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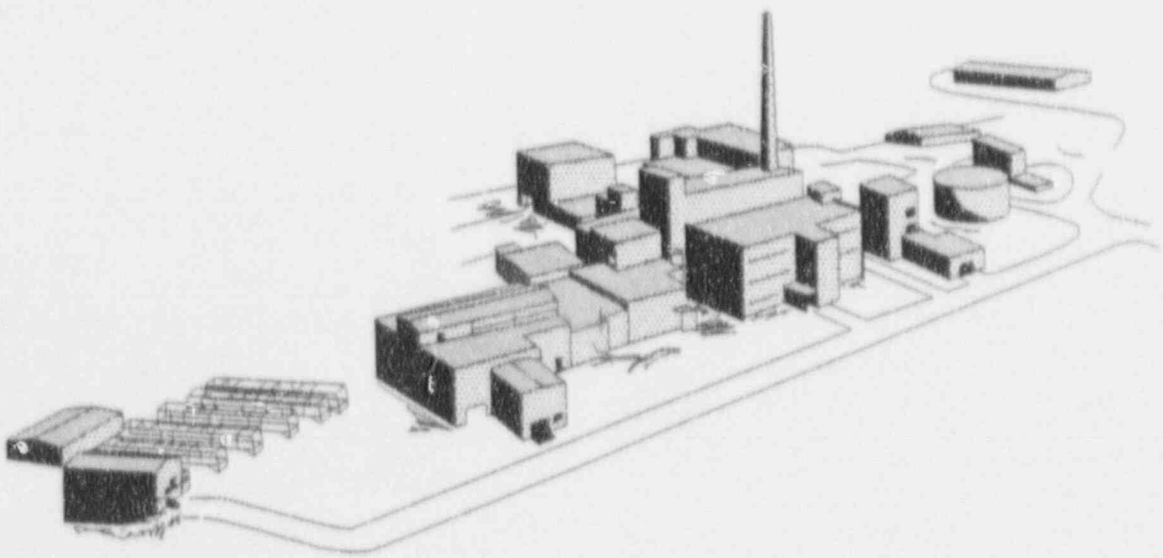
WVDP - 019

Annual Waste Management Plan



West Valley Demonstration Project

West Valley, New York 14171

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ANNUAL WASTE MANAGEMENT PLAN

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RECORD OF REVISION

PROCEDURE

If there are changes to the procedure, the revision number increases by one. These changes are indicated by placing a heavy vertical black line located in the right-hand margin adjacent to the sentence or paragraph which was revised.

Example:

The vertical line in the margin indicates a change. |

Rev. No.	Description of Changes	Revision On Page(s)	Dated
0	Original Issue	All	07/83
1	Update	All	07/83
2	Update	All	09/83
2	(Supplement)	---	05/84
3	Restructure entire Document to format suggested in Attachment 1 of DOE Order 5820.2	All	12/84
4	Information Update	All	10/85
5	Information Update	All	10/86
6	Information Update	All	10/87
7	Information Update-Complete Revision	All	10/88
8	Information Update-Complete Revision and title change from "WVDP Long-Term Radioactive Waste Management Plan" to "Annual Waste Management Plan".	All	12/89
9	Information Update-Complete Revision	All	02/91
10	Information Update-General Revision	All	12/91

RECORD OF REVISION (CONTINUATION SHEET)

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ANNUAL WASTE MANAGEMENT PLAN

A. EXECUTIVE SUMMARY

In May of 1963, the Atomic Energy Commission (AEC), under authority now vested in the Nuclear Regulatory Commission (NRC), issued a permit authorizing construction of the Western New York Nuclear Service Center. The site and the principal facilities are the property of the State of New York. Construction was completed in early 1966, and on April 19 of that year, the AEC issued a license to the newly formed Nuclear Fuel Services, Inc. (NFS), as operator, and the State of New York as owner, by and through a predecessor of the New York State Energy Research and Development Authority (NYSERDA), to reprocess fuel from both commercial and federally owned reactors. The first term of the lease between NYSERDA and NFS terminated at the end of calendar year (CY) 1980.

