA/CATEX: SOIL $

9302353[redacted]

B-1

Rec'd.
Rec. Mgmt.
September 9, 1991

Department of Energy
Idaho Operations Office
West Valley Project Office
P.O. Box 191
West Valley, NY 14171

DW:91:0751

RESPONSE:
WD:2006

September 6, 1991

Approval of EC90-35

Mr. J. J. Buggy, President
and General Manager
West Valley Nuclear Services Co., Inc.
P.O. Box 191
West Valley, NY 14171

ATTENTION: C. J. Roberts, Safety and Environmental Assessment Manager

SUBJECT: DOE Approval of Categorical Exclusion (CX) Determination for "Site Characterization/Environmental Monitoring" (90-35)

Dear Sir:

Enclosed for your files is the subject approval. Please contact Elizabeth Matthews on extension 4930 if you have any questions.

Sincerely,

Tom Rowland

T. J. Rowland, Director
West Valley Project Office

Enclosure

cc: J. L. Knabenschuh, WVNS
T. L. Perkins, DOE-ID (w/enc)
P. W. Arpke, UNC Geotech-ID

EAM:145:91 - 2702:90:10

EAM/sl

9302353

B.2

United States Government Department of Energy

memorandum

DATE: JUL 29 1991

REPLY TO ATTN OF: EM-343

SUBJECT: Section D Determination - Categorical Exclusion

TO: Leo P. Duffy, EM-1

Attached is a categorical exclusion (CX) for your signature as follows:

Site Characterization/Environmental Monitoring at the West Valley Demonstration Project, Idaho Operations Office

Also attached for your signature is a memorandum transmitting the CX to EH-25 for indication of objection/no objection.

Jill E. Lytle
Associate Director
Office of Waste Operations
Environmental Restoration
and Waste Management

2 Attachments

2702:90:10

9302353[redacted]
B-3

Memo to Duffy fm Lytle
re: Section D Determination - Categorical Exclusion

Distribution:
so: Addee
1bcc: EM-343, Truskett rdr.
1bcc: EM-343 rdr.
2bcc: EM-30 (Lytle & Cowan) rdr.
1bcc: EM-343 suspense
1bcc: EM-30 suspense (Cowan)
1bcc: EM Mailroom
1bcc: EM-20
1bcc: Henninger, EM-331
1bcc: Stevens, EM-331
1bcc: Turi, EM-33

EM-343:Truskett:kdc:3-7194:3/7/91
(c:Truskett:KC91-38)

File Code # 4753.38

Action # KC91-38

Correspondence Reviewers: S. Sappington S/S 4/15
K. Morris, Exec. Asst., EM-30 5/15

EM-343
Truskett
3/15/91

EM-343
McIntosh
3/18/91

EM-331
Henninger
3/18/91

EM-331
Stevens
3/19/91

EM-343
Chacey
3/20/91

EM-34
Frei
3/20/91

EM-33
Turi
3/21/91

EM-30
Cowan
4/12/91

EM-20
Scott
/ /91

EM-30
Lytle
5/1/91

B-4
9302353

United States Government

Department of Energy

Memorandum

DATE: JUL 30 1991

REPLY TO ATTN OF: EM-343

SUBJECT: Section D Determination - Categorical Exclusion

TO: Carol M. Borgstrom, EH-25

Attached is the National Environmental Policy Act (NEPA) documentation for the following proposed action which I have determined is within the existing categorical exclusions (CX) as defined in Section D of the Department of Energy NEPA Guidelines:

Site Characterization/Environmental Monitoring at the West Valley Demonstration Project, Idaho Operations Office

I request that you notify me within two weeks, in accordance with the Interim Procedural Guidelines for Implementation of Secretary of Energy Notice-15-90, if you have any objection to this CX determination.

Leo P. Duffy
Director
Office of Environmental Restoration
and Waste Management

Attachment

Response cc:
D. Henninger, EM-331

9302553
B.5

Memo to Borgstrom fm Duffy
re: Section D Determination - Categorical Exclusions

Distribution:
so: Addee
cc: As stated
1bcc: EM-343, Truskett rdr.
1bcc: EM-343 rdr.
2bcc: EM-30 (Cowan & Lytle) rdr
1bcc: EM-343 Suspense
1bcc: EM Mailroom
2bcc: EM-30 suspense (Cowan & Lytle)
1bcc: Yellow File Copy
1bcc: Henninger, EM-331
1bcc: Stevens, EM-331
1bcc: Turi, EM-33

EM-343:Truskett:kdc:3-7194:3/15/91
(c:Truskett:KC91-38)

Action # KC91-38

File Code # 4783.38

Correspondence Reviewers: S. Sappington SJS 4/15
K. Morris, Exec. Asst., EM-30 ___

EM-343
Truskett
7/18/91

EM-343
McIntosh
3/18/91

EM-331
Henninger
3/18/91

EM-331
Stevens
3/19/91 LS

EM-343
Chacey
3/21/91

EM-34 MF
Frei
3/20/91

~~EM-33~~
~~Turi~~
~~/91~~

EM-30
Cowan
4/12/91

EM-20
Scott
/ /91
5/10/91 all attached EM-22 Record of Review

EM-30
Lytle
7/29/91

EM-3
7/29/91

EM-2
7/29/91

EM-1
Duffy
/ /91

9302353

B.6

nited States Government

Department of Energy

memorandum

Idaho Operations Office

DATE: January 31, 1991

SUBJECT: Section D "Site Characterization/Environmental Monitoring" Determination

TO: D. Henninger
EM-30, DOE-HQ

DOE-Idaho has reviewed the attached Categorical Exclusion (CX) prepared by the West Valley Demonstration Project (WVDP) for site-wide field sampling/monitoring activity (90-35), which falls under the Section D "Site Characterization and Environmental Monitoring" CX.

After this CX is approved, please send a copy back to J. E. Solecki, Assistant Manager, Environmental Restoration and Waste Management; C. R. Nichols, Acting Assistant Manager, Site Engineering and Support; and T. J. Rowland, Acting Director, West Valley Project Office.

An Expeditious review of this CX by February 15, 1991, would be appreciated. If you have any questions, please call T. J. Rowland at FTS 473-4312.

R. C. Tiller for

A. A. Pitrolo
Manager

Attachments

cc: C. E. Gilmore, DOE-ID
J. E. Solecki, DOE-ID
W. N. Sato, DOE-ID
T. J. Rowland, WVPO

9302353

B.7

EM-22 RECORD OF REVIEW

EM Document Control Number: EM 9100661

Subject: Categorical Exclusion (CX) for Site Characterization/ Environmental Monitoring at the West Valley Demonstration Project, Idaho Operations Office

Action Requested of EM-20: Concurrence in this CX Determination

EM-22 Recommendation: Concur and forward to EM-1 for approval

Analysis/Comments: This is a resubmittal of a package that was previously reviewed by EM-22. The previous review was documented on an EM-22 Record of Review (ROR) dated May 10, 1991. The proposed action includes site characterization, environmental monitoring, compliance and process monitoring, and all field activities associated with such monitoring. These monitoring activities can occur onsite and/or offsite, be routine or special, and involve radiological and/or non-radiological parameters. The previous review of the CX Determination indicated that the CX category applied "Site characterization and environmental monitoring..." was limited to those activities being performed under CERCLA and RCRA and therefore, did not qualify for the applied CX category. However, after reviewing the wording of the applied CX category and consulting with EM-25 staff, EM-22 has determined that the proposed action does qualify for the applied CX category. Additionally, the CX determination contains the necessary information to make that determination and is adequate for transmittal to EM-1 for approval.

Recommendation: Concur and forward to EM-1 for approval.

EM-22 INTERNAL QUALITY ASSURANCE RECORD OF REVIEW

Reviewer: E. Harr Date: July 26, 1991

Reviewed: Michael H. Kleinrock Date: 7/26/91
Michael H. Kleinrock
Director, Environmental Compliance Division

EM-20 approves EM-22's recommendation: ☒ to concur and forward to EM-1 for approval; ☐ to return to the program office for revision.

Randal S. Scott Date: 7/26/91
Randal S. Scott
Director, Office of Quality Assurance
and Quality Control

9302353

B.8

EM-22 RECORD OF REVIEW

EM Document Control Number: EM 9100661

Subject: Categorical Exclusion (CX) for Site Characterization/ Environmental Monitoring at the West Valley Demonstration Project, Idaho Operations Office

Action Requested of EM-20: Concurrence in this CX Determination

EM-22 Recommendation: Return to EM-30 for appropriate action

Analysis/Comments: A CX Determination does not appear to be the appropriate mechanism to satisfy the NEPA requirements of this proposed action. The proposed action includes site characterization, environmental monitoring, compliance and process monitoring, and all field activities associated with such monitoring. These monitoring activities can occur onsite and/or offsite, be routine or special, and involve radiological and/or non-radiological parameters. The CX category applied is "Site characterization and environmental monitoring...". However, this CX category is limited to those activities being performed under CERCLA and RCRA.

Some portions of the proposed action may qualify for the applied CX category, i.e., monitoring under RCRA and/or CERCLA. However, there is not enough information presented to determine which, if any, part of the monitoring program is being carried out under RCRA and/or CERCLA. If monitoring is being carried out under RCRA and/or CERCLA, the CX Determination needs to be revised to include only those portions as appropriate.

Other environmental monitoring activities, e.g., those being undertaken for the annual site environmental reports, etc., may qualify as a CX in the proposed DOE NEPA regulation. Therefore, the preparation of a "mini" EA would be the appropriate level of NEPA documentation. It should also be noted that some of the proposed environmental monitoring activities may be covered under existing NEPA documentation and not require further NEPA compliance.

Recommendation: Return to EM-30 for appropriate action.

EM-22 INTERNAL QUALITY ASSURANCE RECORD OF REVIEW

Reviewer: E. Harr Date: May 10, 1991

Reviewed: MHKleinrock Date: 5/10/91
Michael H. Kleinrock
Director, Environmental Compliance Division

EM-20 approves EM-22's recommendation: ☐ to concur and forward to EM-1 for signature; ☒ to return to the program office for revision.

Randal S. Scott Date: 5/10/91
Randal S. Scott
Director, Office of Quality Assurance
and Quality Control

9302353[redacted]
B9

CATEGORICAL EXCLUSION (CX) DETERMINATION

Proposed action: WVDP Sitewide Field Sampling/Monitoring Activities (90-35)

Location: West Valley Demonstration Project

Proposed by (if other than DOE): West Valley Nuclear Services

Description of the proposed action:
Site characterization, environmental monitoring, compliance and process monitoring, - onsite and offsite, routine and special, radiological and non-radiological - and all field activities associated with such monitoring.

CX to be applied (from Section D, DOE NEPA Guidelines):
"Site characterization and environmental monitoring . . ."

I have determined that the proposed action meets the requirements for the CX referenced above. Therefore, I have determined that the proposed action may be categorically excluded from further NEPA review and documentation.

Signature:

Title: Director
Office of Environmental Restoration and Waste Management

Date:

EH-25 has reviewed this determination and has no objection. to those site characterization or environmental monitoring activities under RCRA or CERCLA.

Signature:

Date: 8/15/91

·35 "WVDP Sitewide Field Sampling/Monitoring Activities" Date 10/25/90

ENVIRONMENTAL CHECKLIST REVIEW AND APPROVAL:

	NO	YES	APPROVAL DATE
1. Does proposed project/activity require new or modified state or federal permits? If yes, identify permits. A Scientific Collector's Licence is required, and a NYS air permit would be required should any chemicals that NYS regulates as carcinogenic air contaminants [6 NYCRR Part 201.6(j)1] be discharged to the atmosphere.		X	
2. Does proposed project/activity require new or additional safety review (WV-906)?	X		
3. Does Project/Activity require new or additional NEPA review?		X	

If yes, indicate recommended documentation.

____ Memorandum-To-File (MTF)
____ Action Description Memorandum (ADM)
____ Environmental Assessment (EA)
____ Environmental Impact Statement (EIS)

X A categorical exclusion is hereby requested on the basis that this action is eligible for categorical exclusion per Section D of NEPA Guidelines published at 55 FR 37178 et seq. Specifically;- "3. Site characterization and monitoring . . ."

ENVIRONMENTAL CHECKLIST APPROVALS

Manager, Env. Compl. — Date 11/30/90

Manager, S&EA — Date 12/5/90

NEPA APPROVAL

The review and documentation required by the National Environmental Policy Act and its implementing regulations has been completed for this action.

DOE-WVPO — Date

No.	Rev.
WV-914	2

C-1

9302353

Attachment D

Safety Review Screen

USE BLACK INK OR TYPE

I. Responsibility

A. Date: AUGUST 18, 1993

B.1 Title of Proposed Change or Discovery: STREAM, IMPOUNDMENT & SEPTIC TANK SEDIMENT SAMPLING

B.2 Reference Document (affected document - e.g. work order no. " ")

9302353

C. Cognizant Department: SAFETY & ENVIRONMENTAL ASSESSMENT

D. Cognizant Manager (Typed/Printed): C. J ROBERTS

E. Prepared by (Typed/Printed): R. JOE JOHNSON

II. Safety Exclusion Screen (Complete either A or B, not both)

A. Discovery Process (Occurrence Reports, Non Conformance Reports, and RCA's only) NA

1. Does the facility configuration or operation differ from that described in the approved safety analysis or authorization basis? ☐ No ☐ Yes ☐ Maybe

2. Is there an error, omission, or inadequacy in the safety analysis which could reduce margin of safety in the SAR or an OSR/TSR? ☐ No ☐ Yes ☐ Maybe

B. Change Process:

1. Will the proposed change be a change in a facility described in an approved safety analysis? ☒ No ☐ Yes ☐ Maybe

2. Will the proposed change make changes in procedures described in the approved safety analysis? ☒ No ☐ Yes ☐ Maybe

3. Will the proposed change involve tests or experiments affecting a facility or operation described in the approved safety analysis? ☒ No ☐ Yes ☐ Maybe

If any of the questions in A or B above were answered with "Yes" or "Maybe" then complete the remainder of the Safety Review Screen.

If all of the questions in A or B above were answered "No" then provide the basis in Section V, sign the form where indicated, and attach this copy with the change or discovery documentation per the governing procedure (see WV-914, Att. B).

III. Safety Research and Conclusions (attach additional pages if needed):

9302353

No.	Rev.
WV-914	2

C-2

Attachment D

SAFETY REVIEW SCREEN

IV. Safety Questions:

A. Will the probability of an accident previously evaluated in approved safety analyses be increased? ☐ No ☐ Yes ☐ Maybe

B. Will the consequences of an accident previously evaluated in the approved safety analyses be increased? ☐ No ☐ Yes ☐ Maybe

C. Will the probability of a malfunction of equipment important to safety be increased? ☐ No ☐ Yes ☐ Maybe

D. Will the consequences of a malfunction of equipment important to safety be increased? ☐ No ☐ Yes ☐ Maybe

E. Will the possibility of an accident of a different type than any previously evaluated in approved safety analyses be created? ☐ No ☐ Yes ☐ Maybe

F. Will the possibility of a malfunction of a different type than any previously evaluated in the approved safety analyses be created? ☐ No ☐ Yes ☐ Maybe

G. Will the margin of safety as defined in the basis for any technical specification or safety analysis report be reduced? ☐ No ☐ Yes ☐ Maybe

H. Name (Typed/Printed) and Signature:

1. _____ _____
Safety Reviewer Date

2. _____ _____
Independent Reviewer Date

V. Basis (attach additional pages as needed): SEE ATTACHED SHEET

VI. Manager Recommendation and Signoff

A. Recommendation (Either 1, 2, or 3 shall be answered "Yes"):

1. It is recommended that the change or discovery is not a potential USQ. [X] Yes

2. It is recommended that the change or discovery is a potential USQ to be transmitted to the Radiation and Safety Committee for further review. [ ] Yes

3. Terminate the proposed change activity. [ ] Yes

B. Signoff:

1. [signature] 8/18/93
Cognizant Manager Date

VII. Radiation and Safety Committee Recommendation:

Recommendation (circle choice): Not USQ Probable USQ

_____ _____
Chairman, R&SC Date

C-3

9302353[redacted]

V. BASIS (FOR SAFETY REVIEW SCREEN FOR STREAM, IMPOUNDMENT & SEPTIC TANK SEDIMENT SAMPLING)

On site stream, impoundment and septic tank sediment sampling is a routine operation adequately covered by administrative procedures. R&D technicians and Waste Operations will provide support, as needed. An RWP will be obtained daily and an IWP will be obtained weekly. Protective equipment will be used as specified on the RWP/IWP. All personnel directly involved in the stream, impoundment and septic tank sediment sampling will have received hazardous and rad-worker training and be respirator qualified as required per procedures. There will be no off-site impacts from this activity.

[illegible] 8/18/93

R. Joe Johnson 8/18/93

COPY

No.	Rev.	Date
WV-111	2	12-16-92

J-3 Field Changes

1. Field Change Number (Entered by WCC Only) ATTACHMENT J: 9 3 0 2 3 5 2 . 1 FC 1

2. Originator	Date	Organization	Extension
R. Teifke	2 SEP 93	SE9A	4734

3. Priority	4. Quality Level	5. Est. Accum. Dose (100 Mrem)	6. Responsible Work Group
4N	C	Below X Above ___ N/A ___	SE9A

7. Estimated Manhours
Operations ___ Rad & Safety 80
Maint. ___ Qual. Assur. 40
Other RC 40 waste gp 40

8. Work Control Number: 9302352

9. Notified Work Group Supervisor: Yes ✓ No ___

10. Safety Review Screen: Completed and attached NA

11. Originator Mgr.: R. Gorton — Approval/Date: Peter Morton 9-2-93

12. Description of Change — Page 1 of 1

Task Number	Description of Field Change	Signature/Date
ADD:	Collect a sample to archive, at the direction of the field geologist, for future geologic studies.	
	Non-radioactive samples will be stored with other archived samples at the BSW, radioactive samples will be stored in a suitable Radioactive Materials Storage Area	

13. Reason for Change

RECEIVED SEP 3 1993 WORK CONTROL CENTER

14. Review/Approvals

Work Group	Signature/Date	Work Group	Signature/Date
Operations (MPO)	[signature] 9/3/93	NMO	R.L. Phelps 9-3-93
Maintenance	NA	RC	[signature] 9/3/93
Rad & Safety	RH George H. Mefle 9/3/93	IHTS	M.F. Schmitz 9-3-93
Qual. Assurance	[signature] 9/3/93		

WV-1085, Rev. 1

FC1

Attachment D

Safety Review Screen

USE BLACK INK OR TYPE

I. Responsibility

A. Date: 16 September 1993

B.1 Title of Proposed Change or Discovery:

B.2 Reference Document (affected document - e.g. work order no. " ")
9302352

C. Cognizant Department: Safety & Environmental Assessment

D. Cognizant Manager (Typed/Printed): C.J. Roberts

E. Prepared by (Typed/Printed): P.M. Vlas

II. Safety Exclusion Screen (Complete either A or B, not both)

A. Discovery Process (Occurrence Reports, Non Conformance Reports, and RCA's only) NA

1. Does the facility configuration or operation differ from that described in the approved safety analysis or authorization basis? ☐ No ☐ Yes ☐ Maybe

2. Is there an error, omission, or inadequacy in the safety analysis which could reduce margin of safety in the SAR or an OSR/TSR? ☐ No ☐ Yes ☐ Maybe

B. Change Process:

1. Will the proposed change be a change in a facility described in an approved safety analysis? ☒ No ☐ Yes ☐ Maybe

2. Will the proposed change make changes in procedures described in the approved safety analysis? ☒ No ☐ Yes ☐ Maybe

3. Will the proposed change involve tests or experiments affecting a facility or operation described in the approved safety analysis? ☒ No ☐ Yes ☐ Maybe

If any of the questions in A or B above were answered with "Yes" or "Maybe" then complete the remainder of the Safety Review Screen.

If all of the questions in A or B above were answered "No" then provide the basis in Section V, sign the form where indicated, and attach this copy with the change or discovery documentation per the governing procedure (see WV-914, Att. B).

III. Safety Research and Conclusions (attach additional pages if needed):

No.	Rev.
WV-914	2

Attachment D

SAFETY REVIEW SCREEN

IV. Safety Questions:

A. Will the probability of an accident previously evaluated in approved safety analyses be increased? ☒ No ☐ Yes ☐ Maybe

B. Will the consequences of an accident previously evaluated in the approved safety analyses be increased? ☒ No ☐ Yes ☐ Maybe

C. Will the probability of a malfunction of equipment important to safety be increased? ☒ No ☐ Yes ☐ Maybe

D. Will the consequences of a malfunction of equipment important to safety be increased? ☒ No ☐ Yes ☐ Maybe

E. Will the possibility of an accident of a different type than any previously evaluated in approved safety analyses be created? ☒ No ☐ Yes ☐ Maybe

F. Will the possibility of a malfunction of a different type than any previously evaluated in the approved safety analyses be created? ☒ No ☐ Yes ☐ Maybe

G. Will the margin of safety as defined in the basis for any technical specification or safety analysis report be reduced? ☒ No ☐ Yes ☐ Maybe

H. Name (Typed/Printed) and Signature:

1. _____ _____
Safety Reviewer Date

2. _____ _____
Independent Reviewer Date

V. Basis (attach additional pages as needed): see attached sheet

VI. Manager Recommendation and Signoff

A. Recommendation (Either 1, 2, or 3 shall be answered "Yes"):

1. It is recommended that the change or discovery is not a potential USQ. ☑ Yes

2. It is recommended that the change or discovery is a potential USQ to be transmitted to the Radiation and Safety Committee for further review. [ ] Yes

3. Terminate the proposed change activity. [ ] Yes

B. Signoff:

1. _____ 9/16/93
Cognizant Manager Date

VII. Radiation and Safety Committee Recommendation:

Recommendation (circle choice): Not USQ Probable USQ

_____ _____
Chairman, R&SC Date

9302352

C-3

V. Basis (for Safety Review Screen for Surface Soil Sampling - August 18, 1993)

On site surface soil sampling is a routine operation adequately covered by administrative procedures. R&S technicians and Waste Operations will provide support, as needed. An RWP will be obtained daily and an IWP will be obtained weekly. Protective equipment will be used as specified on the RWP/IWP. All personnel directly involved in the surface soil sampling will have received hazardous and rad-worker training and be respirator qualified as required per procedures. There will be no off-site impacts from this activity.

[illegible] 8/18/93

R Joe Johnson 8/18/93

COPY

Work Order Shop Orders Only (Others Use J-2) | V-111 | Rev. 2 | Date: 12-16-92

J1 - Work Authorization

1. Work Control Number (Used By WCC): EM-9302352-1/WO

ATTACHMENT B

Originator: R. Tiefke (Name) 8/18/93 (Date) S+EA (Organization) Z-05 (Mailstop) 4734 (Extension)

3. Charge No. (Labor) WH 6100001 (M & S) WH 6100003 | 4. System 40 | 5. Equip. No. E I V N/A | 6. Location 303

7. Performance Code
A. ___ Special Preparation
B. ✓ Normal Preparation

System: 0 ___ May be shut down; 1 ___ Must be shut down; 2 ___ Must be operating; 3 ✓ N/A

Equipment: 0 ___ May be shut down; 1 ___ Must be shut down; 2 ___ Must be operating; 3 ✓ N/A

8. Estimated Manhours

ACTIVITY	MH
waste Ops	40
Maint N/A	—
QA ✓	40
RS Tech ✓	80
~~EOT~~ RC	40

CORRECTIVE MAINTENANCE: Yes ___ No ✓

S+EA 80

9. Dwg./Sk. Yes ___ No ✓ Attached ___ | 10. Docs/Dwgs Required Revs Yes ___ No ✓ ECN No. ___ | 11. Required Document(s) As-Built ___ D-Spec ___ N/A | 12. Type of Work Item W.O. | 13. Internal ___ External ✓ | 14. Priority 4N

15. Document Ref. No. Soils SAP | 16. Qual. Level C | 17. Safety Class N | 18. Est. Accumulated Dose (100 mRem) Below ✓ Above ___ N/A ___

19. Eng. Approval Required Yes ___ No ✓ | 20. IWP Required? Yes ✓ No ___ RWP Required? Yes ✓ No ___ | 21. High Consequence Lift? Yes ___ No ✓ If yes, rigging sketch required.

22. QA Inspection Required? Yes ✓ No ___ | 23. Welding or Spec Process Req.? Yes ___ No ✓ Cite ___ | 24. Special Qualification Req.? Yes ___ No ✓ | Note: A Yes to any of item 21 thru 24 requires a QA approval.

25. Quality Related Material Req.? Yes ✓ No ___ | 26. Safety Review Screen: Completed and Attached ✓ | 27. Environmental Checklist: Yes ✓ No ___ Attached ✓

28. Reqd. Finish Date 10/30/93 | 29. Originator's Manager R. Blickwedehl [signature] | Approval/Date 8/18/93

TITLE: Surface Soil Sampling

OBJECTIVE: Sampling of surface soils accross the WVDP site

___ FAB.
___ INSTALL
___ MOD./REPAIR
___ INSP.
✓ TEST
___ CALIB.

31. Description of Work

Task	Description	Signature/Date
1	Surface soil sampling per the attached steps	

ISSUED AUG 30 1993 WORK CONTROL CENTER

32. Responsible Work Group: S+EA

33. Work Group Supervisor: R. Tiefke

34. Work Group Manager: C. Roberts

35. Review/Approvals

WORK GROUP	SIGNATURE/DATE	WORK GROUP	SIGNATURE/DATE
WMO Ops	[signature]	Ind. Hyg. & Safety	M.F. Schmitz 8-23-93
Maintenance	N/A	___ Eng	N/A
Radiation & Safety	[signature] 8/26/93	~~EOT~~ RC JPB	[signature] 8/20/93
Quality Assurance	[signature] 8/26/93	~~Reg. Cmt.~~ MPO	[signature] 8/26/93

36. Documentation of Work Completion

Work Group Supervisor ___ Date ___ Originator ___ Date ___

WO-EM-930-2352-IWO

SHALLOW SOIL SAMPLING

A log book will be maintained of all activities that occur during shallow soil sampling. Sample locations can be found on the Plate 4 of the Amendment to the RFI Work Plan, Draft B, June 1993.