In 1972, while the plant was closed for modifications and expansion, more rigorous federal and state safety regulations were imposed. Most of the changes were aimed at the disposal of high-level radioactive liquid waste and at preventing earthquake damage to the facilities. Compliance with the new regulations was deemed not economically feasible and in 1976 NFS notified NYSERDA that it would not continue the fuel reprocessing operations. New York State (NYS) requested that the Federal government take over operation and maintenance of the Center.

In 1980, Congress enacted Public Law No. 96-368, the West Valley Demonstration Project (WVDP) Act, which mandated the demonstration of technology for solidification and disposal of the liquid high-level radioactive waste (HLLW) that was produced by commercial fuel reprocessing at the center. The WVDP Act required that containers suitable for transport and disposal of the high level waste (HLW) be developed, along with provisions to dispose of the low-level (LLW) and Transuranic (TRU) wastes resulting from solidification and vitrification of the HLW. Also, the Act required the cleaning of tanks, facilities, materials, and hardware used in connection with the project.

In February 1984, the U.S. Department of Energy (DOE) Order 5820.2, "Radioactive Waste Management," established policies, guidelines, and minimum requirements for managing radioactive and mixed wastes and contaminated facilities. The revised order, DOE Order 5820.2A, issued in September, 1988, reflects the DOE determination to provide more prescriptive regulations for managing DOE wastes, much like counterpart regulations promulgated by the NRC and the Environmental Protection Agency (EPA). Section 8.d. (1) of DOE Order 5820.2A defines applicability of the order to WVDP operations under responsibilities of the Office of Assistant Secretary for Nuclear Energy (NE-1). Hazardous and mixed waste operations at the WVDP are performed under regulations issued by the EPA and the New York State Department of Environmental Conservation (NYSDEC).

The WVDP submitted the Part A Resource Conservation and Recovery Act (RCRA) Interim Status permit application for the storage and treatment of hazardous wastes to the EPA and NYSDEC on June 4, 1990. This was submitted in response to RMW becoming subject to the hazardous waste regulations when NYS received authorization to regulate RMW under its hazardous waste program (effective June 6, 1990). The WVDP is currently

negotiating a Federal and State Facilities Compliance Agreement (FSFCA) with the regulatory agencies in addition to a RCRA 3008(h) Consent Order.

Phase I includes the processing of the HLLW, solidification of the HLW sludge, development of the glass containers, and decontamination of existing facilities required to support the solidification activities. Phase I also includes the negotiation of the FSFCA, TRU and LLW management, facility operation and maintenance. To provide a logical, smooth transition to Phase II-Post Solidification, negotiation of a RCRA 3008(h) Consent Order, the FSFCA, site characterization, National Environmental Policy Act of 1969 (NEPA), and initial strategic planning documentation have been initiated in Phase I.

Phase II includes activities associated with transport of HLW canisters to a federal repository, disposal of LLW and TRU Waste, and Decontamination and Decommissioning (D&D) of equipment, tanks, hardware and facilities used in connection with the solidification process.

HLW generated during operation of the NFS Reactor Fuel Reprocessing Facility (RFRF) will be blended and vitrified into borosilicate glass, and contained in stainless steel canisters. This glass form is subject to a formal waste acceptance and certification program in accordance with requirements set forth by the DOE's Office of Civilian Radioactive Waste Management (OCRWM).

LLW generating activities at West Valley have been primarily associated with the treatment of supernatant from the HLW tanks. This liquid has been processed through ion-exchange columns and evaporators and is cement solidified in .27 m^3 (71 gallon) drums. This processed waste is classified as Class C LLW and is stored in the Radioactive Waste Treatment System (RTS) Drum Cell.

Other LLW streams at the WVDP result from plant work and consist of compactable trash, construction materials, and equipment. These forms of LLW are treated by compaction and size-reduction, as appropriate, and placed in storage in the LAG Storage Area (LSA).

Also, wastewater sources from plant drains, surface runoff, cooling tower blowdown, the New York State (NYS) disposal area, the NRC Licensed Disposal Area (NDA) and the laundry are currently treated by the existing Low-Level Waste Treatment Facility (LLWTF).

TRU wastes have primarily resulted from past D&D activities at WVDP. Currently, no D&D activities are being performed.

LLW was formerly disposed of by shallow-land burial within the WVDP boundaries; however, this was suspended in Fiscal Year (FY) 87, as a result of litigation by the Coalition on West Valley Nuclear Waste (Civil No. 86-1052-C). The out-of-court settlement stated that LLW could be disposed of on-site if the NEPA Environmental Impact Statement (EIS) process is completed, or if NRC reviews and approves of the disposal methodology. An EIS submittal in 1982 fulfilled the mandate for HLW solidification, but did not address LLW disposal options. Currently, an EIS Implementation Plan has been written that focuses on both on-site and off-site disposal of waste at the WVDP. However, there is a significant issue regarding the definition of TRU waste, and the NRC has advised the West Valley Project Office (WVPO) that the TRU waste definition must be affirmed in the EIS process.

Federal Register Vol. 53, No. 251, Friday, December 30, 1988, published a Notice of Intent for the DOE and NYSERDA to prepare an EIS. The scope of this EIS includes potential impacts to the general public and on-site workers, the environment (land use, commitment of resources, erosion), waste disposal on-site and off-site, concentration limits for TRU disposal, characterization of previously disposed waste, interim storage of wastes at other locations, transportation to interim storage facilities or final repositories, D&D of facilities, and post closure maintenance and monitoring. The EIS process will identify alternative courses of action and associated potential impacts for WVDP related to the above topics, and allow for decisions to be made based on technical analyses and public input

In April, 1989, WVDP issued the DOE Order 5820.2A Implementation Plan that identified areas of noncompliance. There is a requirement that noncompliance items be tracked and statused in the Annual Waste Management Plan update. This status is provided in Appendix A.

During 1991 WVDP established an objective, with the DOE, to develop a joint strategic plan for waste management. A draft document "Waste Management Strategic Directions" has been developed and will serve as a roadmap to guide WVDP actions and measure progress in the areas of waste minimization, waste characterization, waste treatment, waste storage, and waste transportation and disposal.

Through 1991 approximately 80 percent of the supernatant in tank 8D-2 has been removed and approximately 10,400 drums of LLW have been produced for storage in the RTS Drum Cell The supernatant processing phase is complete. The remaining supernatant will be processed during the sludge washing phase (see Section C.1.c).

During 1991, construction of two new engineered fabric storage structures was completed. Storage of LLW in these structures began on June 18, 1991.

Volume reduction of LLW continued during 1991. More than 555.8 m^3 (19,624 ft^3) of pipes, equipment, vessels, and miscellaneous plant wastes were size reduced and placed into storage.

Significant progress was made during 1991 toward the remediation of processed LLWTF sludge drums located in storage. Due to ineffective mixing, these drums have experienced raw sludge areas which cause liquid and sludge leakage. These drums were overpacked during 1991 to ensure double containment.

Also, a 24 drum characterization/demonstration program was performed using physical segregation of the processed sludge drums. This demonstration provided information used to establish a procedure for the safe remediation of these drums. Approximately 220 drums are to be included in a production remediation effort using physical segregation. This effort is scheduled to be completed by May 1992.

Investigations were made during 1991 to determine the feasibility for removing radioactive contaminants from approximately 110,000 ft^3 of soil stored on-site. Soil washing technology may be applicable but has not been proven on clay type soils which comprise approximately 35 percent of our dirt inventory. Waste Engineering has recommended soil storage while continuing to monitor technology developments in this area.

Two (2) vendors requested and received contaminated soil samples to perform R&D testing at their own expense. One of these vendors has provided WVNS with preliminary data resulting from their R&D efforts. Pending a review of this data an on-site vendor presentation will be made to the WVDP.