Notify facility Managers at least 24 hours in advance of initiation of activities at each sampling location 8/27/93

1 Obtain an RWP and IWP.

2 Contact all personnel to be involved in the field sampling. (S&EA, RC, R&S, QA, RP)

3 Obtain field sampling equipment (dedicated sampling equipment will be used as much as possible).

- A. Pre-cleaned stainless steel trowels or spoons.
- B. Pre-cleaned stainless steel mixing trays or bowls.
- C. Tape measure or distance measuring device.
- D. Brunton compass.
- E. Stakes.
- F. Plastic waste bags.
- G. Pre-labeled sample jars.
- H. Sampling storage container, lined with a plastic bag and containing enough ice to cool the samples to 4°±2°C.
- I. Personnel protective equipment as prescribed by the RWP.

4 With all personnel involved in the sampling exercise hold a 'tail gate' safety meeting.

5 With all necessary personnel to complete sampling, proceed to a previously designated grid sampling location.

6 Prepare a work area with plastic sheeting or herculite and plastic bags to contain waste materials that are produced during sampling.

7 At the designated grid sampling location remove all large surface debris and vegetation, and place adjacent to the sample area 8/27/93 Rmy

8 The R & S technician will direct check the exposed surface of the area to be sampled.

9 Locate the secondary sampling locations one meter north, south, east and west of the primary sample location.

10 Clear all large surface debris and vegetation from the secondary sample locations. and place adjacent to the sample locations. [illegible]

11 The R & S technician will direct check the exposed surface of the area to be sampled.

12 Using the Pre-cleaned stainless steel trowel or spoon collect a soil sample from the upper 15 centimeters from the primary and secondary locations. Samples to be collected at each primary and secondary location will be directed by the Sample Coordinator.

A. VOC samples: Place a portion of soil sample from each location into an appropriate sample jar until the jar is full. If the New York State Department of Environmental Conservation (NYSDEC) representative requests and provides a sample jar, split the sample with him. This is accomplished by placing half of a sample aliquot into each jar from each location until the jars are filled. Seal the jar, record the pertinent data on the label and the chain of custody form and place the jar into the storage container. The NYSDEC representative will take custody of the sample containers they provided after the sample containers are checked and cleared of lose surface contamination by the R & S technician.

B. Continue to collect soil from the primary and secondary locations into the pre-cleaned mixing bowl (tray), until enough sample is collected to satisfy the requirements of the contract laboratories.

13 Mix the sample by quartering and combining the soil until a homogeneous mixture is achieved.

4

14 At the direction of the Sample Coordinator spoon the sample into jars until the requisite sample jars are filled. If the New York State Department of Environmental Conservation (NYSDEC) representative requests and provides a sample jar, split the sample with him. This is accomplished by placing half of a sample aliquot into each jar from each location until the jars are filled. The NYSDEC representative will take custody of the sample containers they provided after the sample containers are checked and cleared of lose surface contamination by the R & S technician.

15 Seal the jars and record the pertinent data on the label and chain of custody forms.

16 Place the jars into the pre-cooled (4°±2°C) sample storage container.

17 At the direction of the R & S Technician collect enough sample to satisfy the screening analysis needs.

18 The R & S technician will make the determination if the sample will be controlled as radioactive material on a case by case basis. All samples considered to be radioactive material will be handled and stored per WVDP-010, Rad Con Manual. Any material exceeding 150 cpm/probe area will have to be analyzed in accordance with RC-ADM-27. Results of the field check will be recorded on the attached "SOIL SAMPLE FIELD RADIOACTIVITY CHECK" form. The form may be used for more then one sample. If the sample results are less then 150 cpm/probe area, beta-gamma then the sample can be considered to be less then 0.002 μcuries/gram gross alpha and beta for shipping purposes.

19 Packaging and shipment will be performed in accordance with Work Order EM-930-1971.

20 Place all of the sampling equipment into a plastic bag at the direction of the R & S Technician.

21 Allow the R & S technician to survey and label the bag or materials as needed.

22 Allow the R & S technician to survey the sample jars and storage container at the work site or at the sample storage area at his(her) discretion. Cleaning and Rad 8/27/93 Decontamination of these containers will be conducted as required.

Start a SOP 300-07, Attachment A form and inform WMO of waste containers to be retrieved. RAP 8/27/93

23 Stake and label the position of the sample.

24 Transport the samples and storage container to the designated storage location and secure the samples to await the results of the screening analysis.

25 Sample packaging and shipment will be performed at the direction of work order 930-1971.

26 At the completion of the week or sample program, return to the sample location and using a compass and distance measuring device determine the location of the sample as compared to a fixed landmark and record the location in the sample program log book.

9302352

No.	Rev.	Date
WV-111	2	12-16-92

J1A - Work Authorization
(Continuation)

1. Work Control Number: 9 - / ATTACHMENT C

2. DESCRIPTION OF WORK

Page 6 of 6

Title: Surface Soil Sampling

TASK	DESCRIPTION	SIGNATURE/DATE

3. BRIEF DESCRIPTION OF COMPLETED WORK:

Actual Hours Worked:

ACTIVITY	MH
_____ Ops	_____
Maint _____	_____
QA _____	_____
RS Tech _____	_____
_____	_____

9302352

A.1

Soil Sample Field Radioactivity Check.

DATE	SAMPLE LOCATION	SAMPLE NUMBER	RESULTS (cpm above background)	INSTRUMENT SERIAL NUMBER	TECHNICIAN	REMARKS

9302352[redacted] NEPA/CATEX: SOIL $

B-1

Rec'd.
Rec. Mgmt.
September 9, 1991

Department of Energy
Idaho Operations Office
West Valley Project Office
P.O. Box 191
West Valley, NY 14171

DW:91:0751

RESPONSE:
WD:2006

September 6, 1991

Approval of EC90-35

Mr. J. J. Buggy, President
and General Manager
West Valley Nuclear Services Co., Inc.
P.O. Box 191
West Valley, NY 14171

ATTENTION: C. J. Roberts, Safety and Environmental Assessment Manager

SUBJECT: DOE Approval of Categorical Exclusion (CX) Determination for "Site Characterization/Environmental Monitoring" (90-35)

Dear Sir:

Enclosed for your files is the subject approval. Please contact Elizabeth Matthews on extension 4930 if you have any questions.

Sincerely,

Tom Rowland

T. J. Rowland, Director
West Valley Project Office

Enclosure

cc: J. L. Knabenschuh, WVNS
T. L. Perkins, DOE-ID (w/enc)
P. W. Arpke, UNC Geotech-ID

EAM:145:91 - 2702:90:10

EAM/sl

9302352

B.2

United States Government

Department of Energy

Memorandum

DATE: JUL 29 1991

REPLY TO ATTN OF: EM-343

SUBJECT: Section D Determination - Categorical Exclusion

TO: Leo P. Duffy, EM-1

Attached is a categorical exclusion (CX) for your signature as follows:

Site Characterization/Environmental Monitoring at the West Valley Demonstration Project, Idaho Operations Office

Also attached for your signature is a memorandum transmitting the CX to EH-25 for indication of objection/no objection.

Jill E. Lytle
Associate Director
Office of Waste Operations
Environmental Restoration
and Waste Management

2 Attachments

2702:90:10

9302352

B-3

Memo to Duffy fm Lytle
re: Section D Determination - Categorical Exclusion

Distribution:
so: Addee
1bcc: EM-343, Truskett rdr.
1bcc: EM-343 rdr.
2bcc: EM-30 (Lytle & Cowan) rdr.
1bcc: EM-343 suspense
1bcc: EM-30 suspense (Cowan)
1bcc: EM Mailroom
1bcc: EM-20
1bcc: Henninger, EM-331
1bcc: Stevens, EM-331
1bcc: Turi, EM-33

EM-343:Truskett:kdc:3-7194:3/7/91
(c:Truskett:KC91-38)

File Code # 4753.38

Action # KC91-38

Correspondence Reviewers: S. Sappington SJS 4/15
K. Morris, Exec. Asst., EM-30 5/15

EM-343
Truskett
3/15/91

EM-343
McIntosh
3/18/91

EM-331
Henninger
3/18/91

EM-331
Stevens
3/19/91

EM-343
Chacey
3/20/91

EM-34
Frei
3/20/91

EM-33
Turi
3/21/91

EM-30
Cowan
4/12/91

EM-20
Scott
/ /91 5/10/91

EM-30
Lytle
5/16/91

9302352

B.4

United States Government

Department of Energy

Memorandum

DATE: JUL 30 1991

REPLY TO ATTN OF: EM-343

SUBJECT: Section D Determination - Categorical Exclusion

TO: Carol M. Borgstrom, EH-25

Attached is the National Environmental Policy Act (NEPA) documentation for the following proposed action which I have determined is within the existing categorical exclusions (CX) as defined in Section D of the Department of Energy NEPA Guidelines:

Site Characterization/Environmental Monitoring at the West Valley Demonstration Project, Idaho Operations Office

I request that you notify me within two weeks, in accordance with the Interim Procedural Guidelines for Implementation of Secretary of Energy Notice-15-90, if you have any objection to this CX determination.

Leo P. Duffy
Director
Office of Environmental Restoration
and Waste Management

Attachment

Response cc:
D. Henninger, EM-331

9302352

B.5

Memo to Borgstrom fm Duffy
re: Section D Determination - Categorical Exclusions

Distribution:
so: Addee
cc: As stated
1bcc: EM-343, Truskett rdr.
1bcc: EM-343 rdr.
2bcc: EM-30 (Cowan & Lytle) rdr
1bcc: EM-343 Suspense
1bcc: EM Mailroom
2bcc: EM-30 suspense (Cowan & Lytle)
1bcc: Yellow File Copy
1bcc: Henninger, EM-331
1bcc: Stevens, EM-331
1bcc: Turi, EM-33

EM-343:Truskett:kdc:3-7194:3/15/91
(c:Truskett:KC91-38)

Action # KC91-38

File Code # 4793.38

Correspondence Reviewers: S. Sappington SJS 4/15
K. Morris, Exec. Asst., EM-30 ___

EM-343
Truskett
7/18/91

EM-343
McIntosh
3/18/91

EM-331
Henninger
3/18/91

EM-331
Stevens
3/19/91 LS

EM-343
Chacey
3/21/91

EM-34 MF
Frei
3/20/91

~~EM-33~~
~~Turi~~
~~/91~~

EM-30
Cowan
4/12/91

EM-20
Scott
/ /91
5/10/91 see attached EM-22 Record of Review

EM-30
Lytle
7/29/91

EM-3
7/29/91

EM-2
7/29/91

EM-1
Duffy
/ /91

9302352

B.6

United States Government

Department of Energy

memorandum

Idaho Operations Office

DATE: January 31, 1991

SUBJECT: Section D "Site Characterization/Environmental Monitoring" Determination

TO: D. Henninger
EM-30, DOE-HQ

DOE-Idaho has reviewed the attached Categorical Exclusion (CX) prepared by the West Valley Demonstration Project (WVDP) for site-wide field sampling/monitoring activity (90-35), which falls under the Section D "Site Characterization and Environmental Monitoring" CX.

After this CX is approved, please send a copy back to J. E. Solecki, Assistant Manager, Environmental Restoration and Waste Management; C. R. Nichols, Acting Assistant Manager, Site Engineering and Support; and T. J. Rowland, Acting Director, West Valley Project Office.

An Expeditious review of this CX by February 15, 1991, would be appreciated. If you have any questions, please call T. J. Rowland at FTS 473-4312.

R. C. Tiller for

A. A. Pitrolo
Manager

Attachments

cc: C. E. Gilmore, DOE-ID
J. E. Solecki, DOE-ID
W. N. Sato, DOE-ID
T. J. Rowland, WVPO

9302352

B-7

EM-22 RECORD OF REVIEW

EM Document Control Number: EM 9100661

Subject: Categorical Exclusion (CX) for Site Characterization/ Environmental Monitoring at the West Valley Demonstration Project, Idaho Operations Office

Action Requested of EM-20: Concurrence in this CX Determination

EM-22 Recommendation: Concur and forward to EM-1 for approval

Analysis/Comments: This is a resubmittal of a package that was previously reviewed by EM-22. The previous review was documented on an EM-22 Record of Review (ROR) dated May 10, 1991. The proposed action includes site characterization, environmental monitoring, compliance and process monitoring, and all field activities associated with such monitoring. These monitoring activities can occur onsite and/or offsite, be routine or special, and involve radiological and/or non-radiological parameters. The previous review of the CX Determination indicated that the CX category applied "Site characterization and environmental monitoring..." was limited to those activities being performed under CERCLA and RCRA and therefore, did not qualify for the applied CX category. However, after reviewing the wording of the applied CX category and consulting with EM-25 staff, EM-22 has determined that the proposed action does qualify for the applied CX category. Additionally, the CX determination contains the necessary information to make that determination and is adequate for transmittal to EM-1 for approval.

Recommendation: Concur and forward to EM-1 for approval.

EM-22 INTERNAL QUALITY ASSURANCE RECORD OF REVIEW

Reviewer: E. Harr Date: July 26, 1991

Reviewed: Michael H. Kleinrock Date: 7/26/91
Michael H. Kleinrock
Director, Environmental Compliance Division

EM-20 approves EM-22's recommendation: ☒ to concur and forward to EM-1 for approval; ☐ to return to the program office for revision.

Randal S. Scott Date: 7/26/91
Randal S. Scott
Director, Office of Quality Assurance and Quality Control

9302352

B.8

EM-22 RECORD OF REVIEW

EM Document Control Number: EM 9100661

Subject: Categorical Exclusion (CX) for Site Characterization/ Environmental Monitoring at the West Valley Demonstration Project, Idaho Operations Office

Action Requested of EM-20: Concurrence in this CX Determination

EM-22 Recommendation: Return to EM-30 for appropriate action

Analysis/Comments: A CX Determination does not appear to be the appropriate mechanism to satisfy the NEPA requirements of this proposed action. The proposed action includes site characterization, environmental monitoring, compliance and process monitoring, and all field activities associated with such monitoring. These monitoring activities can occur onsite and/or offsite, be routine or special, and involve radiological and/or non-radiological parameters. The CX category applied is "Site characterization and environmental monitoring...". However, this CX category is limited to those activities being performed under CERCLA and RCRA.

Some portions of the proposed action may qualify for the applied CX category, i.e., monitoring under RCRA and/or CERCLA. However, there is not enough information presented to determine which, if any, part of the monitoring program is being carried out under RCRA and/or CERCLA. If monitoring is being carried out under RCRA and/or CERCLA, the CX Determination needs to be revised to include only those portions as appropriate.

Other environmental monitoring activities, e.g., those being undertaken for the annual site environmental reports, etc., may qualify as a CX in the proposed DOE NEPA regulation. Therefore, the preparation of a "mini" EA would be the appropriate level of NEPA documentation. It should also be noted that some of the proposed environmental monitoring activities may be covered under existing NEPA documentation and not require further NEPA compliance.

Recommendation: Return to EM-30 for appropriate action.

EM-22 INTERNAL QUALITY ASSURANCE RECORD OF REVIEW

Reviewer: E. Harr Date: May 10, 1991

Reviewed: MHKleinrock Date: 5/10/91
Michael H. Kleinrock
Director, Environmental Compliance Division

EM-20 approves EM-22's recommendation: ☐ to concur and forward to EM-1 for signature; ☒ to return to the program office for revision.

Randal S. Scott Date: 5/10/91
Director, Office of Quality Assurance
and Quality Control

9302352

B.9

CATEGORICAL EXCLUSION (CX) DETERMINATION

Proposed action: WVDP Sitewide Field Sampling/Monitoring Activities (90-35)

Location: West Valley Demonstration Project

Proposed by (if other than DOE): West Valley Nuclear Services

Description of the proposed action:
Site characterization, environmental monitoring, compliance and process monitoring, - onsite and offsite, routine and special, radiological and non-radiological - and all field activities associated with such monitoring.

CX to be applied (from Section D, DOE NEPA Guidelines):
"Site characterization and environmental monitoring . . ."

I have determined that the proposed action meets the requirements for the CX referenced above. Therefore, I have determined that the proposed action may be categorically excluded from further NEPA review and documentation.

Signature:

Title: Director
Office of Environmental Restoration and Waste Management

Date:

EH-25 has reviewed this determination and has no objection. to those site characterization or environmental monitoring activities under RCRA or CERCLA.

Signature:

Date: 8/15/91

9302352

B.10

-35 "WVDP Sitewide Field Sampling/Monitoring Activities" Date 10/25/90

ENVIRONMENTAL CHECKLIST REVIEW AND APPROVAL:

	NO	YES	APPROVAL DATE
1. Does proposed project/activity require new or modified state or federal permits? If yes, identify permits. A Scientific Collector's Licence is required, and a NYS air permit would be required should any chemicals that NYS regulates as carcinogenic air contaminants [6 NYCRR Part 201.6(j)1] be discharged to the atmosphere.		X	
2. Does proposed project/activity require new or additional safety review (WV-906)?	X		
3. Does Project/Activity require new or additional NEPA review?		X	

If yes, indicate recommended documentation.

____ Memorandum-To-File (MTF)
____ Action Description Memorandum (ADM)
____ Environmental Assessment (EA)
____ Environmental Impact Statement (EIS)

X A categorical exclusion is hereby requested on the basis that this action is eligible for categorical exclusion per Section D of NEPA Guidelines published at 55 FR 37178 et seq. Specifically;- "3. Site characterization and monitoring . . ."

ENVIRONMENTAL CHECKLIST APPROVALS

Manager, Env. Compl. — Date 11/30/90

Manager, S&EA — Date 12/5/90

NEPA APPROVAL

The review and documentation required by the National Environmental Policy Act and its implementing regulations has been completed for this action.

DOE-WVPO — Date

9302352

No.	Rev.
WV-914	2

C.1

Attachment D

Safety Review Screen

USE BLACK INK OR TYPE

I. Responsibility

A. Date: August 18, 1993

B.1 Title of Proposed Change or Discovery: Surface Soil Sampling

B.2 Reference Document (affected document - e.g. work order no. " ")

9302352

C. Cognizant Department: Safety & Environmental Assessment

D. Cognizant Manager (Typed/Printed): C. J Roberts

E. Prepared by (Typed/Printed): R. Joe Johnson

II. Safety Exclusion Screen (Complete either A or B, not both)

A. Discovery Process (Occurrence Reports, Non Conformance Reports, and RCA's only) NA

1. Does the facility configuration or operation differ from that described in the approved safety analysis or authorization basis? ☐ No ☐ Yes ☐ Maybe

2. Is there an error, omission, or inadequacy in the safety analysis which could reduce margin of safety in the SAR or an OSR/TSR? ☐ No ☐ Yes ☐ Maybe

B. Change Process:

1. Will the proposed change be a change in a facility described in an approved safety analysis? ☒ No ☐ Yes ☐ Maybe

2. Will the proposed change make changes in procedures described in the approved safety analysis? ☒ No ☐ Yes ☐ Maybe

3. Will the proposed change involve tests or experiments affecting a facility or operation described in the approved safety analysis? ☒ No ☐ Yes ☐ Maybe

If any of the questions in A or B above were answered with "Yes" or "Maybe" then complete the remainder of the Safety Review Screen.

If all of the questions in A or B above were answered "No" then provide the basis in Section V, sign the form where indicated, and attach this copy with the change or discovery documentation per the governing procedure (see WV-914, Att. B).

III. Safety Research and Conclusions (attach additional pages if needed):

SAFETY REVIEW SCREEN

IV. Safety Questions:

A. Will the probability of an accident previously evaluated in approved safety analyses be increased? ☐ No ☐ Yes ☐ Maybe

B. Will the consequences of an accident previously evaluated in the approved safety analyses be increased? ☐ No ☐ Yes ☐ Maybe

C. Will the probability of a malfunction of equipment important to safety be increased? ☐ No ☐ Yes ☐ Maybe

D. Will the consequences of a malfunction of equipment important to safety be increased? ☐ No ☐ Yes ☐ Maybe

E. Will the possibility of an accident of a different type than any previously evaluated in approved safety analyses be created? ☐ No ☐ Yes ☐ Maybe

F. Will the possibility of a malfunction of a different type than any previously evaluated in the approved safety analyses be created? ☐ No ☐ Yes ☐ Maybe

G. Will the margin of safety as defined in the basis for any technical specification or safety analysis report be reduced? ☐ No ☐ Yes ☐ Maybe

H. Name (Typed/Printed) and Signature:

1. _____ _____
Safety Reviewer Date

2. _____ _____
Independent Reviewer Date

V. Basis (attach additional pages as needed): see attached sheet

VI. Manager Recommendation and Signoff

A. Recommendation (Either 1, 2, or 3 shall be answered "Yes"):

1. It is recommended that the change or discovery is not a potential USQ. [X] Yes

2. It is recommended that the change or discovery is a potential USQ to be transmitted to the Radiation and Safety Committee for further review. [ ] Yes

3. Terminate the proposed change activity. [ ] Yes

B. Signoff:

1. [signature] 8/10/93
Cognizant Manager Date

VII. Radiation and Safety Committee Recommendation:

Recommendation (circle choice): Not USQ Probable USQ

_____ _____
Chairman, R&SC Date

9302352

C-3

V. BASIS (for SAFETY REVIEW SCREEN for SURFACE SOIL SAMPLING - AUGUST 18, 1993)

On site surface soil sampling is a routine operation adequately covered by administrative procedures. R & S. technicians and Waste Operations will provide support, as needed. An RWP will be obtained daily and an IWP will be obtained weekly. Protective equipment will be used as specified on the RWP/IWP. All personnel directly involved in the surface soil sampling will have received hazardous and rad-worker training and be respirator qualified as required per procedures. There will be no off-site impacts from this activity.

[illegible]
8/18/93

R Joe Johnson
8/18/93

COPY

No.	Rev.	Date
WV-111	2	12-16-92

J-3 Field Changes

1. Field Change Number (Entered by WCC Only): 9 3 0 1 9 9 6 . 3 FC — ATTACHMENT J

2. Originator	Date	Organization	Extension
R. Tetfke	14 Sept 93	S&EA	4734

3. Priority	4. Quality Level	5. Est. Accum. Dose (100 Mrem)	6. Responsible Work Group
2	N	Below ✓ Above ___ N/A ___	S&EA

7. Estimated Manhours	8. Work Control Number	9. Notified Work Group Supervisor
Operations ___ Rad & Safety ___ Maint. ___ Qual. Assur. ___ Other ___ N/A	930196	Yes ✓ No ___

10. Safety Review Screen:	11. Originator Mgr.	Approval/Date
Completed and attached ___	[signature]	9-14-93

12. Description of Change — Page 1 of 2

Task Number	Description of Field Change	Signature/Date
5.5.4.3	ADD: Carefully transfer the liquids from buckets land 2 into a 55 gallon lined container. When the 55 gallon drum is filled, collect samples for Radio-Chemical Analysis. All activities are to be approved by cog-engineer, R/S, and IH&S	
5.5.7	ADD: Carefully transfer the liquid from steam cleaning into a 55 gallon lined container. When the container is filled, collect samples for chemical analysis. All activities are to be approved by cog engineer, R/S, & IH&S.	
5.5.7.1	Samples are to be packaged per W.O. 930197	

13. Reason for Change

SEP 14 1993 WORK CONTROL CENTER

14. Review/Approvals

Work Group	Signature/Date	Work Group	Signature/Date
Operations	[signature] 9/14/93	WMO	[signature] 9-14-93
Maintenance	N/A	RC	[signature] 9/14/93
Rad & Safety	[signature] 9/14/93	IH&S	[signature] 9-14-93
Qual. Assurance	[signature] 9/14/93	Phase II Eng.	[signature] 9-14-93

9/14/93

WV-1085, Rev. 1

No.	Rev.	Date
WV-111	2	12-16-92

J3A - FIELD CHANGE (Continuation)

1. FIELD CHANGE NUMBER: 9 3 0 1 9 9 6 . 3

ATTACHMENT K **FC**

2. DESCRIPTION OF FIELD CHANGE

Page 2 of 2

TASK NUMBER	DESCRIPTION OF FIELD CHANGE	SIGNATURE/DATE
5.5.8	For the filled collection containers, fill out the appropriate SOP 300-7 attachment	
5.5.9	Contact the WMO - Haz Ops Supervisor to transfer the containers to the INSF for storage, until classification has been completed.	
	ADD:	
5.5.4.1	Based upon field screening of the equipment, Segregate radiological from non-radiological ~~and [illegible] OVA [illegible] from [illegible]~~ PW 14 Sept 93	
14 Sept 94	~~OVA [illegible]~~, before ~~[illegible]~~ cleaning the drilling equipment.	
5.5.4.2	ADD: ~~Placed~~ Clean the drilling equipment as prescribed, collecting rad-contaminated solutions from non-radiological solutions.	
	ADD:	
5.5.1.1	All Equipment cleaning will be performed per each SWMU, ~~Za~~ PW 14 Sept 93 For areas that are not part of a SWMU consolidation of cleaning solutions will be performed after the approval of the cognizant engineer and Regulatory Compliance.	

Safety Review Screen

USE BLACK INK OR TYPE

I. Responsibility | A. Date: 16 Sept 93

B.1 Title of Proposed Change or Discovery:

B.2 Reference Document (affected document - e.g. work order no. " ")

9301996

C. Cognizant Department: Safety & Environmental Assessment

D. Cognizant Manager (Typed/Printed): G J Roberts

E. Prepared by (Typed/Printed): D M Nuno

II. Safety Exclusion Screen (Complete either A or B, not both)

A. Discovery Process (Occurrence Reports, Non Conformance Reports, and RCA's only) N/A

1. Does the facility configuration or operation differ from that described in the approved safety analysis or authorization basis? ☐ No ☐ Yes ☐ Maybe

2. Is there an error, omission, or inadequacy in the safety analysis which could reduce margin of safety in the SAR or an OSR/TSR? ☐ No ☐ Yes ☐ Maybe

B. Change Process:

1. Will the proposed change be a change in a facility described in an approved safety analysis? ☒ No ☐ Yes ☐ Maybe

2. Will the proposed change make changes in procedures described in the approved safety analysis? ☒ No ☐ Yes ☐ Maybe

3. Will the proposed change involve tests or experiments affecting a facility or operation described in the approved safety analysis? ☒ No ☐ Yes ☐ Maybe

If any of the questions in A or B above were answered with "Yes" or "Maybe" then complete the remainder of the Safety Review Screen.

If all of the questions in A or B above were answered "No" then provide the basis in Section V, sign the form where indicated, and attach this copy with the change or discovery documentation per the governing procedure (see WV-914, Att. B).

III. Safety Research and Conclusions (attach additional pages if needed):

SAFETY REVIEW SCREEN

IV. Safety Questions:

A. Will the probability of an accident previously evaluated in approved safety analyses be increased? ☒ No ☐ Yes ☐ Maybe

B. Will the consequences of an accident previously evaluated in the approved safety analyses be increased? ☒ No ☐ Yes ☐ Maybe

C. Will the probability of a malfunction of equipment important to safety be increased? ☒ No ☐ Yes ☐ Maybe

D. Will the consequences of a malfunction of equipment important to safety be increased? ☒ No ☐ Yes ☐ Maybe

E. Will the possibility of an accident of a different type than any previously evaluated in approved safety analyses be created? ☒ No ☐ Yes ☐ Maybe

F. Will the possibility of a malfunction of a different type than any previously evaluated in the approved safety analyses be created? ☒ No ☐ Yes ☐ Maybe

G. Will the margin of safety as defined in the basis for any technical specification or safety analysis report be reduced? ☒ No ☐ Yes ☐ Maybe

H. Name (Typed/Printed) and Signature:

1. _____ Safety Reviewer _____ Date

2. _____ Independent Reviewer _____ Date

V. Basis (attach additional pages as needed): see attached sheet

VI. Manager Recommendation and Signoff

A. Recommendation (Either 1, 2, or 3 shall be answered "Yes"):

1. It is recommended that the change or discovery is not a potential USQ. [✓] Yes

2. It is recommended that the change or discovery is a potential USQ to be transmitted to the Radiation and Safety Committee for further review. [ ] Yes

3. Terminate the proposed change activity. [ ] Yes

B. Signoff:

1. [signature] Cognizant Manager 9-16-93 Date

VII. Radiation and Safety Committee Recommendation:

Recommendation (circle choice): Not USQ Probable USQ

_____ Chairman, R&SC _____ Date

COPY

9301996

0.3

SAFETY REVIEW SCREEN

REFERENCE No 9301996

SECTION V. BASIS

On-site drilling and sampling is a routine operation adequately covered by administrative procedures. R&D technicians and Waste Operations will provide support, as needed. An RWP will be obtained daily and an IWP will be obtained weekly. Protective equipment will be used as specified on the RWP/IWP. All personnel directly involved in drilling and sampling will have received hazardous and rad-waste training and be respirator qualified as needed. There will be no off-site impacts from this operation. The consequences from an earthquake induced failure of lagoon walls as described in WVNS-SAR-002 envelops the consequences of any effects to weaken the lagoon walls from drilling.

COPY

No.	Rev.	Date
WV-111	2	12-16-92

J-3 Field Changes

ATTACHMENT J

1. Field Change Number (Entered by WCC Only): 9 3 0 1 9 9 6 . 2 FC

2. Originator	Date	Organization	Extension
R Teitke	9/10/93	SRRA	4734

3. Priority	4. Quality Level	5. Est. Accum. Dose (100 Mrem)	6. Responsible Work Group
2	C	Below X Above ___ N/A ___	SRRA

7. Estimated Manhours	8. Work Control Number	9. Notified Work Group Supervisor
Operations ___ Rad & Safety ___ Maint. ___ Qual. Assur. ___ Other ___ N/A	93 0 1 9 9 6	Yes X No ___

10. Safety Review Screen: Completed and attached	11. Originator Mgr.	Approval/Date
N/A	P Gorton	Peter Gorton 9-10-93

12. Description of Change

Page 1 of 1

Task Number	Description of Field Change	Signature/Date
5.6.17	ADD:	
	Collect a sample to archive at the direction of the field geologist, for future geologic study	
	Non-Radioactive samples ~~will be stored with~~ RMM 9/14/93 ~~the archived samples at the DOW~~ RMM 9/14/93 and radioactive samples will be stored in a suitable Radioactive Materials Storage Area. The samples will be classified based on both radiological and chemical analysis prior to disposition. RMM 9/14/93	

13. Reason for Change

SEP 14 1993

WORK CONTROL CENTER

14. Review/Approvals

Work Group	Signature/Date	Work Group	Signature/Date
Operations (MPO)	FOR S. MACVEAN 9/10/93	WMM	Dan Biel 9-14-93
Maintenance	[illegible]	RC	[illegible] for JPS 9/14/93
Rad & Safety	Gary W. Mitchell 9/10/93	I&C	Michael Schmitz 9-10-93
Qual. Assurance	[illegible] 9/10/93		

FC2

Attachment D

Safety Review Screen

USE BLACK INK OR TYPE

I. Responsibility

A. Date: 16 Sept 93

B.1 Title of Proposed Change or Discovery:

B.2 Reference Document (affected document - e.g. work order no. " ")

9301996

C. Cognizant Department: Safety + Environmental Assessment

D. Cognizant Manager (Typed/Printed): C. J. Roberts

E. Prepared by (Typed/Printed): P.M. Vivas

II. Safety Exclusion Screen (Complete either A or B, not both)

A. Discovery Process (Occurrence Reports, Non Conformance Reports, and RCA's only) NA

1. Does the facility configuration or operation differ from that described in the approved safety analysis or authorization basis? ☐ No ☐ Yes ☐ Maybe

2. Is there an error, omission, or inadequacy in the safety analysis which could reduce margin of safety in the SAR or an OSR/TSR? ☐ No ☐ Yes ☐ Maybe

B. Change Process:

1. Will the proposed change be a change in a facility described in an approved safety analysis? ☒ No ☐ Yes ☐ Maybe

2. Will the proposed change make changes in procedures described in the approved safety analysis? ☒ No ☐ Yes ☐ Maybe

3. Will the proposed change involve tests or experiments affecting a facility or operation described in the approved safety analysis? ☒ No ☐ Yes ☐ Maybe

If any of the questions in A or B above were answered with "Yes" or "Maybe" then complete the remainder of the Safety Review Screen.

If all of the questions in A or B above were answered "No" then provide the basis in Section V, sign the form where indicated, and attach this copy with the change or discovery documentation per the governing procedure (see WV-914, Att. B).

III. Safety Research and Conclusions (attach additional pages if needed):

No.	Rev.
WV-914	2

Attachment

SAFETY REVIEW SCREEN

IV. Safety Questions:

A. Will the probability of an accident previously evaluated in approved safety analyses be increased? ☒ No ☐ Yes ☐ Maybe

B. Will the consequences of an accident previously evaluated in the approved safety analyses be increased? ☒ No ☐ Yes ☐ Maybe

C. Will the probability of a malfunction of equipment important to safety be increased? ☒ No ☐ Yes ☐ Maybe

D. Will the consequences of a malfunction of equipment important to safety be increased? ☒ No ☐ Yes ☐ Maybe

E. Will the possibility of an accident of a different type than any previously evaluated in approved safety analyses be created? ☒ No ☐ Yes ☐ Maybe

F. Will the possibility of a malfunction of a different type than any previously evaluated in the approved safety analyses be created? ☒ No ☐ Yes ☐ Maybe

G. Will the margin of safety as defined in the basis for any technical specification or safety analysis report be reduced? ☒ No ☐ Yes ☐ Maybe

H. Name (Typed/Printed) and Signature:

1. _____ _____
Safety Reviewer Date

2. _____ _____
Independent Reviewer Date

V. Basis (attach additional pages as needed): see attached sheet

VI. Manager Recommendation and Signoff

A. Recommendation (Either 1, 2, or 3 shall be answered "Yes"):

1. It is recommended that the change or discovery is not a potential USQ. [✓] Yes

2. It is recommended that the change or discovery is a potential USQ to be transmitted to the Radiation and Safety Committee for further review. [ ] Yes

3. Terminate the proposed change activity. [ ] Yes

B. Signoff:

1. C. Malat 9-16-93
Cognizant Manager Date

VII. Radiation and Safety Committee Recommendation:

Recommendation (circle choice): Not USQ Probable USQ

_____ _____
Chairman, R&SC Date

COPY

9301996

0.3

SAFETY REVIEW SCREEN

REFERENCE No 9301996

SECTION V. BASIS

On site drilling and sampling is a routine operation adequately covered by administrative procedures. R&D technicians and Waste Operations will provide support, as needed. An RWP will be obtained daily and an IWP will be obtained weekly. Protective equipment will be used as specified on the RWP/IWP. All personnel directly involved in drilling and sampling will have received hazardous and rad-waste training and be respirator qualified as needed. There will be no off-site impacts from this operation. The consequences from an earthquake induced failure of lagoon walls as described in WVNS-SAR-002 envelopes the consequences of any effects to weaken the lagoon walls from drilling.

COPY

WVDP-RFI-014 Rev. 0

No.	Rev.	Date
WV-111	2	12-16-92

J-3 Field Changes

1. Field Change Number (Entered by WCC Only) - ATTACHMENT J

9 3 0 1 9 9 6 . 1 FC

2. Originator	Date	Organization	Extension
R. Teifke	13 SEPT 93	J&EA	4734

3. Priority	4. Quality Level	5. Est. Accum. Dose (100 Mrem)	6. Responsible Work Group
2		Below ___ Above ___ N/A X	J&EA

7. Estimated Manhours
Operations 1560 Rad & Safety 650
Maint. NE Qual. Assur. 104
Other SHEA 250N
ECT-RC = 156

8. Work Control Number: 9 3 0 1 9 9 6

9. Notified Work Group Supervisor: Yes X No ___

10. Safety Review Screen: Completed and attached ___

11. Originator Mgr.: P. Gorton — Approval/Date: Peter Gorton 9/13/93

12. Description of Change — Page 1 of 1

Task Number	Description of Field Change	Signature/Date
5.5.7	change location of decon pad from SDA to "designated location", as approved by cognizant engineer and the Facility Manager.	

ISSUED
SEP 13 1993
WORK CONTROL CENTER

13. Reason for Change

14. Review/Approvals

Work Group	Signature/Date	Work Group	Signature/Date
Operations	[signature] 9/13/93	WMO	[signature] 9-13-93
Maintenance	N/A	RC	[signature] 9/10/93 [signature] 9/13/93
Rad & Safety	[signature] 9/13/93	IH & S	[signature] 9-13-93
Qual. Assurance	[signature] 9/13/93		

WV-1085, Rev. 1

Safety Review Screen

USE BLACK INK OR TYPE

I. Responsibility

A. Date: 16 Sept 93

B.1 Title of Proposed Change or Discovery:

B.2 Reference Document (affected document - e.g. work order no. " ")
9301996

C. Cognizant Department: Safety & Environmental Assessment

D. Cognizant Manager (Typed/Printed): C.J. Roberts

E. Prepared by (Typed/Printed): P.M. Vlad

II. Safety Exclusion Screen (Complete either A or B, not both)

A. Discovery Process (Occurrence Reports, Non Conformance Reports, and RCA's only) N/A

1. Does the facility configuration or operation differ from that described in the approved safety analysis or authorization basis? ☐ No ☐ Yes ☐ Maybe

2. Is there an error, omission, or inadequacy in the safety analysis which could reduce margin of safety in the SAR or an OSR/TSR? ☐ No ☐ Yes ☐ Maybe

B. Change Process:

1. Will the proposed change be a change in a facility described in an approved safety analysis? ☑ No ☐ Yes ☐ Maybe

2. Will the proposed change make changes in procedures described in the approved safety analysis? ☑ No ☐ Yes ☐ Maybe

3. Will the proposed change involve tests or experiments affecting a facility or operation described in the approved safety analysis? ☑ No ☐ Yes ☐ Maybe

If any of the questions in A or B above were answered with "Yes" or "Maybe" then complete the remainder of the Safety Review Screen.

If all of the questions in A or B above were answered "No" then provide the basis in Section V, sign the form where indicated, and attach this copy with the change or discovery documentation per the governing procedure (see WV-914, Att. B).

III. Safety Research and Conclusions (attach additional pages if needed):

No.	Rev.
WV-914	2

Attachment D

SAFETY REVIEW SCREEN

IV. Safety Questions:

A. Will the probability of an accident previously evaluated in approved safety analyses be increased? ☒ No ☐ Yes ☐ Maybe

B. Will the consequences of an accident previously evaluated in the approved safety analyses be increased? ☒ No ☐ Yes ☐ Maybe

C. Will the probability of a malfunction of equipment important to safety be increased? ☒ No ☐ Yes ☐ Maybe

D. Will the consequences of a malfunction of equipment important to safety be increased? ☒ No ☐ Yes ☐ Maybe

E. Will the possibility of an accident of a different type than any previously evaluated in approved safety analyses be created? ☒ No ☐ Yes ☐ Maybe

F. Will the possibility of a malfunction of a different type than any previously evaluated in the approved safety analyses be created? ☒ No ☐ Yes ☐ Maybe

G. Will the margin of safety as defined in the basis for any technical specification or safety analysis report be reduced? ☒ No ☐ Yes ☐ Maybe

H. Name (Typed/Printed) and Signature:

1. _____ Safety Reviewer _____ Date

2. _____ Independent Reviewer _____ Date

V. Basis (attach additional pages as needed): see attached sheet

VI. Manager Recommendation and Signoff

A. Recommendation (Either 1, 2, or 3 shall be answered "Yes"):

1. It is recommended that the change or discovery is not a potential USQ. [✓] Yes

2. It is recommended that the change or discovery is a potential USQ to be transmitted to the Radiation and Safety Committee for further review. [ ] Yes

3. Terminate the proposed change activity. [ ] Yes

B. Signoff:

1. C J Roberts — Cognizant Manager — 9-16-93 Date

VII. Radiation and Safety Committee Recommendation:

Recommendation (circle choice): Not USQ Probable USQ

_____ Chairman, R&SC _____ Date

COPY
9301996
0.3

SAFETY REVIEW SCREEN

REFERENCE No 9301996

SECTION V. BASIS

Onsite drilling and sampling is a routine operation adequately covered by administrative procedures. R&D technicians and Waste Operations will provide support, as needed. An RWP will be obtained daily and an IWP will be obtained weekly. Protective equipment will be used as specified on the RWP/IWP. All personnel directly involved in drilling and sampling will have received hazardous and rad-worker training and be respirator qualified as needed. There will be no off-site impacts from this operation. The consequences from an earthquake induced failure of lagoon walls as described in WVNS-SAR-002 envelops the consequences of any effects to weaken the lagoon walls from drilling.

COPY

WVDP-RFI-014 Rev. 0

Work Orde Shop Orders Only (Others Use J-2) | 111 | Rev. 2 | Date: 12-16-92

ATTACHMENT B

J1 - Work Authorization

1. Work Control Number (Used By WCC): EM-9301996-I/WO

2. Originator: R. Tiefke (Name) 7/7/93 (Date) S+EA (Organization) Z-05 (Mailstop) 473H (Extension)

3. Charge No. (Labor) WH 6100001 (M & S) 1 WH 6100003 | 4. System SITE | 5. Equip. No. E I I V N/A | 6. Location 303

7. Performance Code
A. ___ Special Preparation
B. ___ Normal Preparation

System: 0 ___ May be shut down; 1 ___ Must be shut down; 2 ___ Must be operating; 3 ✓ N/A

Equipment: 0 ___ May be shut down; 1 ___ Must be shut down; 2 ___ Must be operating; 3 ✓ N/A

8. Estimated Manhours

ACTIVITY	MH	CORRECTIVE MAINTENANCE
Waste Ops	1560 ~~[illegible]~~	Yes ___ No ✓
Maint NA		
QA ✓	~~[illegible]~~ 106	
RS Tech ✓	580	
EOT-HMT	~~110~~ 156	

RHT 07/09/93

9. Dwg./Sk. Yes ✓ No ___ Attached ✓ | 10. Does/Dwgs Required Revs Yes ___ No ✓ ECN No. ___ | 11. Required Document(s) As-Built ___ D-Spec ___ N/A | 12. Type of Work Item WO | 13. Internal ___ External ✓ | 14. Priority 4N

15. Document Ref. No. Soils : SAP | 16. Qual. Level NC | 17. Safety Class N | 18. Est. Accumulated Dose (100 mRem) Below ✓ Above ___ N/A ___

19. Eng. Approval Required Yes ___ No ✓ | 20. IWP Required? Yes ✓ No ___ RWP Required? Yes ✓ No ___ | 21. High Consequence Lift? Yes ___ No ✓ If yes, rigging sketch required.

22. QA Inspection Required? Yes ✓ No ___ | 23. Welding or Spec Process Req.? Yes ___ No ✓ Cite ___ | 24. Special Qualification Req.? Yes ___ No ✓ | Note: A Yes to any of Item 21 thru 24 requires a QA approval.

25. Quality Related Material Req.? Yes ___ No ✓ | 26. Safety Review Screen: Completed and Attached ✓ | 27. Environmental Checklist: Yes ✓ No ___ Attached ✓

28. Reqd. Finish Date 10/30/93 | 29. Originator's Manager P. Gorton | Approval/Date [signature] 7-7-93

30. TITLE: ~~Site wide soils and sediment~~ Sub-Surface Drilling and Sampling

OBJECTIVE: To provide reliable data which will indicate the absence or presence of radiological and hazardous constituents within SSWMIA's and contaminant migration from these units

___ FAB. ___ INSTALL ___ MOD./REPAIR ___ INSP. ✓ TEST ___ CALIB.

31. Description of Work

Task	Description	Signature/Date
	Work to be performed in accordance with the attached "Admendment to Draft I of the SAP for Facilities Assessment, June 1, 1993	

ISSUED SEP 10 1993 WORK CONTROL CENTER

32. Responsible Work Group: S+EA (Z12)

33. Work Group Supervisor: R. Tiefke

34. Work Group Manager: C. Roberts

35. Review/Approvals

WORK GROUP	SIGNATURE/DATE	WORK GROUP	SIGNATURE/DATE
WMO Ops	With comments as noted [signature] 8/4/93	Ind. Hyg. & Safety	M.F. Schmitz 9-7-93
Maintenance	N/A	Eng	N/A
Radiation & Safety	[signature] 8/26/93	EOT 7/9/93 KP	[signature] 8/31/93
Quality Assurance	[signature] 8/26/93	Waste Engineering	NA
		MPO	[signature] 8/26/93

36. Documentation of Work Completion

Work Group Supervisor ___ Date ___ Originator ___ Date ___

WV-1090, Rev. 7
WV:0000426.RM

WO-EM-930-1996-IWO

SUB-SURFACE DRILLING AND SAMPLING

1.0 INTRODUCTION

This procedure is to give instructions to be followed during the RCRA Facilities Investigation Sub-Surface Soils Sampling Program at the West Valley Demonstration Project. The object of the sampling program is to characterize the subsurface soils associated with designated super SWMU's on the site.

This procedure is written to serve as the Work Order required by the WVDP procedures.

Mr. Robert Teifke is the Program Manager for this soils investigation program.

2.0 PREREQUISITES

2.1 An RWP and IWP must be obtained from West Valley Nuclear Services (WVNS).

2.2 Weather conditions will be conducive to safe working conditions (i.e., no work during heavy rain, snow, or freezing rain).

2.3 All needed equipment will be staged at the drilling location.

2.4 WVNS will provide a Radiation and Safety Technician and Waste Management Operations support, as needed.

2.5 The Facility Manager for each drilling location shall be notified at least 24 hours in advance of drilling activities. Drilling locations can be found on the Plate 4 of the Amendment to the RFI Work Plan, Draft B, June 1993.

3.0 EQUIPMENT

- Drill rig*
- Split spoon samplers*
- Bentonite pellets*
- Bentonite powder*
- Plywood boards/wood planking*
- Metal or wooden sawhorses (optional)*
- Portland Cement Powder*
- Portable mudpan*
- Steam cleaner*
- Generator*
- Augers*
- Drill bits*
- Extension rod*
- Hand tools*
- Rope**
- Signs**
- Anti-contamination clothing
- Plastic disposable gloves
- Splash shields
- Waste containers (e.g. 55-gallon drums, B-25 boxes)
- Plastic sheeting
- Herculite
- Five or ten gallon pails
- Paper towels
- Plastic bags
- Tape (e.g. duct, masking)
- Disposable wipes
- hNu photo-ionization detector
- Calibration gas
- Radiation survey instruments (beta-gamma surface contamination)
- Hard hats
- Sample collection spoons
- Bowls
- Sample jars
- Jar labels
- Pre-cooled sample storage container
- Blue ice
- Labels (radioactive, waste, empty)
- Spray bottles
- Non-phosphate detergent
- D.I. water
- Tap water
- 10 liter Nalgene liquid containers with lids
- Brushes (long handled)
- Aluminum foil
- Camera
- Field notebook
- First aid kit
- Eye wash kit
- Vehicle
- Water proof pens

---

* Provided by subcontractor

** Provided by R & S.

4.0 PRECAUTIONS

4.1 All personnel involved will be briefed as to the work activities planned each day. (S & EA, RC, R & S, QA, RP)

4.2 All personnel directly involved with the drilling and sampling operations will wear the protective clothing and equipment specified on the RWP and IWP.

4.3 All unnecessary personnel will stay back from the drilling rig and the borehole.

4.4 Efforts will be made to minimize the quantity of solid and liquid waste produced during drilling and sampling.

4.5 All instruments will be calibrated and in good working order prior to the start of drilling. Radiation detection instruments used on the samples will be source checked at the start of the day, periodically during the day, and at the end of the day. All source checks will be recorded in the program field notebook.

4.6 A herculite skirt, plastic sheeting, and mudpan will be available and used around the hole to minimize the spread of contamination from the sampling and drilling operations.

5

WO-EM-930-1996-IWO

5.0 PROCEDURE

All work will require a RWP and IWP.

A log book will be maintained of all activities that occur during shallow soil sampling.

5.1 At each designated borehole location, a work area will be set up for the control of radioactive contamination that may be produced as a result of sampling operations. Borehole locations can be found on the attached Plate 4.
This work order does not include boreholes 5, 6 & 7 located at the closed lagoon 1. RMG 8/26/93 AM 8/26/93

5.2 A work area around the boring location will be defined. The work area will be large enough to accommodate the following activities:

5.3 Drilling.

5.3.1 Lay-down area for pipe and/or rods removed from the hole.

5.3.2 A raised work table positioned on the outer edge of the controlled area.

5.3.3 Cleaning station (two pails in a line).

5.3.4 Dress down area at the exit to the controlled area.

5.3.5 Trash and waste containers (provided by WMO).

5.3.6 The controlled area will be defined by a rope boundary with warning signs as required by the R&S Technician.

5.3.7 Plastic will be placed on the ground inside the controlled area, at areas where water or materials may be dropped (e.g., around the work table, wash pails, and lay down area). Plastic pieces will be overlapped and the seams duct tapped. The edge of the plastic will be raised to form a berm. It may also be necessary to cover the back of the drilling vehicle.

Limit the use of plastic to necessary areas. Caution: the plastic may become a slipping hazard if it becomes wet.

5.3.8 Herculite or plywood sheeting will be put on the ground in areas of heavy traffic and usage (e.g., around the borehole, at the work table, and at the cleaning station).

Limit the use of herculite to necessary areas. Caution: herculite may become a slipping hazard if it becomes wet.

5.3.9 Waste containers or bags will be placed at the entrance/egress area.

5.3.10 Prior to the start of sampling operations, prepare the sample work station (table) and the equipment decontamination area.

5.3.11 The work table will be set up at the edge of the controlled area until needed.

5.3.12 Sample jars and bags will be kept outside of the controlled area and covered with plastic.

5.3.13 The equipment cleaning station will be set up along another edge of the controlled area, near the sample work table. The equipment cleaning station should also be located downwind of the sample work table.

5.3.14 Only that equipment necessary for drilling or sampling will be taken into the controlled area. Extra equipment and materials will be stored outside of the controlled area in an easily accessible area.

5.4 Drilling and Split Spoon Sampling.

5.4.1 At each borehole location, drive a split spoon sampler into the soil and collect a sample. Using an appropriate size hollow stem auger, bore to the depth that the split spoon was driven to.

Repeat this sequence, sampling ahead of the augers to borehole completion depth.

5.4.2 The R&S Technician will survey all cuttings and fluids removed from the borehole and will indicate which material are contaminated.

All waste material will be containerized for disposal after any additional archive soil samples are collected. Materials will be segregated as much as practical into bags and the bags will be labeled with borehole number and sample interval in addition to labeling requirements of the WVDP. SOP 300-07, Waste Status Determination will be implemented for waste produced during drilling.

5.5 Equipment Cleaning and Decontamination

5.5.1 All sampling equipment will be cleaned daily prior to the start of sampling activities in the following manner:

5.5.2 Clean disposable gloves will be donned prior to handling equipment.

5.5.3 In bucket 1, radioactive decontamination will be conducted using a non-phosphate detergent and water mixture scrub.

5.5.4 Over bucket 2, rinse with tap water.

5.5.5 Set the equipment aside on a clean piece of aluminum foil to air dry.

5.5.6 The R & S technician will survey the equipment for radioactive contamination. If the equipment is radioactively clean, the equipment will be removed to the chemical decontamination pad: otherwise repeat the above as many as three times. If the equipment is still radioactively contaminated, the equipment will be disposed of as radioactive waste in accordance with SOP 300-07.

5.5.7 Chemical decontamination will consist of steam cleaning and will occur at the decon pad located at the SDA. Decontamination residues will be transferred to waste containers, stored and classified according to SOP 300-07 followed.

5.6 Sampling

5.6.1 Clean disposable gloves will be donned prior to handling sampling equipment.

5.6.2 Assemble the sampling device to the drill rod.

5.6.3 Lower the sampling device into the borehole and drive the sampler. The geologist will record the number of blows needed to drive the sampler into the sample media, in 6-inch increments.