Waste Management alternatives for the treatment/disposal of radioactively contaminated oil were also investigated. Filtration/centrifugation processing and incineration options were evaluated during 1991. Our current inventory of contaminated oil occupies a 300 ft³ storage space which could effectively be used for the storage of other materials. Authorization was received to pursue the incineration of oil during 1992.

During 1991 cost estimates for a Waste Treatment and Remediation Facility were refined to incorporate currently planned preliminary facility layout features. It is anticipated that work on this facility will be initiated during 1992 so as to insure proper packaging, characterization and storage of radioactive waste.

In 1991, eight samples of sludge were obtained through the High Level Waste Tank 8D-2 M-4 riser. The first sample was taken in July and the final of the eight samples was taken in September. A total of 1260.94 grams of sample were removed from the tank and transferred to the Analytical Labs for sludge-wash analysis.

During 1990, the WVDP installed an interceptor trench (approximately 800 feet long) between the boundary of the NRC Licensed Disposal Area (NDA) and Erdmann Brook. The purpose of this trench is to intercept any liquid migration which might be occurring along ganglia (stringers) or through fractures in the weathered till. The liquid collected by the interceptor trench is a mixture of water and small amounts of solvent contaminated with radionuclides. The solvent, n-dodecane with up to 30 percent tributyl phosphate (TBP), was used to recover fissile material when the NFS fuel reprocessing plant operated from 1965-1972. A Liquid Pretreatment System (LPS) has been assembled in the NDA Sprung Structure. This system will process liquids removed from the trench. (see Section F.4)

Work on the LPS for the interceptor trench was completed on October 21, 1991. This work included installation of system components, inspection by a consultant for compliance with NYS regulations, training of system operators, and operational testing of the system. The readiness review and NYSDEC inspection of the system are scheduled to be completed in early 1992.

Information on Radioactive Mixed Waste and Hazardous Waste is provided in sections C.4. and D. of the this report.

Figure 1 provides the WVDP Summary Project Schedule for long-term project actions.

Table 1 provides a summary of Major Planned Activities for WVDP over the next several years.

Cost and schedule information contained in this plan is based on information presently used for planning purposes. This information is subject to change due to budget and scheduling modifications/approvals.

B. GENERAL SITE INFORMATION

1. Organization and Administration

Responsibility for successful implementation of the WVDP lies with the U.S. Department of Energy, Idaho Field Office (DOE-ID); Assistant Manager for Nuclear Programs; and the Director, WVPO.

The West Valley Nuclear Services Company Inc. (WVNS), a wholly owned subsidiary of Westinghouse Electric Corporation, is the prime contractor and site operator under contract DEAC07-81NE44139. All waste generation and daily operational activities are controlled by the contractor. The WVNS Master Records Center (MRC) is responsible for maintaining up-to-date copies of all reference materials including this Annual Waste Management Plan.

The WVDP Act of 1980, directed the DOE to carry out a high-level radioactive waste management demonstration project at the WVDP site. The Act directed review, consultation, and monitoring by the NRC to identify any potential radiological danger to public health and safety. In addition, the WVDP is subject to NRC requirements for final D&D of tanks, facilities, material, and hardware used in connection with the project.

Funding for waste management is appropriated through project sources. Phase I of the WVDP is funded ninety (90) percent by the U. S. DOE and ten (10) percent by NYSERDA.

The U.S. DOE-ID has been assigned the responsibility for implementing the WVDP Act. U.S. DOE-ID has established a project office (WVPO) for the on-site administration of the project. Since the State of New York is the owner of the site and is required by the Act to participate in the funding of the Project, a Cooperative Agreement between DOE and NYSERDA has been established (DOE/NYSERDA, 1981). The State is represented on-site by NYSERDA. The Act requires the U.S. DOE to consult with the U.S. NRC concerning the substantive aspects of the project; and U.S. NRC approval of the final D&D Plan, to be implemented upon completion of the Project, is required. The Act also requires the U.S. DOE to consult with the U.S. Department of Transportation (DOT), the U.S. EPA, and the U.S. Geological Survey (USGS) in matters relating to their respective areas of expertise and concern. The EPA and NYSDEC are also consulted for review and approval on matters of environmental concern. Dames and Moore (D&M) provides geotechnical, environmental, and safety assessment services for the Project as a subcontractor to WVNS. Ebasco Services Inc., and Societa Generale pour les Techniques Nouvelles (SGN) have been retained by WVNS for design services. The project also consults with and is engaged in technology transfer on a national level with the Defense Waste Processing Facility (DWPF), and on an international level with German, French, and Japanese nuclear program organizations.