5.6.4 As the sample is withdrawn, wipe off the drill rods and the outside of the sample device with disposable wipes. The wipes will be classified as radioactive, hazardous or industrial waste and stored in accordance with SOP 300-07.

5.6.5 As the sampler is withdrawn the R&S Technician will monitor the sample for exposure rates. If the activity is greater than 10,000 cpm/probe area beta-gamma, then place the sample back into the borehole and inform the Program Manager of the results. The Program Manager will direct operations for continued sampling or hole closure.

5.6.6 Using towels, a sheet of plastic, or a plastic bag under the sample device, carry the sample to the work table.

5.6.7 Open the sample device, perform an organic compound and beta-gamma survey, take photographs and record the geologic data.

5.6.8 Using a clean knife and gloves, split the sample lengthwise.

5.6.9 Packaging and shipment of samples will be performed in accordance with Work Order EM-930-1971.

5.6.10 Collect samples, using clean spoons and mixing bowls.

5.6.11 Have an assistant outside of the controlled area handle the sample jars while the sampler inside the controlled area handles the samples.

5.6.12 The outside person shall record the sample numbers, fill out chain-of-custody forms, and complete other required paperwork.

5.6.12.A: The New York State Department of Environmental Conservation (NYSDEC) representative may request duplicate samples. The NYSDEC representative will provide jars or containers for the duplicate sample. The NYSDEC representative will take custody of the sample containers they provide [illegible] containers are checked and cleared of lose surface

RMJ 8/26/93

5.6.13 All sample containers will be bagged immediately and placed into pre-cooled storage containers.

5.6.14 Repeat steps 5.6.8 to 5.6.11 until the appropriate number of samples are collected.

5.6.15 At the direction of the R & S Technician collect enough sample to satisfy the screening analysis needs.

5.6.16 The R & S technician will make the determination if the sample will be controlled as radioactive material on a case by case basis. All samples considered to be radioactive material will be handled and stored per WVDP-010, Rad Con Manual. Any material exceeding 150 cpm/probe area will have to be analyzed in accordance with RC-ADM-27. Results of the field check will be recorded on the attached "SOIL SAMPLE FIELD RADIOACTIVITY CHECK" form. The form may be used for more then one sample. If the sample results are less then 150 cpm/probe area, beta-gamma then the sample can be considered to be less then 0.002 μcuries/gram gross alpha and beta for shipping purposes.

5.7 Hole Closure

5.7.1 Hole closure will occur after all needed samples have been collected, logged, and placed into temporary storage. The Program Manager will give his approval of the samples and approval for hole closure.

5.7.2 An adequate volume of cement-bentonite grout will be mixed to fill the borehole to grade.

5.7.3 The cement-bentonite grout mixture will be used to close the borehole from the bottom up.

5.7.4 A borehole location stake will be positioned at the center of the borehole and anchored into the grout.

5.8 Clean Up

5.8.1 All cleaning and rinse solutions will be placed in appropriately labeled and lined 55-gallon drums and the containers will be classified and stored in accordance with SOP 300-07.

5.8.2 All buckets and brushes will be stored in plastic bags for future use unless the sampling program is complete. When the program is complete, the buckets and brushes will be discarded as waste and classified following SOP 300-07.

5.8.3 All herculite and plastic will be wiped and surveyed for radioactive contamination.

5.8.4 All contaminated solid material (e.g., wipes, plastic) will be drummed or wrapped and transported to WVDP Waste Management Organization for processing. SOP 300-07 will be followed for all liquid and solid wastes being transferred to WMO for processing.

5.8.5 The liquid waste will be stored and classified following SOP 300-07.

5.8.6 The drilling rig and sampling equipment will be surveyed by the R&S Technician for offsite release.

6.0 RECORDS

6.1 All records, logs, and data will be distributed in accordance with the RFI Work Plan, Draft B, WVDP-EIS-014.

6.2 Radiological survey results will be retained by the WVNS R&S group and copies will be retained by Dames & Moore.

No.	Rev.	Date
WV-111	2	12-16-92

J1A - Work Authorization
(Continuation)

1. Work Control Number: EM-930199 6-I/WO

ATTACHMENT C

DESCRIPTION OF WORK

Page 13 of 13

Title: Site Wide Soils & Sediment Sampling

TASK	DESCRIPTION	SIGNATURE/DATE

3. BRIEF DESCRIPTION OF COMPLETED WORK:

Actual Hours Worked:

ACTIVITY	MH
Ops	
Maint	
QA	
RS Tech	

WV 1080, Rev. 7
WV:0100428.RM

9301996

A-1

Soil Sample Field Radioactivity Check.

DATE	SAMPLE LOCATION	SAMPLE NUMBER	RESULTS (cpm above background)	INSTRUMENT SERIAL NUMBER	TECHNICIAN	REMARKS

9301990

B-1

WVDP-RFI-014
Rev. 0

Rec'd.
Rec. Mgmt.
September 9, 1991

Department of Energy
Idaho Operations Office
West Valley Project Office
P.O. Box 191
West Valley, NY 14171

DW:91:0751

RESPONSE:
WD:2006

September 6, 1991

Approval of EC90-35

Mr. J. J. Buggy, President
and General Manager
West Valley Nuclear Services Co., Inc.
P.O. Box 191
West Valley, NY 14171

ATTENTION: C. J. Roberts, Safety and Environmental Assessment Manager

SUBJECT: DOE Approval of Categorical Exclusion (CX) Determination for "Site Characterization/Environmental Monitoring" (90-35)

Dear Sir:

Enclosed for your files is the subject approval. Please contact Elizabeth Matthews on extension 4930 if you have any questions.

Sincerely,

Tom Rowland

T. J. Rowland, Director
West Valley Project Office

Enclosure

cc: J. L. Knabenschuh, WVNS
T. L. Perkins, DOE-ID (w/enc)
P. W. Arpke, UNC Geotech-ID

EAM:145:91 - 2702:90:10

EAM/sl

DOE F 1325.8
(8-89)
EFG 107-90

9301996

9301996

B-2

United States Government

Department of Energy

memorandum

DATE: JUL 29 1991

REPLY TO ATTN OF: EM-343

SUBJECT: Section D Determination - Categorical Exclusion

TO: Leo P. Duffy, EM-1

Attached is a categorical exclusion (CX) for your signature as follows:

Site Characterization/Environmental Monitoring at the West Valley Demonstration Project, Idaho Operations Office

Also attached for your signature is a memorandum transmitting the CX to EH-25 for indication of objection/no objection.

Jill E. Lytle
Associate Director
Office of Waste Operations
Environmental Restoration
and Waste Management

2 Attachments

B-8.77

2702:90:10

- 9301996

B.3

Memo to Duffy fm Lytle
re: Section D Determination - Categorical Exclusion

Distribution:
so: Addee
1bcc: EM-343, Truskett rdr.
1bcc: EM-343 rdr.
2bcc: EM-30 (Lytle & Cowan) rdr.
1bcc: EM-343 suspense
1bcc: EM-30 suspense (Cowan)
1bcc: EM Mailroom
1bcc: EM-20
1bcc: Henninger, EM-331
1bcc: Stevens, EM-331
1bcc: Turi, EM-33

EM-343:Truskett:kdc:3-7194:3/7/91
(c:Truskett:KC91-38)

File Code # 4753.38

Action # KC91-38

Correspondence Reviewers: S. Sappington 4/15
K. Morris, Exec. Asst., EM-30 5/15

EM-343
Truskett
3/15/91

EM-343
McIntosh
3/18/91

EM-331
Henninger
3/18/91

EM-331
Stevens
3/19/91

EM-343
Chacey
3/20/91

EM-34
Frei
3/20/91

EM-33
Turi
3/21/91

EM-30
Cowan
4/12/91

EM-20
Scott
/ /91

EM-30
Lytle
5/1/91

9301996

DOE F 1325.8
(8-89)
EFG (07-90)

United States Government

Department of Energy

Memorandum

DATE: JUL 30 1991

REPLY TO ATTN OF: EM-343

SUBJECT: Section D Determination - Categorical Exclusion

TO: Carol M. Borgstrom, EH-25

Attached is the National Environmental Policy Act (NEPA) documentation for the following proposed action which I have determined is within the existing categorical exclusions (CX) as defined in Section D of the Department of Energy NEPA Guidelines:

Site Characterization/Environmental Monitoring at the West Valley Demonstration Project, Idaho Operations Office

I request that you notify me within two weeks, in accordance with the Interim Procedural Guidelines for Implementation of Secretary of Energy Notice-15-90, if you have any objection to this CX determination.

Leo P. Duffy
Director
Office of Environmental Restoration
and Waste Management

Attachment

Response cc:
D. Henninger, EM-331

9301996

B.5

Memo to Borgstrom fm Duffy
re: Section D Determination - Categorical Exclusions

Distribution:
so: Addee
cc: As stated
1bcc: EM-343, Truskett rdr.
1bcc: EM-343 rdr.
2bcc: EM-30 (Cowan & Lytle) rdr
1bcc: EM-343 Suspense
1bcc: EM Mailroom
2bcc: EM-30 suspense (Cowan & Lytle)
1bcc: Yellow File Copy
1bcc: Henninger, EM-331
1bcc: Stevens, EM-331
1bcc: Turi, EM-33

EM-343:Truskett:kdc:3-7194:3/15/91
(c:Truskett:KC91-38)

Action # KC91-38

File Code # 4743.38

Correspondence Reviewers: S. Sappington SJS 4/15
K. Morris, Exec. Asst., EM-30 ___

EM-343
Truskett
7/15/91

EM-343
McIntosh
3/18/91

EM-331
Henninger
3/18/91

EM-331
Stevens
3/19/91

EM-343
Chacey
3/21/91

EM-34
Frea
3/26/91

~~EM-33~~
~~Turi~~
~~/ /91~~

EM-30
Cowan
4/12/91

EM-20
Scott
/ /91
5/10/91

EM-30
Lytle
7/29/91

EM-3
~~Borgstrom~~
7/29/91

EM-2
~~Borgstrom~~
7/29/91

EM-1
Duffy
/ /91

9301996

United States Government

Department of Energy

memorandum

Idaho Operations Office

DATE: January 31, 1991

SUBJECT: Section D "Site Characterization/Environmental Monitoring" Determination

TO: D. Henninger
EM-30, DOE-HQ

DOE-Idaho has reviewed the attached Categorical Exclusion (CX) prepared by the West Valley Demonstration Project (WVDP) for site-wide field sampling/monitoring activity (90-35), which falls under the Section D "Site Characterization and Environmental Monitoring" CX.

After this CX is approved, please send a copy back to J. E. Solecki, Assistant Manager, Environmental Restoration and Waste Management; C. R. Nichols, Acting Assistant Manager, Site Engineering and Support; and T. J. Rowland, Acting Director, West Valley Project Office.

An Expeditious review of this CX by February 15, 1991, would be appreciated. If you have any questions, please call T. J. Rowland at FTS 473-4312.

R. C. Tiller for

A. A. Pitrolo
Manager

Attachments

cc: C. E. Gilmore, DOE-ID
J. E. Solecki, DOE-ID
W. N. Sato, DOE-ID
T. J. Rowland, WVPO

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B.7

EM-22 RECORD OF REVIEW

EM Document Control Number: EM 9100661

Subject: Categorical Exclusion (CX) for Site Characterization/ Environmental Monitoring at the West Valley Demonstration Project. Idaho Operations Office

Action Requested of EM-20: Concurrence in this CX Determination

EM-22 Recommendation: Concur and forward to EM-1 for approval

Analysis/Comments: This is a resubmittal of a package that was previously reviewed by EM-22. The previous review was documented on an EM-22 Record of Review (ROR) dated May 13, 1991. The proposed action includes site characterization, environmental monitoring, compliance and process monitoring, and all field activities associated with such monitoring. These monitoring activities can occur onsite and/or offsite, be routine or special, and involve radiological and/or non-radiological parameters. The previous review of the CX Determination indicated that the CX category applied "Site characterization and environmental monitoring..." was limited to those activities being performed under CERCLA and RCRA and therefore, did not qualify for the applied CX category. However, after reviewing the wording of the applied CX category and consulting with EM-25 staff, EM-22 has determined that the proposed action does qualify for the applied CX category. Additionally, the CX determination contains the necessary information to make that determination and is adequate for transmittal to EM-1 for approval.

Recommendation: Concur and forward to EM-1 for approval.

EM-22 INTERNAL QUALITY ASSURANCE RECORD OF REVIEW

Reviewer: E. Harr Date: July 26, 1991

Reviewed: Michael H. Kleinrock Date: 7/26/91
Michael H. Kleinrock
Director, Environmental Compliance Division

EM-20 approves EM-22's recommendation: ☒ to concur and forward to EM-1 for approval; ☐ to return to the program office for revision.

Randal S. Scott Date: 7/26/91
Randal S. Scott
Director, Office of Quality Assurance and Quality Control

9301996

B.8

EM-22 RECORD OF REVIEW

EM Document Control Number: EM 9100661

Subject: Categorical Exclusion (CX) for Site Characterization/ Environmental Monitoring at the West Valley Demonstration Project, Idaho Operations Office

Action Requested of EM-20: Concurrence in this CX Determination

EM-22 Recommendation: Return to EM-30 for appropriate action

Analysis/Comments: A CX Determination does not appear to be the appropriate mechanism to satisfy the NEPA requirements of this proposed action. The proposed action includes site characterization, environmental monitoring, compliance and process monitoring, and all field activities associated with such monitoring. These monitoring activities can occur onsite and/or offsite, be routine or special, and involve radiological and/or non-radiological parameters. The CX category applied is "Site characterization and environmental monitoring...". However, this CX category is limited to those activities being performed under CERCLA and RCRA.

Some portions of the proposed action may qualify for the applied CX category, i.e., monitoring under RCRA and/or CERCLA. However, there is not enough information presented to determine which, if any, part of the monitoring program is being carried out under RCRA and/or CERCLA. If monitoring is being carried out under RCRA and/or CERCLA, the CX Determination needs to be revised to include only those portions as appropriate.

Other environmental monitoring activities, e.g., those being undertaken for the annual site environmental reports, etc., may qualify as a CX in the proposed DOE NEPA regulation. Therefore, the preparation of a "mini" EA would be the appropriate level of NEPA documentation. It should also be noted that some of the proposed environmental monitoring activities may be covered under existing NEPA documentation and not require further NEPA compliance.

Recommendation: Return to EM-30 for appropriate action.

EM-22 INTERNAL QUALITY ASSURANCE RECORD OF REVIEW

Reviewer: E. Harr Date: May 10, 1991

Reviewed: MHKleinrock Date: 5/10/91
Michael H. Kleinrock
Director, Environmental Compliance Division

EM-20 approves EM-22's recommendation: ☐ to concur and forward to EM-1 for signature; ☒ to return to the program office for revision.

Randal S. Scott Date: 5/10/91
Randal S. Scott
Director, Office of Quality Assurance
and Quality Control

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B.9

CATEGORICAL EXCLUSION (CX) DETERMINATION

Proposed action: WVDP Sitewide Field Sampling/Monitoring Activities (90-35)

Location: West Valley Demonstration Project

Proposed by (if other than DOE): West Valley Nuclear Services

Description of the proposed action:
Site characterization, environmental monitoring, compliance and process monitoring, - onsite and offsite, routine and special, radiological and non-radiological - and all field activities associated with such monitoring.

CX to be applied (from Section D, DOE NEPA Guidelines):
"Site characterization and environmental monitoring . . ."

I have determined that the proposed action meets the requirements for the CX referenced above. Therefore, I have determined that the proposed action may be categorically excluded from further NEPA review and documentation.

Signature:

Title: Director
Office of Environmental Restoration and Waste Management

Date:

EH-25 has reviewed this determination and has no objection. to those site characterization or environmental monitoring activities under RCRA or CERCLA.

Signature:

Date: 6/15/91

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C.1

ENVIRONMENTAL CHECKLIST

West Valley Demonstration Project
NEPA, PERMITS, SAFETY REVIEW

EC 90-35

Project/Activity Title: WVDP Sitewide Field Sampling/Monitoring Activities		Project/Activity Number:
WVNS Department: Safety & Environmental Assessment	Originator: A.H. Quimby	Telephone: (716) 942-451
WVNS Cognizant Manager: C.J. Roberts	Signature:	Date: 10/25/90

PROJECT/ACTIVITY DESCRIPTION

TYPE AND SCOPE OF ACTIVITY - The WVDP sitewide field sampling/monitoring activities covered by this Checklist include site characterization, environmental monitoring, compliance and process monitoring, - onsite and offsite, routine and special, radiological and nonradiological - and all field activities associated with such monitoring. These activities include but are not limited to those contained in the WVDP Site Characterization Plan and the WVDP Annual Environmental Monitoring Report. Examples of WVDP monitoring and sampling programs are contained in Attachment A.

SITE MAP - Appropriate maps indicating sampling locations are contained in Attachment A.

PURPOSE/NEED - Sitewide field sampling and monitoring is conducted in accordance with multiple Federal and State requirements including NEPA, and DOE Orders 5400.1, 5400.5, 5400.6 (draft), and reported in the WVDP Site Annual Environmental Report.
In addition: to detect any changes in the environment resulting from project activities and to assess the affects of any such changes on the human population and the environmen surrounding the site; to ensure adherence to the discharge limits and standards set by the federal and state governments and agencies; to understand the environmental characteristics of the site to ensure an appropriate sampling/monitoring program.

SCHEDULE/TIMING - These activities include both "on-going" and special "one time" occurrences. Field activities for one or more of the above programs occurs on a daily basis.

ALTERNATIVES - There are no appropriate alternatives for these activities except to have no such activities;- which would result in violations of federal and state mandates, regulations, etc.

IMPACTS - See section B. below.

SOURCE DOCUMENTS -
NEPA
Site Annual Environmental Report
Environmental Monitoring Plan (draft)
Env. Prot. Implementation Plan (WVDP-076)
Emergency Plan & Procedures WVDP-022
Groundwater Prot. Mgmt. Plan (WVDP-091)
DOE Order 5400.1
DOE Order 5400.5
DOE Order 5400.6 (draft)
SPDES Permit NY0000973
Sampling & Analysis Plan
Operational Safety Requirements

ENVIRONMENTAL CONSIDERATIONS

These activities, both individually and collectively, will have no significant impact o the environment.

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C -35 "WVDP Sitewide Field Sampling/Monitoring Activities" Date 10/25/90

ENVIRONMENTAL CHECKLIST REVIEW AND APPROVAL:

	NO	YES	APPROVAL DATE
1. Does proposed project/activity require new or modified state or federal permits? If yes, identify permits.		X	
A Scientific Collector's Licence is required, and a NYS air permit would be required should any chemicals that NYS regulates as carcinogenic air contaminants [6 NYCRR Part 201.6(j)1] be discharged to the atmosphere.			
2. Does proposed project/activity require new or additional safety review (WV-906)?	X		
3. Does Project/Activity require new or additional NEPA review?		X	

If yes, indicate recommended documentation.

____ Memorandum-To-File (MTF)
____ Action Description Memorandum (ADM)
____ Environmental Assessment (EA)
____ Environmental Impact Statement (EIS)

_X_ A categorical exclusion is hereby requested on the basis that this action is eligible for categorical exclusion per Section D of NEPA Guidelines published at 55 FR 37178 et seq. Specifically;- "3. Site characterization and monitoring . . ."

ENVIRONMENTAL CHECKLIST APPROVALS

Manager, Env. Compl. — Date 11/30/90

Manager, S&EA — Date 12/5/90

NEPA APPROVAL

The review and documentation required by the National Environmental Policy Act and its implementing regulations has been completed for this action.

DOE-WVPO — Date

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D-1

WV-914	2

Attachment D

Safety Review Screen

USE BLACK INK OR TYPE

I. Responsibility

A. Date: 9-9-93

B.1 Title of Proposed Change or Discovery: Exploratory Vertical Drilling (with small diameter augers to provide soil samples for site characterization purposes & surficial sampling with hand-held devices for same purpose.)

B.2 Reference Document (affected document - e.g. work order no. " ")

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C. Cognizant Department: Safety & Environmental Assessment

D. Cognizant Manager (Typed/Printed): C.J. Roberts

E. Prepared by (Typed/Printed): R. Joe Johnson

II. Safety Exclusion Screen (Complete either A or B, not both)

A. Discovery Process (Occurrence Reports, Non Conformance Reports, and RCA's only)

1. Does the facility configuration or operation differ from that described in the approved safety analysis or authorization basis? ☐ No ☐ Yes ☐ Maybe

2. Is there an error, omission, or inadequacy in the safety analysis which could reduce margin of safety in the SAR or an OSR/TSR? ☐ No ☐ Yes ☐ Maybe

B. Change Process:

1. Will the proposed change be a change in a facility described in an approved safety analysis? ☒ No ☐ Yes ☐ Maybe

2. Will the proposed change make changes in procedures described in the approved safety analysis? ☒ No ☐ Yes ☐ Maybe

3. Will the proposed change involve tests or experiments affecting a facility or operation described in the approved safety analysis? ☐ No ☒ Yes ☐ Maybe

If any of the questions in A or B above were answered with "Yes" or "Maybe" then complete the remainder of the Safety Review Screen.

If all of the questions in A or B above were answered "No" then provide the basis in Section V, sign the form where indicated, and attach this copy with the change or discovery documentation per the governing procedure (see WV-914, Att. B).

III. Safety Research and Conclusions (attach additional pages if needed):

See attached sheet

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WV-914	2

Attachment D

SAFETY REVIEW SCREEN

IV. Safety Questions:

A. Will the probability of an accident previously evaluated in approved safety analyses be increased? ☒ No ☐ Yes ☐ Maybe

B. Will the consequences of an accident previously evaluated in the approved safety analyses be increased? ☒ No ☐ Yes ☐ Maybe

C. Will the probability of a malfunction of equipment important to safety be increased? ☒ No ☐ Yes ☐ Maybe

D. Will the consequences of a malfunction of equipment important to safety be increased? ☒ No ☐ Yes ☐ Maybe

E. Will the possibility of an accident of a different type than any previously evaluated in approved safety analyses be created? ☒ No ☐ Yes ☐ Maybe

F. Will the possibility of a malfunction of a different type than any previously evaluated in the approved safety analyses be created? ☒ No ☐ Yes ☐ Maybe

G. Will the margin of safety as defined in the basis for any technical specification or safety analysis report be reduced? ☒ No ☐ Yes ☐ Maybe

H. Name (Typed/Printed) and Signature:

1. R Joe Johnson — 9/9/93
Safety Reviewer R. JOE JOHNSON — Date

2. Joseph C. Wolniewicz — 9/10/93
Independent Reviewer JOSEPH C. WOLNIEWICZ — Date

V. Basis (attach additional pages as needed): See attached sheet for justification

VI. Manager Recommendation and Signoff only this activity is acceptable from a safety envelope standpoint.

A. Recommendation (Either 1, 2, or 3 shall be answered "Yes"):

1. It is recommended that the change or discovery is not a potential USQ. ☒ Yes

2. It is recommended that the change or discovery is a potential USQ to be transmitted to the Radiation and Safety Committee for further review. [ ] Yes

3. Terminate the proposed change activity. [ ] Yes

B. Signoff:

1. C Nolan — 9/10/93
Cognizant Manager — Date

VII. Radiation and Safety Committee Recommendation:

Recommendation (circle choice): Not USQ Probable USQ

Chairman, R&SC — Date

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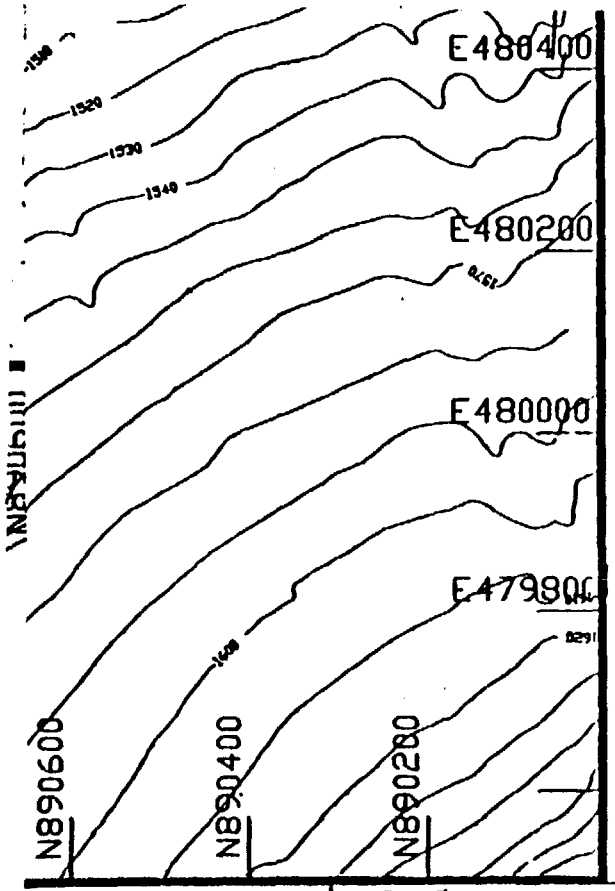
0.3

SAFETY REVIEW SCREEN

REFERENCE No 9301996

SECTION V. BASIS

On-site drilling and sampling is a routine operation adequately covered by administrative procedures. R&D technicians and Waste Operations will provide support, as needed. An RWP will be obtained daily and an IWP will be obtained weekly. Protective equipment will be used as specified on the RWP/IWP. All personnel directly involved in drilling and sampling will have received hazardous and rad-worker training and be respirator qualified as needed. There will be no off-site impacts from this operation. The consequences from an earthquake induced failure of lagoon walls as described in WVNS-SAR-002 envelops the consequences of any effects to weaken the lagoon walls from drilling.



IN RCRA FACILITY INVESTIGATION REPORT.
THIS DATA BASE IS REPRESENTATIVE OF CONDITIONS AS OF JUNE, 1992. FUTURE USERS ARE REQUIRED TO OBTAIN UPDATES MADE TO DWG 900D-5000 SH 3.