The DOE's WVPO organization is shown in Figure 2 and Figure 3 provides the WVNS Organizational Chart.

2. Site Description

The Western New York Nuclear Service Center (WNYNSC) is located in Cattaraugus County, a rural area about 50 km (30 miles) southeast of Buffalo (figure 4). The communities of West Valley, Riceville, Ashford Hollow, and Springville are located within 8 km (5 miles) of

the center. Average population density of Cattaraugus County is 25 persons/km^2, with the closest population center being Springville with approximately 4,300 people. The center's 3345 acre facility (Figure 5) includes the shutdown commercial nuclear fuel reprocessing plant, a spent nuclear fuel receiving and storage facility, disposal areas for solid radioactive wastes, and underground tanks containing liquid high-level radioactive wastes.

The WNYNSC lies within the northeastern deciduous forest biome, and the diversity of its vegetation is typical of the region. Equally divided between forest and open land, the site provides habitats especially attractive to white-tailed deer and various birds, reptiles, and small mammals indigenous to the region. No endangered species are known to be present on the site property.

The land immediately adjacent to the WNYNSC is used primarily for agriculture and arboriculture. Cattaraugus Creek to the north serves as a water recreation area (swimming, canoeing, and fishing). Although limited irrigation of adjacent golf course greens and tree farms is taken from Cattaraugus Creek, no public water supply is drawn from the creek downstream of the WNYNSC.

The average annual temperature in the region is 7.2°C (45.0°F) with recorded extremes of 37°C (98.6°F) and -42°C (-43.6°F). Rainfall is relatively high, averaging about 104 cm (41 inches) per year. Precipitation is evenly distributed throughout the year and is markedly influenced by Lake Erie to the west and Lake Ontario to the north. All surface drainage from the WNYNSC is to Buttermilk Creek which flows into Cattaraugus Creek and ultimately into Lake Erie. Regional winds are predominately from the west and south at over 4m/s (9mph) during most of the year.

The geology of the site is characterized by glacial deposits of varying thickness in the valley areas underlain by sedimentary rocks which are exposed in the upper drainage channels in hillsides. The soil is principally silty till consisting of unconsolidated rock fragments, pebbles, sand, and clays. The uppermost till unit is the Lavery, a very compact gray silty clay. Below the Lavery till is a more granular unit referred to as the Lacustrine unit comprised of silts, sands, and in some places, gravels which overlie a verve clay.

There are two aquifers in the site area. The upper aquifer is a transient water table aquifer in the upper 6 m (20 feet) of weathered till and alluvial gravels concentrated near the western edge of the site. High ground to the west and the Buttermilk Creek drainage to the east intersect this aquifer, precluding off-site continuity. Several shallow, isolated, water-bearing strata also occur at various locations within the site boundary, but do not appear to be continuous. The zone at which the till meets bedrock forms another aquifer that ranges in depth from 2m (6 feet) underground on the hillsides to 170m (560 feet) deep just east of the boundary of the facility exclusion area.