TOPOGRAPHIC MAPPING COMPILED BY TALLAMY, VAN KUREN, GERTIS & ASSOCIATES USING STEREOPHOTOGRAMMETRIC METHODS FROM 1:6000 SCALE AERIAL PHOTOGRAPHY FLOWN ON 5/17/89

HORIZONTAL DATUM: NYS PLANE COORDINATE SYSTEM, WEST ZONE

VERTICAL DATUM: NGVD , 1929

PRELIMINARY
NOT ENG. RELEASED
NOT FOR PROJECT USE

SCALE
100 0 100 200 300 400

CONTOUR INTERVAL: 10 FEET

HERWISE SPECIFIED	DRAFTER J. SCHELBLE	DATE 6/1/92	A/E CONTRACT NO. / CODE IDENT. NO.
MS IN INCHES	CHECKER T. O'Connor	DATE 7/16/92	FOR
	ENGR. T. O'Connor	DATE 7/16/92	West Valley Nuclear Services Co.,Inc. West Valley, New York
L DEC / ANGLES / N/A AA		7/23/92	WVDP SITE MAP WELL/BORING LOCATIONS
N/A / ± N/A	COG.MGR.APPVL	DATE	
991	E&OS APPVL	DATE	
LY	Q.A.APPVL	DATE	DWG SIZE D / SCALE 1"=200'-0 / WEIGHT / DWG NO. 900D-5040 / REV 0
	DFTG.SUPR.	DATE 7/20/92	A/E DWG NO. / SHEET 3 OF

CAD DRAWING-DO NOT REVISE THIS ORIGINAL

WVDP-RFI-014
Rev. 0

B-8.90

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PLATE 12 4

E-1

Appendix C

WVDP RFI
Sampling and Analysis
Data Management Plan

Fall 1993

1.0 DATA MANAGEMENT PLAN

1.1 Introduction

Significant amounts of sampling and analysis data will be generated in the course of the RCRA Facility Investigation. The Data Management Plan outlined below provides the methodology for documenting and tracking the data generated by the investigation and the results inferred from the analysis of the data.

1.2 Data Documentation, Materials, and Procedures

All new data generated for this program are to be documented, verified, and reported. Only reviewed and approved data will be reported. Documents containing approved data will be reviewed for adequacy, completeness, and correctness. Completed peer-reviewed documents will be further reviewed for management approval before final issuance.

Data storage, database development, data reduction, and presentation will use the following software packages:

Lotus 123	:	standard publically available microcomputer spreadsheet
Quattro Pro	:	standard microcomputer spreadsheet/database
Dbase III+	:	standard microcomputer database
LabVantage	:	laboratory information management system (Informix database format)
Surfer	:	surface modeling program
Ventura Publisher	:	standard desktop publishing program
AutoCAD	:	standard WVDP drafting program
WordPerfect	:	standard word processing program

Other software applications also may be used after appropriate validation.

1.2.1 Data Reduction, Verification and Validation, and Reporting

Data reduction, verification and validation, reporting, and other record keeping/documentation associated with processing samples for contaminant analyses will be performed in accordance with the requirements mandated by NYSDEC and USEPA and as promulgated in appropriate environmental monitoring procedures and Appendix B. Physical and geohydrological data collected by the monitoring or investigative activities are gathered in accordance with function-specific environmental monitoring procedures. Appendix B, section 1.13.5, describes the data validation process.

The data may be divided into field and technical data. Documentation of both types of data will enable analytical characterization of the lateral and vertical distribution and concentration of specific contaminants at each SWMU. Field data will consist of all real-time and/or recorded measurements taken in the field; analytical data includes all information pertaining to the analysis of the sample. Technical data will include all field and laboratory analytical data, plus the results of field and laboratory QC samples. The results of all QC samples will be incorporated into each data package. This internal documentation is discussed below.

1.2.2 Laboratory Data Logging

Samples will be logged into the Laboratory Information Management System (LIMS) before analysis. The LIMS is an integrated software and hardware system designed to consolidate operations basic to laboratory operations, including sample log-in, analytical worklist generation, analytical data entry, quality control and statistical analysis, and data file storage and subsequent retrieval. A completed request-for-analysis form and/or chain-of-custody form that details requested analysis and identifies each sample and analyte requested will be filled out by the sampling team members. The Environmental Laboratory manager or the RCRA Characterization Manager or their delegate will, in accordance with documented procedural protocols:

1) verify all paperwork, chain-of-custody forms, and other forms
2) log in samples, assign unique log numbers, and attach the numbers to the sample container(s)
3) open project files in accordance with specified procedures and enter data on the laboratory computer as applicable
4) assign priority and hazard rating criteria
5) store samples, once they are collected, in a secure-controlled, refrigerated sample storage area or in an appropriate environment, depending on analytical requirements.

Laboratory analytical data recorded in the LIMS, or in environmental laboratory bench logs, will be reviewed and approved by the QA/QC group and RCRA Characterization Manager or his designee for adequacy, completeness, and correctness and subsequently recorded in the characterization data file by the data management coordinator before use in reports.

1.2.3 Field Data Logging

Field data will be recorded as specified in the applicable environmental monitoring procedure and Appendix B. These procedures are accompanied, where needed, by an attached form for entering data necessary to complete the task documentation. The field team member recording the data is responsible for legible entries, signing and dating the field record, and appropriate transcription and document control of field records.

1.2.4 Analyzing the Sample and Procedural Detail

The laboratory analyst, (on-site or off-site) will record the analytical results and provide any necessary additional documentation to complete the data package. The laboratory supervisory personnel will verify the results of analyses and detail all procedural modifications, deviations, or problems associated with analyses in the parameter workbook. A completed data package will be provided for entry in the LIMS (if from off-site), or will be provided by the appropriate on-site personnel. A separate validation of data to check for appropriate procedural compliance for all steps in obtaining the data will be applied after the completed data package is received.

1.2.5 Data Reduction

1.2.5.1 Field Measurement Data

The reduction of real-time generated field data may require correcting measurement data to a system baseline value. This data baselining correction will be performed after the field data has been approved by the appropriate cognizant managers and before entering the measurement data into the characterization data file and final report.

All field measurements will be documented using accepted record-keeping practices (e.g., pen or indelible pencil entries, line-through and initialed/dated corrections, each page identified, dated, and signed).

1.2.5.2 Duplicate and Replicate Sample Data

Duplicate and replicate measurements of a singe sample will be tested for acceptability and if determined acceptable will be averaged before further data reduction. This removes bias from the overall mean.

1.2.5.3 Outliers

Environmental field measurements can vary greatly. These environmental measurements can result in values that lie outside the expected range of values. Outlier values may be the result of:

- A catastrophic unnatural occurrence such as a spill
- Inconsistent sampling or analytical chemistry methodology
- Errors in the transcription of data values or decimal points
- Actual extreme concentration measurements.

The data should be corrected, for example, if outliers are caused by incorrect transcription and the correct values can be obtained and documented from valid records. If a catastrophic event or a problem in methodology occurs that can be documented, data values should be reported with clear reference. Documentation and validation of the cause of outliers will accompany any attempt to correct or delete data values because true but extreme values must

not be altered. Statistical methods for identifying outliers require that the analytical laboratory have an ongoing program of quality assurance and that sufficient replicate samples be analyzed to account for field variability.

Outlier values will not be omitted from the raw data unless there is a documented source of error; however, in any case these values will be identified within the summary tables.

1.2.6 Validation of Data

Upon completion of an analytical procedure, data will undergo QA/QC review before reporting in the data package.

The QA/QC review of data as a process is a two-phased system. The first phase is field and bench level technical review/verification which is followed by the second phase -- data validation. The data validation process is described in Section 1.13 of Appendix B, Data Collection and Quality Assurance Plan. Only validated data is to be used and reported for assessment or regulatory purposes.

1.2.7 Final Reporting and Report Archiving

Upon successful completion of the QA/QC process, the validated data is entered in the characterization data file and released to the RCRA Characterization Manager for use. Copies of data and reports will ultimately be stored in the Master Records Center (MRC).

1.2.7.1 Field Data Reporting

All field real-time measurements and observations will be recorded in Project log books, field data records, or similar types of record keeping. Field measurements may include pH, temperature, specific conductance, turbidity and flame ionization/phoionization detector (FID/PID) measurements of groundwater samples. Geotechnical measurements may include data from monitoring well installations such as boring logs. All data will be recorded directly and legibly in field logbooks or appropriate forms. Logs and/or records will be reviewed monthly by the supervisors of the several disciplines involved. These will become part of the project files.

1.2.7.2 Laboratory Data Reporting

Completed data validation checklists will be submitted with the data report. The data will be validated by independent project QA personnel. Specific reporting requirements will include:

- Data necessary for calculation of percent recoveries will be presented along with the analytical results. This section containing QC data will include upper and lower control limits for recovery percent and relative difference percent.

- All laboratory data will be cross-referenced to the appropriate trip blank, field blank, method blank, field duplicate, matrix spike, and matrix spike duplicate. Data and sample identification will be cross-referenced.
- In addition, all pertinent dates (i.e., dates collected, received by the laboratory, extracted, and analyzed) for each sample applicable to the project will be noted against their respective holding times.
- The requirement of reporting analytical results on a wet-weight or a dry-weight basis is dictated by factors such as sample matrix, program or regulatory requirements, and objectives of the analysis. Analytical results will be reported with the percent moisture or percent solid content of the sample.

1.2.8 Data Record

The data record includes the following information:

- a unique sample ID (LIMS - generated log number consisting of year and assigned number)
- a sampling or field measurement location (location code such as WNW 0111)
- sampling or field measurement raw data (as applicable)
- sample matrix
- measured property or component
- the results of analysis (value and units)
- notes, such as cross-referencing to QC samples or duplicates
- sample type.

Data recording formats are specified per the procedure relevant to the task being performed.

1.2.9 Data Quality Objectives

The data will be used to identify and/or confirm suspected contaminants release and to assess both qualitatively and quantitatively the nature and extent of contamination.

After validation, analytical data will be examined to determine if project activities and/or waste units are the source of a release to groundwater. Background values will be compared to site values. Statistical analysis and trend evaluation will be applied to the groundwater data where appropriate. The groundwater data will be compared to the NYCRR Drinking Water Standards for class GA water, established background levels, downgradient readings, and to State Pollutant Discharge Elimination System (SPDES) requirements.

1.3 Project-File Requirements

Data reports generated in the course of the RCRA facility investigation will be peer reviewed in accordance with procedure EM-102. Record management and storage procedures are stipulated in QM 6 and WV-730. A characterization data file will be established.

1.4 Project-Related Progress Reporting Procedures and Documents

Data Generated for the Site Annual Report

Monthly trend analysis reports document possible exceedance levels or trends determined as part of the environmental monitoring program. Quarterly summaries of quality control performance may be included in the monthly trend analysis reports.

A monthly summary of effluent water quality measurements is required by the State Pollution Discharge Elimination System (SPDES) permit.

An annual effluent and on-site discharge report and an annual site environmental monitoring report summarizing the results of both on- and off-site sampling is required by DOE Order 5400.1.

Periodic recording of data stations of the RTS drum cell and other geotechnical instrumentation networks is annually summarized. Any unusual data trends are investigated to determine if any may require interim data reporting and notification of appropriate project staff.

RFI Reporting

RFI reporting will be accomplished as described below. This will include the following:

- Progress Reports - The WVDP will provide brief quarterly progress reports. These may consist of the following:

  1) A description and estimate of percent RFI complete and projected work in reporting period
  2) Summary of findings and or problems
  3) Summary of RFI changes during reporting period
  4) Summary of contacts with outside agencies and groups
  5) Summary of any action items
  6) Changes in personnel.

- Draft and final RFI reports. This is further described in section 1.6 below.

1.5 RFI Data Presentation

The data will be presented in a tabular display for one or more of the following:

- the raw or unsorted data
- the results for each medium or for each constituent measured
- data reduction for statistical analysis
- data sorted by potential factors
- data summary.

The data will be graphically displayed to indicate one or more of the following, as appropriate:

- the sampling location and sampling grid
- the boundaries of the sampling area and those areas where more data are required
- the levels of concentration of each sampling location
- the geographical extent of contamination
- concentration levels, averages, and maxima
- changes in concentration in relation to distance from the source, time, depth, or other parameters
- features affecting intermedia transport and showing potential receptors.

1.6 Data Analysis and Report

RFI reports will be prepared for each SSWMU listed in work plan section 3.0 and Table 3-1. The reports will contain an analysis and summary of the investigations and results.

Data will be analyzed to assess the potential for release from SWMUs as well as the type and extent of contamination, if any, including probable sources and migration pathways. Data will be compared to the following:

- upgradient vs downgradient
- background levels indicative of the applicable area
- groundwater protection standards
- other relevant and applicable standards

APPENDIX D

RFI HEALTH AND SAFETY PLAN

In Support of the WVDP RCRA Facility Investigation (RFI)
and RFI Workplan

Fall 1993

Appendix D

RFI HEALTH AND SAFETY PLAN
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1.0 RFI HEALTH AND SAFETY PLAN

1.1 Purpose

The purpose of the RFI Health and Safety Plan (HASP) is to assign responsibilities, establish personnel protection standards and mandatory safety practices and procedures, and provide for contingencies that may arise while conducting field activities at the West Valley Demonstration Project (WVDP) site.

This plan addresses potential chemical and physical hazards that may present themselves during the course of groundwater investigations. This plan also covers activities not associated with the RFI.

1.2 APPLICABILITY

The provisions of the HASP are mandatory for all on-site employees, contractors, and subcontractors engaged in site investigation activities, including but not limited to site reconnaissance, preliminary field investigation, and project operations.

WVDP personnel, contractors and subcontractors, and visitors are required to perform operations in accordance with this HASP; Occupational Safety and Health Administration (OSHA) rules and regulations, 29 CFR 1910; General Industry Standards, 29 CFR 1926; Construction Industry Standards; and applicable state and local legislation as relevant to their respective site activities.

WVDP contractors and subcontractors will be required to perform operations in accordance with the Occupational Safety and Health Administration (OSHA) regulations 29 CFR Part 1910.120 - Hazardous Waste Operations and Emergency Response. These regulations include the following provisions for employees exposed to hazardous substances, health hazards, or safety hazards: training as described in 29 CFR Part 1910.120(e); medical surveillance as described in 29 CFR Part 1910.120(f); and personal protective equipment described in 29 CFR Part 1910.120 (g).

All contractors/subcontractors shall provide a health and safety plan for their employees covering any exposure to hazardous materials and shall complete all work in accordance with that plan. The contractor/subcontractor may choose to use this Health and Safety Plan as a guide in developing its own plan (which must be consistent with this plan) or may choose to adopt in full the WVDP plan. All subcontractors will, at a minimum, follow all provisions of the WVDP Health and Safety Plan.

Actual or perceived inadequate health and safety precautions may be cause for suspension of the activity and evacuation of the area until such concerns are properly addressed.

1.3 SITE DESCRIPTION

See section 2.0 of the RFI Work Plan for a description of the site.

1.3.1 Site Control

The WVDP is a limited-access federal installation. The public is restricted from entering the site. Additional provisions to restrict nonessential site personnel from hazardous activities will be used. As described in the next section, boundaries of site activities will be flagged and nonauthorized personnel will be restricted from these areas.

1.3.2 Work Zones

Site activities will be restricted to the WVDP site boundary as shown in Plate 1 of this RFI work plan. Work zones will be established around the immediate area of the monitoring well installation and drilling. The boundaries of the aforementioned will be flagged; however, flagging will not be used during groundwater sampling.

All areas will be entered in Level D (refer to Table D-5) personal protective equipment (PPE). If work zones require a higher level of PPE, the zones will be posted to indicate the type of PPE required for entry.

1.3.3 Site Activities

This RFI investigation is being initiated to evaluate and assess contaminated or potentially contaminated facilities, waste management units, and associated areas of the site and the long-term geologic conditions at the WVDP.

Field activities that will be conducted as part of this investigation include:

- Field reconnaissance
- Surveying
- Drilling, sampling, and groundwater monitoring well installation
- Groundwater sampling

Site activities will be limited to the area shown in Plate 1, which illustrates the areas the site has been divided into for the purposes of this Health and Safety Plan. These divisions were made in consideration of the varying potential contaminants, based on knowledge of the history of the solid waste management units in these areas. For the SDA this HASP covers groundwater sampling tasks only. If additional well installation or sampling activities are required, they will be covered by a separate HASP prepared by NYSERDA.

1.4 WVNS RFI RESPONSIBILITIES

The implementation of this HASP will be the responsibility of the Health and Safety Coordinator. All personnel participating in field activities will be responsible for adhering to the HASP. Health and safety responsibilities are summarized below.

1.4.1 WVNS RFI Project Manager

Overall responsibility for health and safety during RFI site operations rests with the Project Manager who is responsible for:

- Supporting the efforts of on-site cognizant management
- Providing adequate resources to perform on-site activities in a safe manner
- Taking the appropriate action when unsafe conditions exist.

1.4.2 RCRA Characterization Manager

The RCRA Characterization Manager shall direct on-site investigations as specified in Appendix B of the RFI workplan. The RCRA Characterization Manager, assisted by the task geologists/engineers, has primary responsibility for:

- Making certain that appropriate personal protective equipment and air monitoring equipment is available and properly used by all on-site personnel.

- Making certain that personnel receive the Health and Safety Plan and are aware of the provisions of this plan, are instructed in the work practices necessary to ensure safety, and are familiar with planned procedures for dealing with emergencies.

- Making certain that personnel are aware of the potential hazards associated with site operations.

- Monitoring the safety performance of all personnel to ensure that the required work practices are employed.

- Correcting any work practices or conditions that may result in injury or exposure to hazardous substances.

- Ensuring the completion of Plan Acceptance Forms.

- Confirming each field person's suitability for work, based on a physician's recommendations.

1.4.3 Task Geologists/Engineers

The task geologists/engineers shall:

- Follow the project Health and Safety Plan and report to the Characterization Manager any deviations from the anticipated conditions described in the plan. The task geologist/engineer has the authority to stop work at any time.

- Calibrate all air monitoring equipment on a daily basis and record both calibration results and field readings in an air monitoring log.

- Make certain that all monitoring equipment is operating correctly according to manufacturer's instructions and provide for maintenance if it is not.

1.4.4 Drilling Supervisor (DS)

The drilling supervisor shall supervise drilling operations and will be responsible for:

- Following the project Health and Safety Plan.

- Modifying or correcting unsafe work practices.

1.4.5 Project Personnel

Project personnel involved in on-site investigations and operations are responsible for:

- Taking precautions to prevent injury to themselves and to their fellow employees.
- Performing only those tasks that they believe they can do safely and immediately reporting any accidents and/or unsafe conditions to the task geologist/engineer.
- Notifying the Characterization Manager and task geologist/engineer of any special medical problems (e.g., allergies) and making certain that all on-site personnel are aware of any such problems.

1.4.6 Field Health and Safety Coordinator

The individual responsible for health and safety shall provide advice on adequate health protection during site operations.

Specifically, this person shall:

- Conduct a site safety briefing meeting prior to new activities and before on-site activities are initiated, and daily, when applicable, for all team members.
- Provide advice on personal protective equipment (PPE) changes.
- Perform field surveillances to ensure proper implementation of the Health and Safety Plan.

- Preparing any accident/incident reports and routine job exposure records.

1.4.7 Radiation and Safety Department

The Radiation and Safety (R&S) Department is responsible for reviewing specific site areas, equipment, or procedures to ensure personnel and property protection. R&S will determine if proposed activities require Radiation Work Permits (RWP) and/or Industrial Work Permits (IWP). Project personnel will follow all prescribed precautions on the RWP and/or IWP. The cognizant manager will keep R&S advised as to:

- Start-up and anticipated completion dates of all on-site activities
- Area(s) of the WVDP site where the activity will be taking place
- The nature of the activity.

R&S will also serve as an advisor to subcontractors engaged in drilling and/or excavation activities. R&S will provide personnel and other support as required by the proposed activity.

1.5 TRAINING

All personnel engaged in on-site activities shall, as a minimum, have received 40 hours of health and safety training for hazardous waste operations and WVDP Radiation Worker Training. This training, which includes respirator training, shall have been conducted before beginning field work at the site.

The level of training shall be consistent with the job function and responsibilities of project personnel. If specific task or job-specific training is needed, it is the responsibility of the RCRA Characterization Manager to provide for such training.

A site safety briefing meeting for all personnel assigned to work on this project will be held before on-site activities begin. The topics to be reviewed are:

- Purpose of the Health and Safety Plan.
- Standard safe work practices including:
  - general safe work practices
  - health and safety considerations during drilling and sampling procedures
  - boat safety practices (lagoon sampling)
  - hazards associated with confined spaces and the use of preplanning "permits"
  - "Buddy System"
- Site layout/work zones
- Vehicle operations
- Site Safety Work Plan
  - air monitoring program
- Personal protective equipment (PPE) for Level D and Level C
- Decontamination procedures including emergency medical decontamination
- Disposal of contaminated materials
- Respiratory protection
  - types of cartridges
  - limitations of cartridges
- Work limitations
  - heat stress/cold stress
  - hours of work
  - lighting
- Emergency contacts and procedures
- Contingency Plan

All field personnel shall receive and sign a Plan Acceptance Form to indicate that he/she has reviewed and understood this Health and Safety Plan and also to agree to abide by the provisions of the plan. In addition, the task

geologist/engineer will conduct meetings at the start of each work day, when new personnel begin work at the site, or whenever site conditions change.

1.6 MEDICAL SURVEILLANCE

1.6.1 Medical Examinations

All personnel working in the field are required to have on file with the WVDP the results of a recent physical examination (within the last year). Along with medical examination results, personnel must also submit a physician's evaluation as to:

- fitness for hazardous waste field work
- fitness to wear a respirator and other protective equipment
- the nature and extent of medical limitations, e.g., requirement for mandatory hearing protection
- heat stress evaluation

The medical examination should include:

- complete medical and occupational history
- determination of vital statistics
- vision and hearing testing
- liver, kidney, lung, and cardiovascular function tests
- heat stress evaluation

Additionally, baseline monitoring for specific toxicants may also be performed to establish a database in cases where project personnel may receive significant exposures to these agents.

1.6.2 Emergency Treatment

1.6.2.1 Notification of WVDP Medical Staff

Before on-site activities begin, the WVDP medical staff will be provided with field work locations and schedules and a copy of the Health and Safety Plan.

1.6.2.2 Field Staff Training/Equipment

All field staff will be trained as noted in 29 CFR 1910.120. A first aid kit along with emergency eyewash bottles will be provided to each field team.

1.6.2.3 Accidents/Chemical Exposure

In the event any member of the field team is injured or experiences an acute chemical exposure, that person will be transported to the nearest medical facility for evaluation and treatment. If the person's skin or clothes are contaminated, the decontamination procedures in section 1.10 of this Health and Safety plan are to be followed.

1.7 HAZARD EVALUATION

1.7.1 Chemical Hazards

Site history and data from prior sampling efforts indicate that there are hazardous chemicals on-site. Table D-1 provides a listing of potential and actual constituents of concern. The exposure limits, recognition qualities, acute and chronic effects and first-aid treatment are presented in Tables D-1 and D-2. Table D-3 provides a breakdown of potential chemical contaminants of concern in each of the areas exhibited in Figure D-1.

The routes of exposure associated with these contaminants are:

- Inhalation of volatile organic compounds, gases, or particulates. The proper use of the appropriate respiratory equipment can protect field personnel from inhaled toxicants.

- Skin and/or eye contact with concentrated hazardous materials, soil, or water samples contaminated with hazardous materials. Exposure can occur during activities that could cause splashing, such as drilling or sample collection and packaging. Skin and eyes can be protected by the use of chemical protective clothing and safety glasses/face shields.

- Ingestion of contaminated materials. Ingestion can occur by hand-to-mouth contact if hands have not been protected during sampling or other work activities. This can be avoided if close attention is paid to the use of protective clothing and to personal hygiene.

1.7.2 Physical Hazards

1.7.2.1 Fire and explosion

Fires and explosions are very rapid, violent releases of heat and energy, and require fuel, air (oxygen), and an ignition source (heat). They may arise spontaneously or can result from site activities such as moving drums, accidentally mixing incompatible materials, or introducing an ignition source (such as a spark from equipment) into an explosive or flammable environment. Fires and explosions can cause hazards such as intense heat, open flame, smoke inhalation, flying objects, and the release of toxic chemicals into the environment.

Additionally, materials that are part of field operations such as decontamination solvents and fuel can be flammable. All combustible or flammable materials should be stored at least fifty feet from ignition or sparking sources.

Air monitoring for explosion and/or fire hazards in suspect areas will be conducted by using a Combination Combustible Gas Indicator (CGI)/Oxygen Meter. Action levels for air monitoring with the CGI are listed in Table D-4.

No drilling or excavation will take place without confirming the absence of buried drums, tanks, or other metal objects.

1.7.2.2 Oxygen Deficiency

The oxygen content of normal air at sea level is approximately 21%. Generally, concentrations of 19.5% or lower are indicative of an oxygen deficiency. Oxygen deficiency can be caused by the displacement of oxygen by another gas (i.e, methane, CO_2) or by the consumption of oxygen during a chemical reaction. Low-lying areas are particularly vulnerable to oxygen deficiency because gases that are heavier than air will settle in these areas. Confined spaces can also be deficient in oxygen.

Monitoring for oxygen-deficient atmospheres will be conducted in areas of concern by using an oxygen meter. Table D-1 lists action levels to be used when monitoring oxygen content.

1.7.2.3 Ionizing Radiation

During site activities, the potential exists for exposure to ionizing radiation during the sample handling and sample collection process. An R&S technician will monitor soil samples as they are removed from the borehole and monitor the borehole (and drilling equipment) during the drilling process. The R&S technician will also be responsible for surveying borehole cuttings and sampling equipment for radioactive contamination.

1.7.2.4 Biological Hazards

Biological hazards that may be present include poisonous plants, insects, animals, and indigenous pathogens.

Protective clothing can help reduce the chances of certain types of exposure but avoidance is the best solution.

1.7.2.5 Safety Hazards

Site conditions may pose numerous safety hazards such as:

- uneven terrain or the presence of holes or ditches
- sharp objects, such as nails or glass, that may puncture the skin
- personal protective equipment that may reduce agility, visibility, and hearing
- heavy equipment that can create a hazard during operation
- elevated work areas such as platforms and roofs

Site personnel will be instructed to look out for potential safety hazards at all times and should immediately inform their supervisor of any such hazards so that mitigating actions can be taken.

1.7.2.6 Electrical Hazards

Overhead power lines, downed electrical wires, and subsurface utility lines pose a danger of shock or electrocution if workers contact or sever them during site operations. Electrical equipment used on-site may also pose a hazard to workers.

Contact with overhead electrical cables will be avoided by visual observation. No drilling will take place without confirming the absence of subsurface transmission lines with the appropriate WVDP contacts and the underground utilities protection group.

1.7.2.7 Heat Stress

If site work is to be conducted during hot periods or in hot environments, heat stress is a concern in the health and safety of personnel. For workers wearing permeable clothing, recommendations for monitoring requirements and suggested work/rest schedules in the current American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values for Heat Stress are to be followed. For workers wearing semipermeable or impermeable clothing, the ACGIH standard cannot be used. For these situations, workers should be monitored when the temperature in the work area is above 70°F (21°C), as follows:

To monitor the worker, measure:

- Heart rate. Count the radial pulse during a 30-second period as early as possible in the rest period.

  If the heart rate exceeds 110 beats per minute at the beginning of the rest period, shorten the next work cycle by one-third and keep the rest period the same.

  If the heart rate still exceeds 110 beats per minute at the next rest period, shorten the following work cycle by one-third.

- Oral temperature. Use a clinical thermometer (3 minutes under the tongue) or similar device to measure the oral temperature at the end of the work period (before drinking).

  If oral temperature exceeds 99.6°F (37.6°C), shorten the next work cycle by one-third without changing the rest period.

  If oral temperature still exceeds 99.6°F (37.6°C) at the beginning of the next rest period, shorten the following work cycle by one-third.

Do not permit a worker to wear a semipermeable or impermeable garment when his/her oral temperature exceeds 100.6°F (38.1°C).

- Body water loss, if possible. Measure weight on a scale accurate to ±0.25 lb. at the beginning and end of each work day to see if enough fluids are being taken to prevent dehydration. Weights should be taken while the employee wears similar clothing or, ideally, is nude. The body water loss should not exceed 1.5 percent total body weight loss in a work day.

Initially, the frequency of physiological monitoring depends on the air temperature, adjusted for solar radiation, and the level of physical work (see following table). The length of the work cycle will be governed by the frequency of the required physiological monitoring.

SUGGESTED FREQUENCY OF PHYSIOLOGICAL MONITORING
FOR FIT AND ACCLIMATED WORKERS

ADJUSTED TEMP.	NORMAL WORK ENSEMBLE	IMPERMEABLE ENSEMBLE
90°F (32.2°C) or above	After each 45 min of work	After each 15 min of work
87.5°F-90°F (30.8°C-32.2°C)	After each 60 min of work	After each 30 min of work
82.5°F-87.5°F (28.1°C-30.8°C)	After each 90 min of work	After each 60 min of work
77.5°F-82.5°F (25.3°C-28.1°C)	After each 120 min of work	After each 90 min of work
72.5°F-77.5°F (22.5°C-25.3°C)	After each 150 min of work	After each 120 min of work

(1) Calculate the adjusted air temperature (ta adj) by using this equation: ta adj °F = ta °F + (13 x % sunshine). Measure air temperature (ta) with a standard mercury-in-glass thermometer, with the bulb shielded from radiant heat. Estimate percent sunshine by judging what percent time the sun is not covered by clouds that are thick enough to produce a shadow. (100 percent sunshine = no cloud cover and a sharp, distinct shadow; 0 percent sunshine = no shadows.)

If workers are not monitored for heat stress, work activities in hot environments can result in dehydration, heat exhaustion, heat stress or even heat stroke.

Signs and Symptoms of Heat Stress

- Heat rash may result from continuous exposure to heat or humid air.

- Heat cramps are caused by heavy sweating with inadequate electrolyte replacement. Signs and symptoms include:

- muscle spasms

- Pain in the hands, feet and abdomen.

- Heat exhaustion occurs from increased stress on various body organs including inadequate blood circulation due to cardiovascular insufficiently or dehydration. Signs and symptoms include:

  - Pale, cool, moist skin
  - heavy sweating
  - dizziness
  - nausea
  - fainting
  - Heat stroke is the most serious form of heat stress. Temperature regulation fails and the body temperature rises to critical levels. Immediate action must be taken to cool the body before serious injury and death occur. Competent medical help must be obtained. Signs and symptoms are:

  - red, hot, usually dry skin
  - lack of or reduced perspiration
  - nausea
  - dizziness and confusion
  - strong, rapid pulse
  - coma

1.7.2.8 Cold Stress

Frost Bite

Frostbite is an injury resulting from exposure to cold. The extremities of the body (fingers and toes) are most often affected. The signs of frostbite are:

- Skin turns white or grayish-yellow.
- Pain is sometimes felt early, but subsides later. Often there is no pain.
- The affected part feels intensely cold and numb.

Hypothermia

If site work is to be conducted during the winter cold stress is a concern in the health and safety of the personnel. Additional insulated clothing will be provided to field personnel. Of special note for cold stress on this site is the wearing of tyvek suits. Disposable clothing does not breath and so perspiration cannot evaporate. During strenuous physical activity an employee's clothes can become wet, which, combined with cold temperatures can lead to hypothermia. If the air temperature is less than 40°F and an employee becomes wet, the employee must change to dry clothes. An on-site heated trailer facility or a site vehicle may be used as a change area.

Hypothermia is characterized by shivering, numbness, drowsiness, muscular weakness and a low internal body temperature when the body feels warm externally. This can lead to unconsciousness and death.

In either case (frostbite or hypothermia), seek immediate medical attention.

To prevent these effects, persons working in cold environments should wear adequate clothing and reduce the time spent in the cold area.

1.7.2.9 Noise

Field personnel may be exposed to noise when working around heavy equipment such as a drill rig. Prior to or during potential noise exposure, the *IH&S* department must conuduct a noise survey. All personnel working close to the drill rig may be required to wear hearing protection.

1.7.3 Standard Safe Work Practices

1.7.3.1 General

1. Eating, drinking, chewing gum or tobacco, and smoking are prohibited in the contaminated or potentially contaminated area or where the possibility for the transfer of contamination exists.

2. Avoid contact with potentially contaminated substances. Do not walk through puddles, pools, mud, etc. Avoid, whenever possible, kneeling on the ground, leaning or sitting on equipment or ground. Do not place monitoring equipment on a potentially contaminated surface.

3. Prevent, to the extent possible, spillage. In the event that a spillage occurs, contain liquid, if possible.

4. Prevent splashing of contaminated materials.

5. All field crew members shall make use of their senses (all senses) to alert them to potentially dangerous situations in which they should not become involved (e.g., presence of strong, irritating, or nauseating odors).

6. Field crew members shall be familiar with the physical characteristics of investigations, including:

- Wind direction in relation to the work area
- Accessibility to associates, equipment, vehicles
- Communications
- Hot zone (areas of known or suspected contamination)
- Site access
- Nearest water sources.

7. The number of personnel and equipment in the contaminated area should be minimized but only to the extent consistent with workforce requirements of safe site operation.

8. All wastes generated during site activities will be disposed of as directed by the Characterization Manager.

1.7.3.2 Drilling and Sampling Procedures

For any required drilling and sampling activities, the following standard safety procedures shall be employed.

1. All drilling and sampling equipment shall be cleaned before proceeding to the site.

2. At the drilling or sampling site, sampling equipment shall be cleaned after each use.

3. Work in "cleaner" areas should be conducted first if practical.

4. The minimum number of persons necessary to achieve the objectives shall be within 25 feet of the drilling or sampling activity.

5. If emergency and back-up subcontracted personnel are at the site, they should remain 25 feet from the drilling or sampling activity, if practical.

6. Exclusion zones will be established within designated hot lines. Delineation of a hot line will reflect the interface between areas at or below a predetermined threshold of contaminant concentration, based on available data that includes the results of monitoring and chemical analyses, information from site personnel regarding historical site activities, and general observations. This determination will be made by the Characterization Manager in conjunction with the task geologist/engineer and site personnel.

1.8 AIR MONITORING

1.8.1 Air Monitoring Requirements

The task personnel will conduct air monitoring for the hazards presented in Table D-1. Equipment necessary for air monitoring at this site consists of a photoionizaton detector (PID) with the necessary equipment (i.e., lamp) for the compounds of concern and an explosimeter/oxygen meter. The type of monitoring instruments specified by the hazard and the action levels to upgrade personal protection are shown in Table D-4. All monitoring equipment shall be maintained following procedures outlined in the operator's manual for the specified monitoring equipment.

1.8.2 Air Monitoring Schedule

Ongoing field activities (i.e., G.W. Monitoring) may not require air monitoring based on historical information.

1.8.2.1 Instrument Calibration

All applicable instruments shall be calibrated daily. Readings shall be recorded in the air monitoring log.

1.8.2.2 Background Readings

Before any field activities begin, the background levels of the site will be read and noted in the air monitoring log. Daily background readings shall take place away from areas of potential contamination to obtain accurate results.

Generally, background levels for organic vapors in ambient air read zero. If background readings indicate higher levels of organic vapors than anticipated, the task geologist/engineer will determine the source of the readings before on-site activities begin. This plan will be amended, as appropriate, to reflect any adjustments necessary as the result of higher than expected background levels.

1.8.2.3 Air Monitoring Frequency

All site readings will be noted in the air monitoring log along with the date, time, weather conditions, wind direction and speed, if possible, and location where the background level was recorded. Copies of results shall be sent to the Health & Safety Coordinator.

The following schedule should be followed for air monitoring:

Air Monitoring Equipment	Monitoring Frequency in the breathing zone
CGI/O_2 meter	Monitor every 30 min/every sample retrieved
PID	Monitor every 30 min/every sample retrieved

1.9 PERSONAL PROTECTIVE EQUIPMENT

1.9.1 Levels of Protection

A minimum of Level D protection is needed to perform work on-site. Level D+ or C protection may be required if action levels are exceeded and will be available on site. Descriptions of Level D, Level D+ and Level C protection are included in Table D-5.

1.9.2 Respiratory Protection

Sampling activities will be initiated in Level D. If organic vapors as measured on the PID exceed 1 ppm, Level C protective equipment should be donned. However, if organic vapors exceed 5 ppm, leave the area and notify the RCRA Characterization Manager and the Health and Safety Coordinator. All ambient air measurements taken to evaluate personnel exposure will be taken within the individual's breathing zone and shall be fairly frequent or constant for a duration of at least one minute.

1.10 DECONTAMINATION PROCEDURES

1.10.1 General

Personnel should follow the decontamination procedures outlined below.

1. Locate a decontamination area.

2. Establish a personnel decontamination station consisting of a basin with soapy water, a rinse basin with plain water, and a can with a plastic bag.

3. Wash and rinse boots.

4. Remove outside gloves and discard in plastic bag.

5. Remove disposable suit and discard in plastic bag.

6. Upon leaving the contamination area, all personnel will proceed through the appropriate contamination reduction sequence as described above.

7. All protection gear should be left on-site during lunch break following decontamination procedures.

The maximum decontamination layout for Level C is shown on Figure D-1, and a description is given below.

Maximum Measures for Level C Decontamination

Station 1:	Segregated Equipment Drop	1. Deposit equipment used on-site (tools, sampling devices and containers, monitoring instruments, clipboards, etc.) on plastic drop cloths or in different containers with plastic liners. Segregation at the drop reduces the probability of cross contamination. During hot weather operations, a cool-down station may be set up within this area.
Station 2:	Boot Cover and Glove Wash	2. Scrub outer boot covers and gloves with decon solution or detergent and water.
Station 3:	Boot Cover and Glove Rinse	3. Rinse off decon solution from Station 2 using copious amounts of water.
Station 4:	Tape Removal	4. Remove tape around boots and gloves and deposit in container with plastic liner.
Station 5:	Boot Cover Removal	5. Remove boot covers and deposit in container with plastic liner.
Station 6:	Outer Glove Removal	6. Remove outer gloves and deposit in container with plastic liner.
Station 7:	Suit and Boot Wash	7. Wash splash suit, gloves, and safety boots. Scrub with long-handle scrub brush and decon solution.
Station 8:	Suit and Boot and Glove Rinse	8. Rinse off decon solution using water. Repeat as many times as necessary.
Station 9:	Cartridge or Mask Change	9. If worker leaves the exclusion zone to change cartridges (or mask), this is the last step in the decontamination procedure. Worker's cartridges are exchanged, new outer gloves and boot covers donned, and joints taped. The worker then returns to duty.
Station 10:	Safety Boot Removal	10. Remove safety boots and deposit in container with plastic liner.
Station 11:	Splash Suit Removal	11. With assistance of helper, remove splash suit. Deposit in container with plastic liner.

Station 12:	Inner Glove Wash	12. Wash inner gloves with decon solution.
Station 13:	Inner Glove Rinse	13. Rinse inner gloves with water.
Station 14:	Face Piece Removal	14. Remove face piece. Deposit in container with plastic liner. Avoid touching face with fingers.
Station 15:	Inner Glove Removal	15. Remove inner gloves and deposit in lined container.
Station 16:	Inner Clothing Removal	16. Remove clothing soaked with perspiration and place in lined container. Do not wear inner clothing off-site since there is a possibility that small amounts of contaminants might have been transferred in removing the disposal coveralls.
Station 17:	Field Wash	17. Shower if highly toxic, skin-corrosive or skin-absorbable materials are known or suspected to be present. Wash hands and face if shower is not available.
Station 18:	Redress	18. Put on clean clothes

Minimal Decontamination

Less extensive procedures for decontamination can be subsequently or initially established when the type and degree of contamination becomes known or potential for transfer is judged to be minimal. These procedures generally involve one of two washdowns only. The layout for a minimal decontamination operation is shown in Figure D-2.

Closure of the Personnel Decontamination Station

All disposable clothing and plastic sheeting used during the operation should be double-bagged and removed to an approved off-site disposal facility. Decon and rinse solution will be contained on-site. Reusable rubber clothing should be dried and prepared for future use. (If gross contamination had occurred, discard the item). Cloth items should be bagged and removed from the site for final cleaning. All wash tub, pail containers, etc., should be thoroughly washed, rinsed, and dried before removal from the site.

1.10.2 Emergency Decontamination

In the event a worker is involved in an accident or impaired, decontamination procedures will be as follows:

- If life-saving procedures are not required, decontaminate the victim as much as possible, and transport to the medical facility for treatment.

- If life-saving procedures are required and the contaminants are extremely hazardous, cover or wrap contaminated areas of the body, perform life-saving procedures, and transport to the medical facility. If the contaminants are not extremely hazardous, life-saving procedures are to be performed, and the victim then transported to the medical facility.

  In any of the aforementioned cases, both transport and emergency room personnel are to be notified regarding both the type and degree of injury as well as the extent and nature of contamination to the injured party.

1.11 EMERGENCY CONTACTS AND PROCEDURES

1.11.1 Contacts

The procedures outlined in the Emergency Plan and Procedures Manual (WVDP-022) will be adhered to. Field personnel should maintain radio contact with the RCRA characterization manager or his/her designee at all times. Should any situation or unplanned occurrence require outside or support services, the appropriate contacts should be made by the RFI Manager or his designee. The appropriate contacts are listed below:

Emergency All Page 812
R&S.....4237
Site Medical Department.....4316

1.11.2 Procedures

In the event of an emergency on-site, the procedures delineated herein are to be immediately followed. Emergency conditions are considered to exist if:

- Any member of the field crew is involved in an accident or experiences any adverse effects or symptoms of exposure while on-site; or
- A condition is discovered that suggests the existence of a situation more hazardous than anticipated.

The following emergency procedures should be followed:

A. Personnel on-site should use the "buddy system" (pairs). Buddies should pre-arrange hand signals or other means of emergency signals for communication in case of lack of radios or radio breakdown (see the following item).

- Hand gripping throat: out of air, can't breath.
- Grip partner's wrist or place both hands around waist: leave the area immediately, no debate.
- Hands on top of head: need assistance.
- Thumbs up: Okay, I'm all right, I understand.
- Thumbs down: No, negative.

B. Site work area entrance and exit routes should be planned, and emergency escape routes delineated by the task geologist/engineer.

C. Visual contact should be maintained between "pairs" on-site with the team remaining in close proximity in order to assist each other in case of emergencies.

D. In the event that any member of the field crew experiences any adverse effects or symptoms or exposure while on-site, the entire field crew should immediately halt work and follow the instructions provided by the field team leader.

E. Wind indicators visible to all on-site personnel should be provided by the RCRA Characterization Manager to indicate possible routes for upwind escape.

F. The discovery of any condition that would suggest the existence of a situation more hazardous than anticipated should result in the evacuation of the field team and reevaluation of the hazard and the level of protection required.

TABLE D-1

EXPOSURE LIMITS AND RECOGNITION QUALITIES FOR COMPOUNDS THAT MAY HAVE BEEN ASSOCIATED WITH THE SITE

Compound	Exposure(a) Limits (ppm unless otherwise indicated)	IDLH(b) Level (ppm unless otherwise indicated)	Odor	Odor Warning Concentration (ppm)	LEL(c) %	UEL(d) %	Ionization pot. (ev)
Aluminum	15 mg/m3 (1) 5 mg/m3 (1) (respirable dust)	none specified	odorless	-	N/A	N/A	N/A
Ammonia	25 (2)	500	pungent strong, penetrating	0.32-55 (55-140)	16	25	10.15
Arsenic	10 ug/m3 (1) 0.2 mg/m3 (2)		variable	varies	varies	varies	N/A
Asbestos	0.2 fibers/cc	none specified	odorless	-	N/A	N/A	N/A
Barium	0.5 mg/m3 (1)(2)	250 mg/m3	variable	varies	varies	varies	N/A
Benzene	STEL 5 (1) 10 (2) 1 (1)		pungent, aromatic	4.68	1.3	7.1	9.25
Beryllium	0.002 mg/m3		variable	varies	varies	varies	N/A
Cadmium	0.2 mg/m3 (1) 0.05 mg/m3 (2)	40 mg/m3	variable	varies	varies	varies	N/A
Chloroform	2 (1) 10 (2)	1000	sweet, etherial, pleasant	50-307, fatigue	not combustible	not combustible	11.42

TABLE D-1 (continued)

EXPOSURE LIMITS AND RECOGNITION QUALITIES FOR COMPOUNDS THAT MAY HAVE BEEN ASSOCIATED WITH THE SITE

Compound	Exposure(a) Limits (ppm unless otherwise indicated)	IDHL(b) Level (ppm unless otherwise indicated)	Odor	Odor Warning Concentration (ppm)	LEL(c) %	UEL(d) %	Ionization pot. (ev)
Chromium	1 mg/m3	500 mg/m3	variable	varies	varies	varies	N/A
Copper (dust & mist)	1 mg/m3 (1) 0.5 mg/m3 (2)	none specified	odorless	-	-	-	N/A
Dibutylphosphate	1 (1)(2)	125	odorless	-	-	-	-
1,1-Dichloroethane	100	4000	chloroform-like	-	6.0	16	-
Kerosene	5 mg/m3 (2)	none specified	like fuel oil	6.082-1	0.7	5.0	6.79
Lead (dust & fumes	0.05 mg/m3 (1) 0.15 mg/m3 (2)	none specified	variable	varies	varies	varies	N/A
Magnesium	none specified	none specified	-	-	-	-	-
Methylene Bisphenol Isocyanate (MDI)	0.02 Ceil (1)(2)	10	odorless	(0.05-0.1)	N/A	N/A	-

TABLE D-1 (continued)

EXPOSURE LIMITS AND RECOGNITION QUALITIES FOR COMPOUNDS THAT MAY HAVE BEEN ASSOCIATED WITH THE SITE

Compound	Exposure(a) Limits (ppm unless otherwise indicated)	IDHL(b) Level (ppm unless otherwise indicated)	Odor	Odor Warning Concentration (ppm)	LEL(c) %	UEL(d) %	Ionization pot. (ev)
Methylene Chloride	100 (2)	5000	sweet, etherial-like chloroform	25-320 (5000)	15% in 02	66.4% in 02	11.35
2-Methyl Phenol	5 (1)(2)	250	sweet, tarry	0.26-0.68	1.4	-	8.9
4-Methyl Phenol	5 (1)(2)	250	sweet, tarry	0.00047-0.0455	1.1	8.6	8.9
Naphthalene	10 (1)(2)	500	moth balls (15)	0.003-0.3	0.9	5.9	8.14
Nickel	1 mg/m3 (1)(2)		variable	varies	varies	varies	N/A
Nitric Acid	2 (1)(2)	100	acrid, sweet to acrid	0.3-1.0 (62)	not combustible	not combustible	11.03
Oxalic Acid	1.0 mg/m3 (1)(2)	500 mg/m3	odorless	-	N/A	N/A	N/A
Phenol	5 (1)(2)	100	sweet, tarry	0.047-5.0 (48)	1.7	8.6	13.6
Selenium	0.2 mg/m3 (1)(2)	100 mg/m3	variable	varies	varies	varies	N/A

TABLE D-1 (continued)

EXPOSURE LIMITS AND RECOGNITION QUALITIES FOR COMPOUNDS THAT MAY HAVE BEEN ASSOCIATED WITH THE SITE

Compound	Exposure(a) Limits (ppm unless otherwise indicated)	IDLH(b) Level (ppm unless otherwise indicated)	Odor	Odor Warning Concentration (ppm)	LEL(c) %	UEL(d) %	Ionization pot. (ev)
Silver	0.01 mg/m3 (1) 0.1 mg/m3 (2)	none specified	variable	varies	varies	varies	N/A
Sodium Hydroxide	2 mg/m3 (1)(2)	200 mg/m3	odorless	-	not combustible	not combustible	N/A
Sulfuric Acid	1 mg/m3 (1)(2)	80 mg/m3	odorless	0.6 mg/m3-2.4 mg/m3	not combustible	not combustible	N/A
Toluene	100 (1)(2)	2000	pungent, aromatic, benzene-like	0.17-40	1.3	7.1	8.82
Toluene-2,4-Diisocyanate	0.005 (1)(2)	10	sweet, fruity, pungent	0.2-2.14	0.9	9.5	
Tributyl Phosphate	0.2 mg/m3 (1)(2)	1300 mg/m3	odorless	-	-	-	-
1,1,1-Trichloroethane	350	1000	mild, like chloroform	20-500 (500-1000)	7.0	16	11.3
Trichlorofluoromethane	1000 ceil (2)	10,000	faint, etherial	135-209	not combustible	not combustible	11.77

TABLE D-1 (concluded)

EXPOSURE LIMITS AND RECOGNITION QUALITIES FOR COMPOUNDS THAT MAY HAVE BEEN ASSOCIATED WITH THE SITE

Compound	Exposure(a) Limits (ppm unless otherwise indicated)	IDLH(b) Level (ppm unless otherwise indicated)	Odor	Odor Warning Concentration (ppm)	LEL(c) %	UEL(d) %	Ionization pot. (ev)
Xylenes	100	10,000	aromatic	0.05-200 (200)	1.1	7.0	8.56
Zinc	none specified	none specified	-	-	-	-	-
Zinc Bromide	none specified	none specified	-	-	-	-	-
Zirconium	5 mg/m3	500 mg/m3	variable	varies	varies	varies	N/A

(a) OSHA Permissible Exposure Limit or American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value
(b) Immediately Dangerous to Life or Health Level
(c) Lower Explosive Limit
(d) Upper Explosive Limit
(1) OSHA Time Weighted Average
(2) ACGIH Time Weighted Average
(3) NIOSH Time Weighted Average
STEL: Short-Term Exposure Limit averaged over a 15-minute period
CEIL: Ceiling concentration not to be exceeded at any time

Note: The odor warning concentrations given are generally odor thresholds with irritation thresholds given in parenthesis.

TABLE D-2

ACUTE AND CHRONIC EFFECTS AND FIRST AID TREATMENT

Compound	Routes of Entry	Eye Irritant	Acute Effects	Chronic Effects
Aluminum	inhalation of dust	yes	inhalation of fine powder can cause pulmonary fibrosis; sneezing; slight irritation of eyes and nose	bronchial asthma; anorexia; shortness of respiration; cough; gastrointestinal pain
Ammonia	ingestion, inhalation, eye/skin contact	yes	irritation to eyes and mucous membranes; conjunctivitis; irritation of nose and throat; coughing, vomiting	respiratory system; eyes
Arsenic	inhalation ingestion	-	irritation of stomach and intestines; sever cases result in collapse and shock with weak, rapid pulse, cold sweats, coma and death	loss of appetite; cramps; nausea; liver damage; blood, kidney and nervous system disturbances; skin abnormalities; possible human carcinogen
Asbestos	inhalation, ingestion	-		asbestosis; carcinoma of the lung; pleural plaques; mesothelioma; anorexia; weight loss; chest pain
Barium	inhalation of dust, ingestion	yes	irritation of the eyes, nose and throat, and of the skin, producing dermatitis	heart, central nervous system, skin, respiratory system, and eyes
Benzene	ingestion, inhalation, skin absorption, eye/skin contact	yes	confusion; dizziness; irritates eyes, nose, respiratory system; nausea; lassitude	leukemia, anemia, fatigue, pallor, nosebleeds

TABLE D-2 (continued

ACUTE AND CHRONIC EFFECTS AND FIRST AID TREATMENT

Compound	Routes of Entry	Eye Irritant	Acute Effects	Chronic Effects
Beryllium	inhalation of dust	-	pulmonary lesions; weight loss; dyspnea; hacking cough; vomiting	pulmonary hypertension; renal failure; cardiac arrest; skin lesions; suspect human carcinogen
Cadmium	inhalation of dust, ingestion	-	irritation to nose and throat; cough; chest pain; sweating; chills; abdominal pain; possible death	loss of smell; nose ulceration dyspnea; kidney damage; mild anemia; carcinogen
Chloroform	inhalation, ingestion, skin contact	yes	skin dryness; headache; drowsiness; vomiting; dizziness; unconsciousness; irregular heart beat; burning throat; swallowing pain; chest pain; possible death	skin irritation; liver and kidney damage; gastrointestinal disorder
Chromium	inhalation of dust, ingestion	-		histologic fibrosis of lung; chromium VI-carcinogen
Copper	inhalation of dust, ingestion eye/skin contact	yes	irritation of respiratory tract; nasal discomfort; conjuctivitis; corneal ulceration	skin discoloration; kidney and liver damage; ulceration of nasal septum
Dibutyl Phosphate	inhalation, ingestion, eye/skin contact	yes	irritation of eyes, nose, throat, and lungs	

TABLE D-2 (continued)
ACUTE AND CHRONIC EFFECTS AND FIRST AID TREATMENT

Compound	Routes of Entry	Eye Irritant	Acute Effects	Chronic Effects
Kerosene	inhalation	yes	headache; stupor; irritation of stomach and intestines; nausea; vomiting	
Lead	inhalation of dust/ fume, ingestion, eye/ skin contact	-	lassitude; insomnia; pallor; anorexia; weight loss; malnutrition; abdominal pain; anemia	gastrointestinal tract; nervous system; kidneys; blood; gingival tissue
Magnesium	inhalation	-	dust irritates eyes in same way as any foreign material; penetration of skin by fragments of metal is likely to produce local irritation	
Methylene Bisphenyl Isocyanate (MDI)	inhalation, ingestion, eye/skin contact	yes	eye, nose, and throat irritation; chest pain	allergic sensitizer; respiratory system; eyes
Methylene Chloride	inhalation, ingestion, eye/skin contact	yes	nausea; acceleration of pulse; can cause dermatitis; irritates eyes, skin; vertigo; weakness; fatigue	skin; cardiovascular system; eyes; central nervous system

TABLE D-2 (continued)

ACUTE AND CHRONIC EFFECTS AND FIRST AID TREATMENT

Compound	Routes of Entry	Eye Irritant	Acute Effects	Chronic Effects
2-Methyl Phenol	inhalation or percutaneous absorption of liquid or vapors, ingestion, eye/skin	yes	corrosive action of skin and mucous membranes; skin burns; dermatitis; irregular, rapid respiration	central nervous system; respiratory system; liver; kidneys; eyes; skin
4-Methyl Phenol	inhalation or percutaneous absorption of liquid or vapors, ingestion, eye/skin	yes	corrosive action of skin and mucous membranes; skin burns; dermatitis; irregular, rapid respiration	central nervous system; respiratory system; liver; kidneys; eyes; skin
Naphthalene	ingestion, skin absorption eye/skin contact, inhalation	yes	poisoning may occur by ingestion in large doses, inhalation or skin absorption; nausea; headache; abdominal pain	liver damage; eyes; blood; kidneys; skin
Nickel	inhalation, ingestion, eye/skin contact		may cause dermatitis in sensitive individuals; allergic asthma	suspect carcinogen

TABLE D-2 (continued)

ACUTE AND CHRONIC EFFECTS AND FIRST AID TREATMENT

Compound	Routes of Entry	Eye Irritant	Acute Effects	Chronic Effects
Nitric Acid	eye/skin contact; inhalation of vapors, ingestion	yes	vapors irritate eyes and respiratory tract; lung injury may not become apparent for several hours following exposure	
Oxalic Acid	inhalation, ingestion, eye/skin contact	yes	dust or solution can burn eyes; nausea; dermatitis	profound kidney disturbance; skin; respiratory system; eyes
Phenol	inhalation of mist or vapor, skin absorption, ingestion, eye/skin	yes	corrosive to tissue on contact; digestive disturbances and nervous disorders	liver and kidney damage; skin discoloration
Selenium	dust/fume inhalation, ingestion, eye/skin contact	yes	irritation to respiratory tract; garlic breath; visual disturbances; chills; pallor; lassitude	respiratory; eyes; skin; liver; blood; kidneys
Silver	dust/fume inhalation, ingestion, eye/skin contact	-	eye/skin irritant; blue-grey eyes; ulceration (GI)	blue-grey eyes (argyria); extremely cumulative once it enters the body tissue

TABLE D-2 (continued)

ACUTE AND CHRONIC EFFECTS AND FIRST AID TREATMENT

Compound	Routes of Entry	Eye Irritant	Acute Effects	Chronic Effects
Sodium Hydroxide	dust/fume inhalation, ingestion, eye/skin contact	yes	irritates nose; burns eyes and skin; pneumonitis	eyes; respiratory system; skin
Sulfuric Acid	mist inhalation, ingestion, eye/skin contact	yes	eye, nose throat irritant; pulmonary edema; bronchitis; eye/skin burns	respiratory system; eyes; skin; teeth
Toluene	inhalation, ingestion, eye/skin contact	yes	narcotic in high concentrations; dizziness; headache; fatigue	central nervous system; liver; kidneys; skin
Toluene-2, 4-diisocyanate	inhalation of vapor; ingestion; eye/skin contact	yes	eye and upper respiratory tract irritant; loss of memory; irritability; neurological distress; dry painful cough	respiratory system; skin
Tributyl Phosphate	inhalation of mist; eye/skin contact; ingestion	yes	eye, respiratory, skin irritant; headache; nausea	respiratory system; skin; eyes

TABLE D-2 (concluded)

ACUTE AND CHRONIC EFFECTS AND FIRST AID TREATMENT

Compound	Routes of Entry	Eye Irritant	Acute Effects	Chronic Effects
1,1,1-Trichloroethane	inhalation of vapor, ingestion	yes	headache; lassitude; eye irritant; poor equilibrium; dermatitis; CNS depression; GI problems	cardiovascular system; skin; eyes; CNS
Trichlorofluoromethane	inhalation, ingestion, skin absorption	-	tremors, dermatitis, frostbite, high concentrations can cause narcosis and anesthesia	cardiovascular system, skin
Xylenes	vapor inhalation, eye/skin contact	yes	headache; dizziness; eye/skin irritation; severe coughing; pulmonary edema; when ingested symptoms are nausea, vomiting, cramps, coma; narcotic in high concentrations	kidney and liver damage; blood disease; skin; CNS
Zinc	dust/fume inhalation	-	inhalation may cause sweet taste; throat dryness; cough; weakness; chills; fever; nausea	
Zinc Bromide	dust inhalation; ingestion	-	if large amounts are ingested, drowsiness and other symptoms of bromide poisoning may occur; inhalation of dust may irritate throat and nose	
Zirconium	dust	yes	skin granuloma	respiratory system

Table D-3

TYPES OF CHEMICALS OF CONCERN - PER SITE AREA

Area Number	Solid Waste Management Units	Potential Chemical Constituents of Concern
1	Construction and Demolition Debris Landfill	Disposal of nonradiological waste, including construction and demolition debris
2	NRC - licensed disposal Area (NDA), including the Trench Interceptor Project and container storage areas	n-dodecane/tributyl phosphate (TBP) solvent, asbestos, decontamination solutions [solutions of sodium hydroxide, potassium permanganate, potassium dichromate, oxalic acid, citric acid, tartaric acid, ammonium fluoride, and nitric acid] spent organic resins and sludges from the LLWFT, lead
3	Lagoon 1	Sodium hydroxide, nitric acid, n-dodecane/TBP, decontamination solutions (see area 2) This lagoon also received leachate from the SDA trenches (see area 12)
4	Low-Level Waste Treatment Facility (LLWTF) and Lagoons 2-5	Sodium hydroxide, nitric acid, n-dodecane/TBP, and decontamination solutions (see area 2) This area also received leachate from the SDA trenches (see area 12)

Table D-3 (continued)

TYPES OF CHEMICALS OF CONCERN - PER SITE AREA

Area Number	Solid Waste Management Units	Potential Chemical Constituents of Concern
5	Sludge Ponds	Sulfuric acid/sodium hydroxide solution, sodium sulfate, brine solution Because these settling ponds receive backflush and recharge from the demineralizer, water softener and clarifier, there may be a higher concentration of metals in this area.
6	Solvent Dike	n-dodecane-TBP solvent
7	Effluent Mixing Basin	Receives waste streams similar to those discharged to the Sludge Ponds (see area 5)
8	Maintenance Ship Sanitary Waste Leach Field	Received toilet, urinal, sink, and shower waste from the Maintenance Shop and the Test and Storage Bldg.
9	"Old" and "New" Hardstands	Because this area has stored radioactively contaminated equipment, there may be a higher concentration of metals here.
10	Paper Waste Incinerator	None known
11	High-level Waste Tanks	Sodium hydroxide, nitric acid

Table D-3 (continued)

TYPES OF CHEMICALS OF CONCERN - PER SITE AREA

Area Number	Solid Waste Management Units	Potential Chemical Constituents of Concern
12	State-licensed low-level radioactive waste disposal area	Refer to Volume 3, NYSERDA RFI Health & Safety Plan
13	North and South Interceptors and Neutralizer Pit	Sodium hydroxide, nitric acid, an decontamination solutions (see area 2)
14	LLW Storage Area (CPC Storage Area)	This facility is used for storage of solid waste removed from the CPC and cement-stabilized LLWTF sludge and contaminated soil.
15	Lag Storage Building Lag Storage Extension	These facilities store radiologically contaminated metal, wood, plastic, cloth, soil, and zinc bromide solution, as well as cement-stabilized LLWTF sludges and radiological mixed waste.
16	Main Process Building Vitrification Facility Cement Solidification System (CSS)	This area houses the major operations on-site, and therefore the potential contaminants would result in the large variety of operations which have occurred here over the years. This includes the constituents in the high-level waste, zinc bromide, nitric acid, sodium hydroxide, fuel oil, decontamination solutions, and kerosene-TBP.

TABLE D-4

HAZARD MONITORING METHOD, ACTION LEVELS, AND PROTECTIVE MEASURES

HAZARD	MONITORING METHOD	ACTION LEVEL	PROTECTIVE MEASURES	MONITORING SCHEDULE
Toxic Vapors	HNU (11.7 ev lamp)	(1) Measurable Above background up to 1 ppm	Level D (see Table D-5)	o Monitor every 30 minutes/every sample retrieved
	HNU (11.7 ev lamp)	Measurable Above Background 1-5 ppm	Level C (see Table D-5)	o Continuous Monitoring
	HNU (11.7 ev lamp)	Measurable above Background >5 ppm	EVACUATE AREA NOTIFY PROJECT MANAGER; A reassessment of PPE will be made	
Explosive Atmosphere	CGI	0-10% LEL	Continue working but with extreme caution	o Monitor every 30 min.
		10-20% LEL	Continue wording but with extreme caution	o Continuous Monitoring
		>20% LEL	*EVACUATE AREA EXPLOSION HAZARD NOTIFY PROJECT MANAGER	
Oxygen	Oxygen Meter	<19.5%	** EVACUATE AREA OXYGEN DEFICIENT ENVIRONMENT NOTIFY PROJECT MANAGER	
		19.5% - 25%	Level D (see Table 4)	o Continuous Monitoring
		>25%	EVACUATE AREA FIRE HAZARD POTENTIAL NOTIFY PROJECT MANAGER	

TABLE D-4 (concluded)

HAZARD MONITORING METHOD, ACTION LEVELS, AND PROTECTIVE MEASURES

NOTES:

(1) The above action levels are not solely based on the criteria for selecting levels of protection by the 1984 EPA Standard Operating Procedures, but also on the professional judgment and experience of the On-Site Safety Officer (OSSO).

* If encountered in a boring hole or monitoring well, purge boring or well with nitrogen until safe levels (<10% LEL) are obtained. If >20% LEL persists, abandon boring and evacuate area temporarily. After at least ½ hour, re-approach borehole from upwind direction while continuously monitoring with explosimeter. If levels are still unsafe, backfill hole and abandon.

** Combustible gas readings are not valid in atmospheres with <19.5% oxygen.

TABLE D-5

PERSONAL PROTECTIVE EQUIPMENT
FOR ON-SITE ACTIVITIES

LEVEL	PERSONAL PROTECTIVE EQUIPMENT
D	o Hard Hat (optional) o Safety Glasses o Safety shoes with steel toe/steel shank o Disposable boot covers (optional) o Nitrile or neoprene outer gloves with latex inner gloves (as necessary) o Hearing protection during noise intensive activities (as necessary)
D+	o Hard Hat o Safety Glasses o Safety Shoes with steel toe/steel shank o Chemical - resistant boot covers o Tyvek Coveralls o Nitrile or Neoprene outer gloves with latex inner gloves o Hearing protection during noise intensive activities (ear muffs preferred as ear plugs can become contaminated during handling)
C	o Same as Level D+ above plus: o Full-facepiece air purifying respirator with appropriate Cartridges/filters o Chemical-resistant coveralls in place of Tyvek coveralls

FIGURE D-1

MAXIMUM DECONTAMINATION LAYOUT

LEVEL C PROTECTION

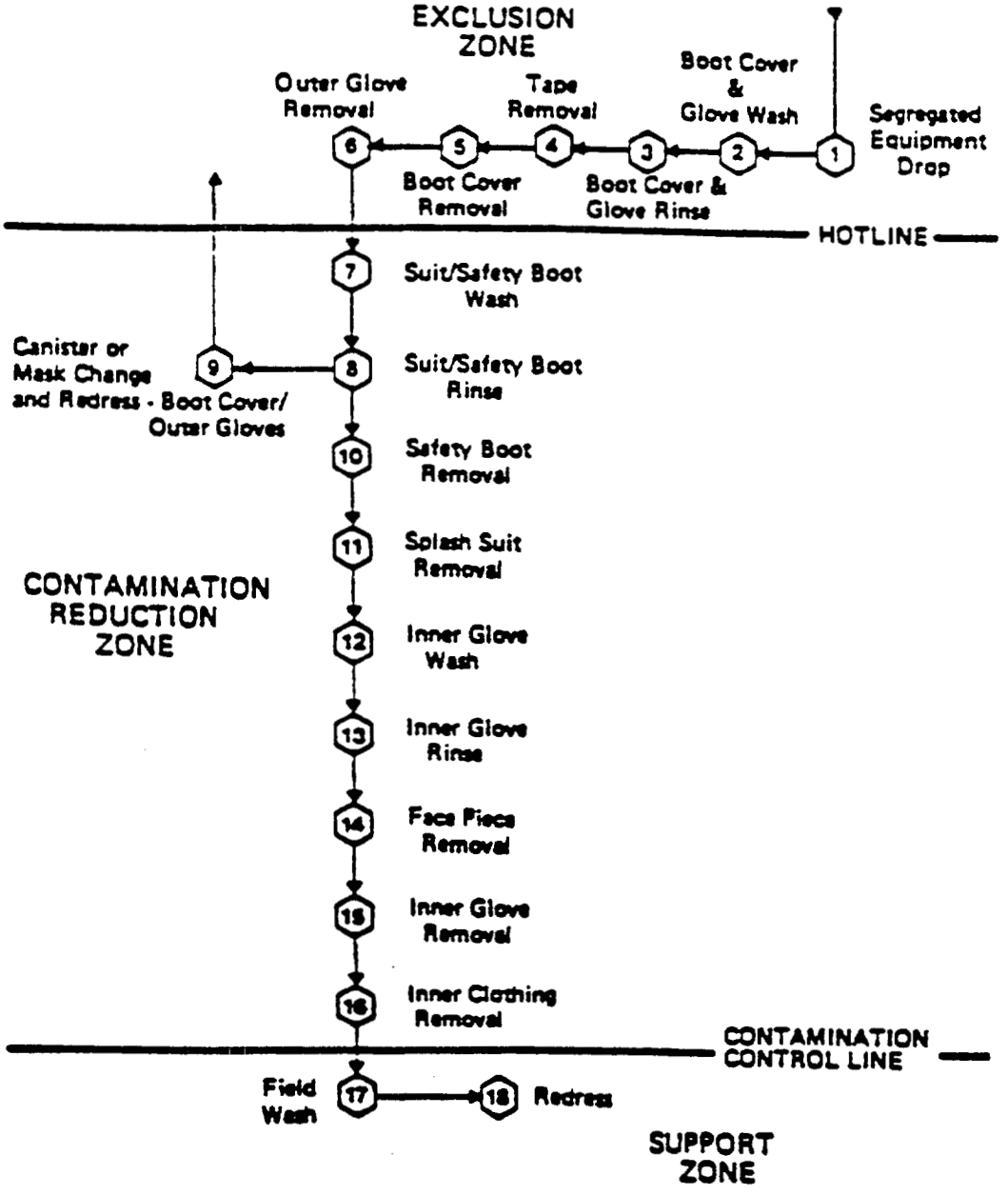
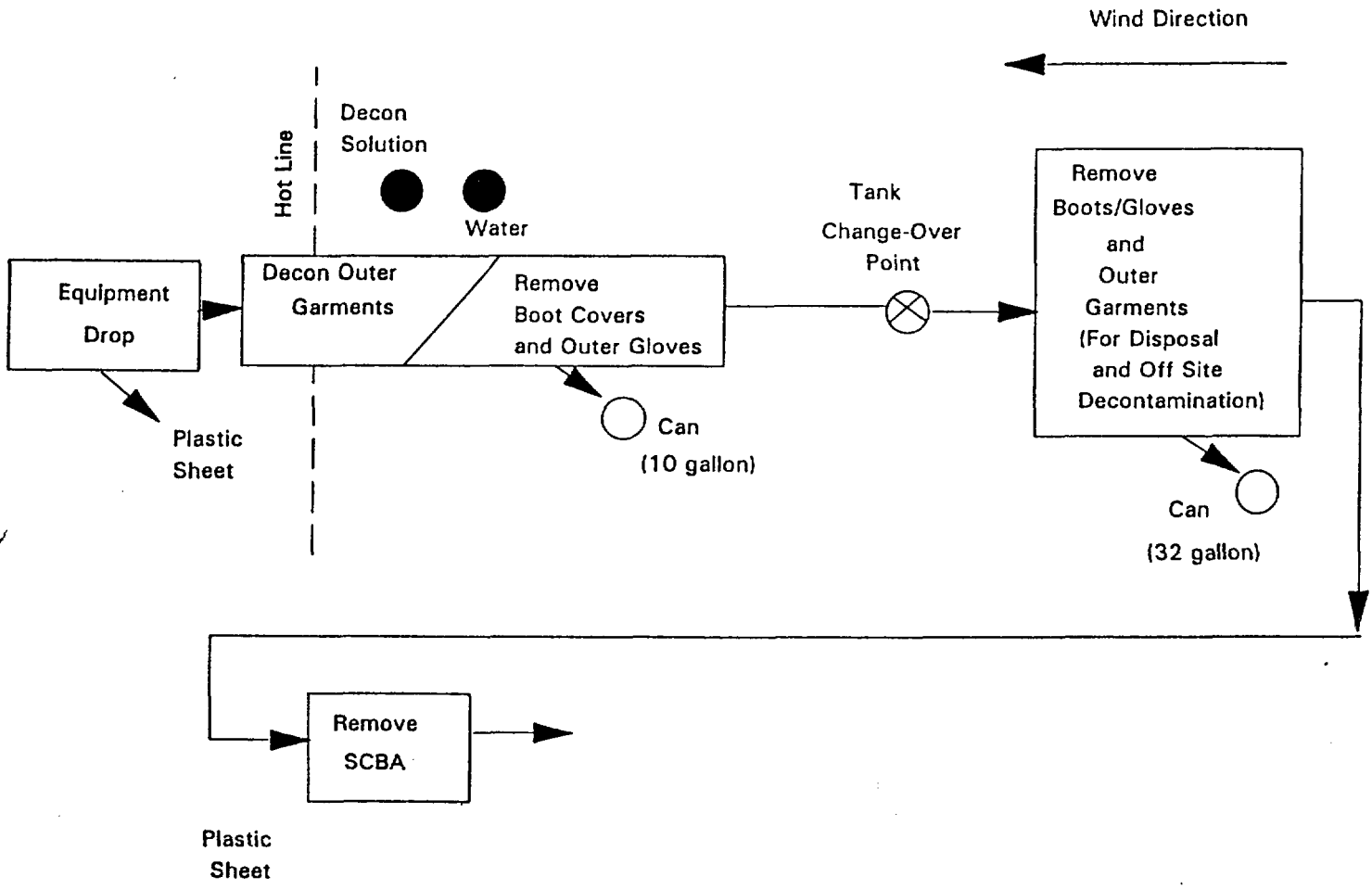


FIGURE D-2

Minimum Layout of Personal Decontamination Station



WVDP-RFI-014
Rev. 0

APPENDIX E

West Valley Demonstration Project
Community Relations Plan FY 1992/93
Topical Report

By
J. D. Chamberlain

September 1991

Work Performed Under Contract No. DE-AC07-81-NE44139

West Valley Nuclear Services Co., Inc.
West Valley, New York

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EXECUTIVE SUMMARY

The West Valley Demonstration Project (WVDP) Community Relations Plan establishes a framework of community outreach activities through which to provide the public current, accurate WVDP information, respond to public inquiries, and to receive comments from interested individuals and organizations. An open, effective community relations program is essential to developing public understanding of WVDP goals and direction.

The mission of the WVDP is to solve an existing environmental concern by solidifying high-level nuclear waste, transporting the solidified waste to a federal repository for permanent disposal, and effectively closing the facilities used.

As an environmental restoration and radioactive waste management project, being conducted at the site of a former nuclear fuel reprocessing facility, the WVDP is a matter of considerable public interest. Safe, effective site operations and the development of technology to meet WVDP goals are both focal points for interested individuals, technical organizations and societies, and environmental and educational groups.

Constructive public involvement in the WVDP is essential to successful project completion. Meeting the public need for information and thereby expanding public understanding of the WVDP establishes a public information baseline necessary for public review, comment, and discussion of project evaluations and planning.
The WVDP Community Relations Plan is structured to allow integration of required and recommended public involvement activities related to specific WVDP actions, with overall community outreach/education functions. Currently included in these specific topics are:

- Development of an Environmental Impact Statement for WVDP completion by the Department of Energy (DOE) and closure of the Western New York Nuclear Service Center by the New York State Energy Research and Development Authority (NYSERDA).

- Review and comment on the annual update of the West Valley Demonstration Project Environmental Restoration and Waste Management Five-Year Site Specific Plan.

Additionally, information regarding WVDP planning for and conducting activities in compliance with the Resources Conservation and Recovery Act implementing regulations will be integrated and the opportunity for public discussion and comment provided.

1.0 WVDP OVERVIEW

The WVDP was authorized by an Act of Congress (Public Law 96-368) in 1980. The Act directs the United States Department of Energy (DOE) to:

- Solidify the high-level radioactive waste in a form suitable for transportation to and disposal in a federal repository.
- Develop containers for the solidified high-level radioactive waste.
- Transport the solidified high-level radioactive waste to a federal repository.
- Dispose of project-generated low-level and transuranic waste.
- Decontaminate and decommission WVDP facilities in accordance with requirements prescribed by the Nuclear Regulatory Commission.

The DOE assumed control of approximately 200 acres of the 3345-acre New York State-owned Western New York Nuclear Service Center in 1982 to conduct the WVDP. The WVDP is the joint responsibility of the United States DOE and the State of New York. The remainder of the Western New York Nuclear Service Center premises, including the closed State Licensed Disposal Area and the portion of the Nuclear Regulatory Commission Licensed Disposal Area which was used for disposal of pre-WVDP waste, is the responsibility of the State of New York.

In June 1982, the DOE published a "Final Environmental Impact Statement - Long-Term Management of Liquid High-Level Radioactive Waste Stored at the Western New York Nuclear Service Center, West Valley" (DOE/EIS-0081). In the DOE Record of Decision, it was determined that DOE would construct and operate facilities at the Western New York Nuclear Service Center to solidify the high-level radioactive waste stored in underground tanks into a durable, borosilicate glass.

Phase I of the project is defined as those activities associated with the solidification of the liquid high-level radioactive waste and the development of containers suitable for the permanent disposal of the solidified wastes. Phase II is defined as those activities associated with the transportation of the solidified high-level radioactive waste to a federal repository, disposal of low-level and transuranic project wastes, and decontamination and decommissioning of facilities used for the WVDP.

2.0 WVDP RESPONSIBILITY

The DOE is responsible for completing the objectives of the Project and protecting public health. The WVDP must act as the facilitator for effective public participation and problem solving. DOE and WVDP management are responsible for effective and meaningful public education and participation.

3.0 COMMUNICATIONS PHILOSOPHY

It is the philosophy and practice of the WVDP to facilitate open, candid, two-way communications with the public. Developing public understanding of WVDP activities and objectives through educational activities forms the basis for constructive public involvement. With accurate baseline information and established channels for open communication, all interested individuals and organizations will be able to participate in the achievement of project objectives.

4.0 COMMUNITY RELATIONS STRATEGIES AND OBJECTIVES

The overall strategy of the community relations program is to educate the community on the WVDP by encouraging and facilitating two-way communication. To accomplish this, we have established the following objectives:

- Develop effective communication mechanisms between the WVDP management team and the general public, the media, public officials, educators, and environmental groups.
- Encourage visits to the WVDP.
- Develop informational materials to assist the public in understanding the WVDP.
- Report on WVDP progress to the public both directly and through the media.
- Provide presentations to the community regarding the WVDP.
- Provide opportunities for public participation in Environmental Impact Statement and Site Specific Plan development and the Resources Conservation and Recovery Act compliance process.
- Build public confidence in the successful completion of the WVDP.

5.0 COMMUNITY RELATIONS ACTIVITIES

The WVDP has established and developed a range of communications activities to expand public understanding of the project, to respond to public inquiry, and to provide for ongoing public involvement. These established channels form the basis for addressing, with the public, changing project issues and activities. The flexibility of the activities, in terms of audiences and formats, allows for modification and/or expansion as necessary to meet the public's needs. Community relations activities can be divided into outreach activities and program support activities. These include:

OUTREACH ACTIVITIES

- WVDP Briefings/Tours
- Presentations
- Newsletter
- West Valley Interface Participants Group
- Open House
- Media Relations
- Response to Inquiries
- Special Events
- Educational Outreach

SUPPORT ACTIVITIES

- Speakers Bureau
- Informational Materials

These programs are discussed in more detail in the sections that follow.

6.0 IMPLEMENTATION

The WVDP Community Relations Plan (Plan) focuses primarily on local community audiences; however, the needs of the extended community and the media are also addressed. The elements of the Plan were formulated by identifying key audiences, assessing information needs, and designing programs that both meet the needs of the various audiences and support Plan objectives. The key WVDP audiences include:

- The local public
- Local, regional, and state officials
- Technical, environmental, civic, and special interest groups
- Local and regional media
- National media, as appropriate
- The educational community

Each aspect of the Plan, as delineated in Section 5.0, is targeted to a specific cross section of the audiences identified. There is considerable overlap in audiences across activities both by plan design and due to the structure of the local community.

OUTREACH ACTIVITIES

6.1 WVDP Briefings/Tours

The ease of public accessibility to the project site and facilities is a tremendous asset to communications and is utilized to the fullest extent practicable. All interested individuals and organizations are encouraged to take part in a site tour, as well as attend a project briefing.

By seeing the WVDP facilities first-hand and speaking directly with personnel conducting cleanup and waste management operations, interested members of the public gain a much clearer understanding of WVDP activities. Site tours can also be arranged to address requests for information on specific topics such as environmental monitoring, low-level waste management, etc.

Combining briefings, site tours, and in-field discussions with WVDP specialists continues to prove to be an excellent means of increasing public understanding and addressing public concerns. This results in increased public confidence in WVDP operations.

6.2 Presentations

Public interest in the WVDP results in frequent requests from technical, special interest, educational, and civic organizations for speakers to address organization meetings. In addition, community relations personnel encourage organizations to utilize WVDP speakers as a preliminary to a site visit or as an informational activity.

These presentations forge links between the WVDP and the community. Members of organizations, after seeing a presentation, often request speakers or site visits for other groups to which they belong.

6.3 Newsletter

A community newsletter was initiated in FY 1991 to provide a progress update to local citizens and interested individuals and organizations outside of the local community. Published and distributed biannually, the newsletter provides a vehicle for both updating the public on project status and addressing specific issues of public concern.

In addition, the newsletter provides the public another avenue through which to request WVDP information and to submit questions and comments related to project activities.

6.4 West Valley Interface Participants Group

The West Valley Interface Participants (WVIP) Group, formed in 1987, is an ongoing program through which concerned citizens and WVDP management can routinely meet to discuss project issues, status, and activities.

The WVIP Group is comprised of members of the Towns of Ashford and Concord Boards, leading area educators, and members of the Coalition on West Valley Nuclear Wastes. Meeting agendas include status reports on WVDP operations; Environmental Impact Statement development for WVDP completion and site closure; and a topic selected jointly by project management and WVIP meeting participants.
Meetings are held quarterly and are open to the general public. Open, candid discussions are encouraged and public input sought on the range of WVDP activities. Informal meeting notes are written and distributed to all meeting participants.

6.5 Open House

Each year, the WVDP conducts an Open House to allow the public to tour the site, view detailed exhibits on project activities, meet employees, and speak to WVDP experts. The event is designed to enhance public understanding of the project. Open House is extensively publicized to generate as large an audience as possible. Guided facility tours include established stops where speakers discuss specific WVDP activities. In addition, WVDP experts are

available at each department exhibit (approximately 20) to interact with visitors. Open House visitors are surveyed to determine the effectiveness of the event and to solicit comments for improvement.

6.6 Media Relations

Print and electronic media are a vital source of information for the general public. The WVDP recognizes the important educational role the media plays in society and works closely with media representatives to provide accurate WVDP information in a timely manner.

Community relations personnel encourage media participation in WVDP community outreach activities such as Open House and WVIP Group meetings. Regional media representatives are also encouraged to visit the site to document WVDP progress. Routine visits by journalists increase the overall understanding of the WVDP and establish lines of communication that help ensure the accurate reporting of project issues.

Press releases are written to highlight WVDP accomplishments as well as to inform the public of any situation which may be of public concern or interest. Releases are distributed to local newspapers, radio and television stations, and when appropriate, national media.

Media representatives are encouraged to contact community relations personnel with questions regarding the WVDP. Efforts are made to respond to inquiries as rapidly as possible while still ensuring the accuracy of the information requested.

Maintaining open, two-way communication with the media is necessary to achieve wide distribution of WVDP information. Access to key project management and reporting of all information, both positive and negative, is essential to WVDP credibility.

6.7 Response to Inquiries

The WVDP encourages public inquiry. Providing interested individuals accurate information minimizes public misunderstanding of project goals or activities. Participants in all community outreach activities are encouraged to contact the Community Relations Department with questions, concerns, and comments.

Community relations personnel respond to approximately 100 public inquiries annually. These range from requests for general WVDP information to specific inquiries on topics such as environmental monitoring results and emergency response planning. In all cases, every effort is made to compile the information necessary to provide a clear, concise response in a timely manner.

6.8 Special Events

The WVDP also participates in and/or supports local events and civic activities to further recognition of the WVDP and its goals. All opportunities to work and meet with community members are reviewed to determine appropriateness as a means of expanding communication and public understanding.

6.9 Educational Outreach

Educational outreach is conducted to both increase public awareness and understanding of the WVDP, and to support science, mathematics, and engineering education. Site briefings/tours, in-school presentations, and support of special educational programs are provided to public schools for middle school through graduate level classes.

In FY 1991, the WVDP Partners in Education Program was established with the West Valley Central School District (WVCS). A joint WVDP/WVCS Partners in Education Committee developed a procedure for partnering activities, solicited teacher requests for educational support, and initiated program activities. In FY 1992, the Partners In Education Program will focus on two special areas. These expansions meet both the needs of the WVCS district and the Secretary of Energy's directive that "All of the Department's organizational elements take appropriate steps to use their resources in a way that supports science and mathematics education . . . ." (SEN-23-90).

Educational Horizons Program - A student work/study program is being initiated for the 1991-92 school year. The program's goal is to encourage students to further their education after high school by providing them workplace experience. An emphasis will be placed on career opportunities in science, mathematics, and engineering fields.

A Computer Assistance Program (CAP) is being initiated in the 1991-92 school year to aid the WVCS district in expanding science and mathematics educational programs. Through the CAP, computer hardware will be loaned to the WVCS district for use in the district's computer laboratory, and expertise will be provided by WVDP computer specialists as needed.

SUPPORT ACTIVITIES

6.10 Speakers Bureau

Due to the many public audiences and changing WVDP issues, a wide-range of activities are included in the Community Relations Plan. These activities provide the necessary flexibility to ensure that accurate, timely information can be provided to the public.

Conducting these activities requires personnel that are knowledgeable regarding WVDP issues and capable of presenting complex, technical information in an appropriate manner for the audiences involved. The purpose of the WVDP Speakers Bureau is to provide volunteers, from all project areas, the necessary communications training and project information to support the outreach program.

6.11 Informational Materials Development

Informational materials support all community relations activities and are targeted for various audiences as well as applications. These include printed materials (i.e., fact sheets, newsletters, brochures, a briefing book) and videotapes. The WVDP provides general information materials and materials regarding specific project technical programs, achievements, and issues.

Printed materials and videotapes are and will continue to be revised and supplemented on an ongoing basis. Extensive slide, video, and photographic documentation of the WVDP is also maintained for use with public and technical audiences.

As a source of additional information and as references, WVDP informational materials are routinely made available through outreach activities. When direct personnel contact is not possible, printed and videotape materials are especially valuable in providing accurate project information.

7.0 SCHEDULE

A time-phased schedule for implementation of the Community Relations Plan follows.

OUTREACH ACTIVITIES

7.1 WVDP Briefings/Tours

Audiences:

- Civic, technical, educational, and special interest groups
- Local public
- Local officials
- Media

Activity	Schedule
Conduct site briefings/tours	Four per month (average) 1,200 visitors per year

7.2 Presentations (off-site)

Audiences:

- Civic, technical, educational, and special interest groups
- Local public
- Local officials
- Media

Activity	Schedule
Establish presentation tracking system to identify new community contacts	January 1991
Conduct off-site presentations	Two per month
Add organizational contacts to newsletter mailing list	Ongoing

7.3 Newsletter

Audiences:

- Civic, technical, educational, and special interest groups
- Local public
- Local officials
- Media
- Interested individuals/organizations

Activity	Schedule
Draft newsletter for review	July/January 1992 July/January 1993
Produce newsletter	August/February 1992 August/February 1993
Distribute	September/March 1992 September/March 1993

7.4 West Valley Interface Participants Group

Audiences:

- Coalition on West Valley Nuclear Wastes
- Local officials
- Educational leaders
- Interested public

Activity	Schedule
Conduct meetings	Quarterly
Distribute minutes to meeting participants	Within 1 month of meeting
Respond to inquiries from meetings	Within 1 month of meeting

7.5 Open House

Audiences:

- Local and regional public
- Local and regional media

Activity	Schedule
Plan event	February-July 1992 February-July 1993
Develop exhibits/materials	May-July 1992 May-July 1993
Conduct event	July 1992 July 1993
Evaluate survey responses	September 1992 September 1993

7.6 Media Relations

Audiences:

- Local and regional media
- National media, as appropriate
- General public

Activity	Schedule
Develop pro-active press release	At milestones
Other press releases	As required
Arrange interviews	Five per year
Arrange site visits/briefings	Ten per year
Special events	At milestones

7.7 Response to Inquiries

Audiences:

- Civic, technical, educational, and special interest groups
- Local public
- Local officials
- Media

Activity	Schedule
Establish inquiry tracking system	January 1992
Respond to inquiries in a timely manner	Within one week or as needed

7.8 Educational Outreach

Audiences:

- Middle school through graduate level students

Activity	Schedule
Conduct educational activities (i.e., briefings/tours, classroom presentations) with area schools	One per month
Educational Horizons Program - West Valley Central School (WVCS)	1992-93 WVCS work study students 1993-94 WVCS work study students
Computer Assistance Program (CAP)	1992-Initiate CAP with WVCS 1993-Support WVCS expansion of math/science computer program

SUPPORT ACTIVITIES

7.9 Speakers Bureau

Goal: Maintain qualified, trained personnel from a cross-section of disciplines to conduct WVDP outreach activities.

Activity	Schedule
1. Training	
- tour guide training	Twice per year or as needed
-speakers training	November 1992 November 1993
-media training	April 1992 April 1993
2. Provide WVDP information to speakers	Biweekly topical meetings
3. Invite personnel to participate in Speakers Bureau	Twice per year

7.10 Informational Materials

Goal: Maintain and update presentation materials for use in outreach activities.

Activity	Schedule
1. Produce annual accomplishments videotape	January 1992 January 1993
2. Produce (8) topical Fact Sheets (i.e., vitrification, environmental monitoring, Environmental Impact Statement, etc.)	September 1992 September 1993
3. Update	
- WVDP overview brochure	Annually
- WVDP briefing book	Annually
4. Maintain/update photo, slide, video files	Ongoing
5. Produce issues Fact Sheets	As needed

APPENDIX F

REFERENCES

Appendix F

REFERENCES

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APPENDIX G

ACRONYM LIST

Appendix G

Acronym List

AEC	U.S. Atomic Energy Commission
ALARA	As Low As Reasonably Achievable
APHA	American Public Health Association
BWR	Boiling Water Reactor
CDDL	Construction and Demolition Debris Landfill
CLP	Contract Laboratory Program
COC	Chain-of-Custody
CPC	Chemical Process Cell
CSS	Cement Solidification System
DMP	Data Management Plan
EE	Environmental Evaluation
ELAP	Environmental Laboratory Approval Program
EP	Extraction Procedure
FRS	Fuel Receiving and Storage Area
FUSRAP	Formerly Utilized Sites Remedial Action Program
GCR	General Purpose Cell Crane Room
GPC	General Purpose Cell
GTCC	Greater-Than-Class C
HASP	Health and Safety Plan
HEPA	High-Efficiency Particulate Air Filter
HLLW	High Level Waste

Acronym List (continued)

IDL	Instrument Detection Limit
IRTS	Integrated Radwaste Treatment System
IWP	Industrial Work Permit
LAG	Temporary Storage Area
LDL	Lower Detection Limit
LIMS	Laboratory Information Management System
LLWTF	Low-Level Waste Treatment Facility
LWC	Liquid Waste Cell
LWTS	Liquid Waste Treatment System
MCR	Mechanical Crane Room
MRR	Manipulator Repair Room
NGVD	National Geodetic Vertical Datum
NIST	National Institute of Standards & Technology
NOI	Notice of Intent
NYSEQRA	New York State Environmental Quality Review Act
OVA	Organic Vapor Analyzer
P&ID	Piping and Instrument Drawing
PMC	Process Mechanical Cell
PPC	Product Purification Cell
PPE	Personal Protection Equipment
PWR	Pressurized Water Reactor
QAMs	Quality Assurance Management Staff
QAP	Quality Assurance Program
RFA	Request for Analysis
RMW	Radioactive Mixed Waste

Acronym List (continued)

RPD	Relative Percent Difference
RTS	Radwaste Treatment System
RWP	Radiation Work Permit
SAP	Sampling & Analysis Plan
SAR	Safety Analysis Report
SAS	Sample Analysis Sheet
SRR	Scrap Removal Room
SST	Solvent Storage Terrace
STS	Supernatant Treatment System
SSWMU	Super Solid Waste Management Unit
SWMU	Solid Waste Management Unit
TBP	Tributyl Phosphate
TCLP	Toxicity Characteristic Leaching Procedure
TEG	Technical Enforcement Guide
TIP	Trench Interceptor Project
TRU	Transuranic
TSDF	Treatment, Storage or Disposal Facility
WTF	Waste Tank Farm

APPENDIX H

Personnel Qualifications

RICHARD B. PROVENCHER

TITLE	Manager, Environmental, Safety, Health, and Quality Programs, U.S. Department of Energy (DOE), West Valley Demonstration Project
RFI PROJECT RESPONSIBILITY	DOE Project Coordinator
EXPERIENCE	Currently provides DOE supervision of environment-al, radiological, and industrial safety, health, and quality assurance programs at the West Valley Demonstration Project (WVDP). Provides direction to contractor and evaluates contractor operations to assure line management implementation of programs in accordance with federal and state regulations and DOE orders. Frequently functions as acting WVDP Project Office Director. Previously, as Radiological and Industrial Safety Engineer, DOE, was responsible for coordinating and evaluating the adequacy of radiological and industrial safety programs at the WVDP. Advised upper management on application of health physics and industrial safety principles and regulations in various radiological waste processing activities. As Health Physicist, Materials Inspector, for a federal agency, performed routine and reactive inspections of licensed facilities using byproduct, source, and special nuclear material. Performed radiological and environmental reviews of license applications. Conducted independent confirmatory measurements of licensee facilities and effluent monitoring systems. As Health Physicist, Safety Project Manager, for the same agency, managed fuel cycle facility, university source, and special nuclear material licensees. Participated on inspection teams for fuel cycle facilities and for assessment of regional inspection programs. Reviewed technical aspects of radiological safety and environmental programs and documents to determine compliance with NRC requirements. As Health Physicist, Transportation Specialist, for the agency, provided technical support to the Transportation Integration Program manager for development of policy and procedures for transportation and use of byproduct, source, and special nuclear material. As a health physics team member for DOE, conducted vicinity property environmental radiation surveys and prepared weekly survey reports for the Uranium Mill Tailings Remedial Action Program.
EDUCATION	M.S. Health Physics, Colorado State University, Fort Collins, Colo., 1985; B.A. Biology, Saint Anselm College, Manchester, N.H., 1984. Additional training in health physics, RCRA compliance, lead auditor certification, and hazardous materials management.

ELIZABETH A. MATTHEWS

TITLE	Environmental Scientist, U.S. Department of Energy (DOE), West Valley Demonstration Project
RFI PROJECT RESPONSIBILITY	DOE Alternate Project Coordinator
EXPERIENCE	Currently provides contractor oversight and support to line management to ensure implementation of environmental protection programs at the West Valley Demonstration Project (WVDP). These programs include environmental monitoring, site characterization activities, solid and hazardous waste management, air and water discharge programs, environmental review in accordance with National Environmental Policy Act, and general environmental regulatory compliance. Previously with an environmental consultant assisted the DOE Project Office at the WVDP in overseeing aspects of site activities to ensure compliance with applicable environmental regulations and DOE orders. Duties included assistance with development of WVDP radioactive mixed waste management program, under the dual purview of the Atomic Energy Act and RCRA. Prior to consultant work, was a WVDP Plant Systems Operator. Involved in Supernatant Treatment System and Vitrification processes. As Safety Specialist with a firm in Schenectady, N.Y., reviewed and developed safety procedures.
EDUCATION	B.S. Industrial Hygiene and Environmental Toxicology, Clarkson University, Potsdam, N.Y., 1986
CERTIFICATION	Institute for Hazardous Materials Management Certified Hazardous Materials Manager; U.S. Environmental Protection Agency Asbestos Hazard Emergency Response Act Certified Building Inspector/Management Planner.

SANDRA J. SZALINSKI

TITLE	Manager, Environmental Planning and Assessment
RFI PROJECT RESPONSIBILITY	RFI Project Manager
EXPERIENCE	Currently responsible for West Valley Demonstration Project (WVDP) site compliance with all applicable environmental regulations and DOE orders, execution of the 3008(h) Administrative Order on Consent, and preparation of the project completion and site closure Environmental Impact Statement (EIS). Responsibilities include planning, scheduling, budgeting, and managing work flow, coordinating activities with other departments, making policy decisions, and interacting with the customer and the public. Previously provided environmental consulting services for an engineering firm in California. Responsibilities included securing permits for hazardous waste treatment systems, performing facility audits, developing Spill, Prevention, Control, and Countermeasures Plans, and supervision of underground tank removals and replacements. For a utility in San Francisco, Calif., identified and analyzed issues with regard to environmental regulations and hazardous materials and waste management. Worked on a task force to develop and implement corporate policy for hazardous materials management and other key issues. Also, managed a group of scientists and engineers providing mathematical and computational services for nuclear design and safety analysis; performed nuclear and thermal-hydraulic design calculations; and supported the licensing of nuclear plants.
EDUCATION	M.B.A., University of Pittsburgh, 1979; M.S. Nuclear Engineering, Carnegie-Mellon University, 1975; B.S. Chemistry, University of Pittsburgh, 1969; Certificate, Hazardous Materials Management, University of California, 1988.
AFFILIATIONS	American Nuclear Society; Society for Risk Analysis.

CRAIG L. REPP

TITLE	Manager, Site Programs
RFI PROJECT RESPONSIBILITY	Project Coordinator, WVNS RFI Management
EXPERIENCE	Current responsibilities at the West Valley Demonstration Project (WVDP) include: coordination of RFI and site characterization support for project completion and site closure Environmental Impact Statement (EIS) activities, compliance with RCRA (3008 [h]) Order, delineating Solid Waste Management Units and reporting under the Consent Order. Responsibilities also include planning, scheduling, budgeting and coordination of activities with other departments. Previously provided environmental consulting services for an engineering firm located in New York State. Responsibilities included project management, securing permits for construction/operation of solid waste management facilities, preparation of closure plans, engineering designs and landfill construction certification documents. Prior experience focused on strategic planning and project scheduling/control at the WVDP site primarily related to Phase I activities.
EDUCATION	MSCE and BSCE at West Virginia University (1977/1976) with focus on Environmental Engineering.
AFFILIATIONS	American Society of Civil Engineers Registered New York State Professional Engineer

PETER J. GORTON

TITLE	Facility Assessment Manager, Senior Environmental Scientist/Hazardous Waste Specialist
RFI PROJECT RESPONSIBILITY	Facility Assessment Manager
EXPERIENCE	During the past three years as Facility Assessment Manager at the West Valley Demonstration Project, was involved in various aspects of hazardous waste management, including RCRA compliance and management of Solid Waste Management Unit (SWMU) assessments in support of RCRA investigations and the facility EIS.

Previously involved in investigation and remediation of numerous oil and hazardous substance spills, hazardous waste sites, and industrial facilities. Performed and supervised sampling to determine presence of hazardous gases and particles and unknown contaminants in various environmental media. Conducted sampling surveys for chemicals and compounds including asbestos, formaldehyde, PCBs, dioxin, trichloroethylene, heavy metals, and organic solvents. Managed several high-hazard waste site investigations and developed more than 100 site safety plans for a variety of hazardous waste projects and remedial investigations/ feasibility studies.

As a member of hazardous waste cleanup group for a consultant, was responsible for project management, health and safety coordination, and performance of site investigations and sampling for various projects in New York and New Jersey.

As project manager for an industrial client, collected facility information from audits at six major research and development facilities concerning federal, state, and local environmental and industrial regulations requiring emergency reporting and notification, including RCRA and other federal and state regulations in New Jersey, Pennsylvania, Illinois, Massachusetts, Ohio, and Georgia.

Participated in sampling program to determine dioxin contamination on Johnson Island in the Central Pacific and two sites in continental United States. Responsible for project planning, budget management, and health and safety aspects of project.

Participated in investigation and remediation of an acid spill at the Niagara Falls, N.Y., wastewater treatment plant. Oversaw spill response and mitigation of a gasoline spill in North Tonawanda, N.Y., that affected the local community and the operation of the municipal wastewater treatment plant. Performed similar activities at a diesel oil spill that affected local property and waterways in Orchard Park, N.Y.

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EDUCATION	B.S. Health Science/Environmental Health, University of Massachusetts, 1977; M.P.H. Yale University School of Medicine, Department of Epidemiology and Public Health, 1979; Fundamentals of Industrial Hygiene, Harvard School of Public Health, 1982.
CERTIFICATIONS	Certified Hazard Control Manager (CHCM), Masters Level; Field Investigation of Uncontrolled Hazardous Sites, 1980; Performance of Remedial Response Activities (Advanced Field Monitoring and Sampling of Hazardous Materials) at Uncontrolled Hazardous Waste Sites, 1985.

SUE G. SCHNEIDER

TITLE	Manager, Environmental Affairs
RFI PROJECT RESPONSIBILITY	Manager of Environmental Monitoring Program
EXPERIENCE	Currently responsible for conducting the environmental monitoring and regulatory compliance aspects of the environmental and pollution control program. Included in this is the responsibility for oversight of tasks associated with these functions. The EA Manager reviews information collected under the monitoring programs and works with systems operation and environmental planning managers to ensure that strict pollution control is maintained, pollution abatement programs are implemented, and systems are operated in accordance with regulatory requirements. The EA Manager is also responsible for the technical and administrative interface with regulatory agencies via the US DOE-WVPO, or directly to the regulator.

For a previous position at another DOE site, I was the compliance lead with Ohio EPA on regulatory integration issues. As the compliance lead on the team, I successfully negotiated amendments to the Consent Decree with the Ohio EPA and the Attorney General's Office.

Compliance lead for integration of RCRA/CERCLA activities and involved in the development of site policy issues. This responsibility coordinates the discussions of compliance strategies and activities when response actions overlap with RCRA facility responsibilities with regulatory agencies.

Organized site-wide support and involvement in the development of a RCRA Part A & B Hazardous Waste Permit Application. Diverse support groups were provided regulatory guidance and policy to prepare the permit.

Developed waste determination program to meet requirements of Proposed Amended Consent Decree for characterizing over 67,000 containers and other materials.

Developed a Regulatory Compliance communication program which includes a newsletter, Federal Register review and summary, workshops on compliance issues, and organized technical guidance documents for site-wide accessibility.

As a manager in a waste management company, I developed a company wide training program on hazardous materials transportation requirements for the training of transportation personnel and drivers for CECOS International, Inc. Implemented the Pilot Program and terminal drivers exceeded corporate average by 40% on written test and road skills.

Sue G. Schneider - page 2

EDUCATION	Master of Science, University of Cincinnati, College of Engineering, Cincinnati, Ohio, 1987; B.S., Ohio State University, College of Engineering, Columbus, Ohio, 1978.
AFFILIATIONS	Institute of Hazardous Materials Management; Certified Hazardous Materials Manager

RALPH E. ESTEP Jr.

TITLE	Industrial Hygienist
RFI PROJECT RESPONSIBILITY	Health & Safety Coordinator
EXPERIENCE	Currently responsible for development and implementation of a comprehensive industrial hygiene program; preparation of company health and safety policies and procedures (Hazard Communi-cation, Asbestos Abatement, Respiratory Protection, Ventilation Testing); design review for chemical processes and hazardous materials handling; supervision of technical staff. Previously was involved in industrial hygiene surveys, including monitoring and abatement of chemical, biological, and physical hazards; development, implementation, and management of hazardous waste disposal program; occupational safety and health training for professional, technical, clerical, and maintenance personnel; technical staff supervision. For a firm in Virginia, developed system safety programs, human engineering programs, and safety assessment reports, and performed other activities in accordance with military standards; provided design input and participated in testing of military weapon systems.
EDUCATION	M.S. Occupational Health and Safety Engineering, West Virginia University, Morgantown, W. Va.; B.A. Chemistry, West Virginia University; Registered Nurse, Willard Hospital School of Nursing, Willard, N.Y.
CERTIFICATIONS	Certified Industrial Hygienist (CIH), Comprehensive Practice, American Board of Industrial Hygiene; EPA Asbestos Management Planner and Inspector; New York State Registered Professional Nurse.
AFFILIATION	American Society of Safety Engineers; American Industrial Hygiene Association; American Academy of Industrial Hygiene.

JOHN D. CHAMBERLAIN

TITLE	Manager Community Relations
RFI PROJECT RESPONSIBILITY	Community Relations Manager
EXPERIENCE	Responsibilities as West Valley Demonstration Project (WVDP) Community Relations Manager(previously Community and Environmental Affairs Specialist) include: conducting briefings for Department of Energy (DOE) and state officials, as well as civic, educational, and technical visitors and other groups; managing a 70-member Speakers Bureau; writing fact sheets, press releases, and information for public distribution; producing highlight videotapes on site activities; serving on the WVDP emergency team as media and public affairs liaison; organizing and directing WVDP quarterly public meetings; developing and conducting Environmental Impact Statement scoping program, which included development and dissemination of press releases, providing briefings for local officials, and conducting public meetings. Previously was a secondary school instructor at a local secondary school.
EDUCATION	M.S. Science Education, SUNY at Fredonia, Fredonia, N.Y., 1982; B.S. Environmental Education, Cornell University, Ithaca, N.Y., 1982