Under the WVDP Act, NYSERDA transferred custody of the "Project Premises", to the DOE. The Project Premises consist primarily of the 200 acre complex of facilities which were constructed and operated by NFS to reprocess spent nuclear fuel. Approximately 4,300 m^3 (151,850 ft^3) of lower activity solid LLW generated in conjunction with the NFS reprocessing activity were disposed of by shallow land burial in an area referred to as the NDA. DOE operations, in preparation for HLW supernatant reprocessing, have also used the NDA for disposal of plant

waste from 1982 to 1986. The NYSERDA retained possession and the right to use the "Retained Premises", which comprises the remaining portion of the 3345 acre facility. This includes the State Licensed Disposal Area (SDA), which is adjacent to and in the vicinity of the NDA. The SDA was used for LLW disposal from colleges, hospitals, state institutions, power plants, and some NFS plant waste. Approximately 67,000 m^3 (2,366,038 ft^3) of waste was disposed of by shallow land burial from 1963 to 1975. The SDA has not been used for disposal since 1975.

At present, HLLW is stored in underground tanks, 8D-2 and 8D-4. Tank 8D-1 is a spare tank for 8D-2 (The general design concepts of these tanks are shown in Figure 6), and tank 8D-3 is a spare tank for 8D-4. Tanks 8D-1 and 8D-2 are carbon steel tanks inside of concrete vaults and 8D-3 and 8D-4 are stainless steel tanks, both inside of the same concrete vault. All of the HLW storage tanks have systems in place for monitoring tank leakage.

TRU waste has primarily been generated from decontamination of plant cells in the processing building. This TRU waste is contained in Type A containers, .21 m^3 (55 gallon) 17 C drums and 1.98 m^3 (70 ft^3) boxes and has been classified and assayed. It is placed into LAG Storage for storage until a disposal site is available and a waste certification plan can be implemented.

LLW streams result from plant work, construction, decontamination activities, and additional liquid waste processing. These wastes are stored in the LAG Storage System.

Figure 7 provides an overview of all waste streams present at the WVDP (supernatant process, plant waste, TRU waste, including Remote Handled (RH) TRU, and HLW). Figure 8 illustrates the main process system being developed at the WVDP to vitrify the HLW for permanent disposal. Figure 9 provides a HLW and LLW overview resulting from the processing of the HLW tanks.

C. RADIOACTIVE AND MIXED WASTE MANAGEMENT

1. High-Level Waste

a. Overview and Background

On April 19, 1966, NFS, Inc. was licensed by the AEC to reprocess both commercial nuclear power reactor fuels and defense production reactor fuels at the WNYNSC. In 1972, the facility was shut down for modifications, and never resumed operations. During the six year period of operation, approximately 2,200,000 liters (580,000 gals) of HLW was generated as a result of the reprocessing activities. This waste is being stored in underground tanks.

Specific agreement requirements between DOE/NRC and DOE/NYSERDA are prescribed in the WVDP Act. These agreements are implemented and amplified in a Memorandum of Understanding (MOU) between DOE and the NRC executed in September 1981, and in a cooperative agreement between DOE and NYSERDA executed October 1, 1980, and amended on September 18, 1981.

The project scope for HLW activities are called out in the WVDP Act, and carried forth by the aforementioned agreements include:

- Solidification of the HLW currently stored at West Valley in a form suitable for transportation and disposal.
- Preparation of the project premises and facilities to accommodate these efforts, including decontamination of facilities and equipment.
- Development of containers suitable for permanent disposal of the HLW.
- Transportation, as soon as feasible, of the solidified and containerized waste to an appropriate Federal waste management facility.
- D&D of the tanks and other hardware and facilities used in carrying out the WVDP.
- Disposal of the TRU and LLW waste produced in the solidification and vitrification efforts.

b. Current and Projected Inventories

Approximately 2.44 million liters (643,506 gallons) are currently in HLW tanks 8D-1, 8D-2, and 8D-4, distributed as follows:

8D-1:	226,288 gallons
8D-2:	402,218 gallons
8D-4:	15,000 gallons

Tank 8D-2, which contains sludge from the reprocessing activities and water (supernatant) from plant decontamination efforts and reprocessing activities, has a capacity of approximately 2.73 million liters (720,000 gallons) and currently is storing about 1.52 million liters (402,200 gallons).

Tank 8D-2 levels have been increased by the addition of water from flushing the downstream decontaminated supernatant (LLW) storage tanks. In addition, 10,000 gallons of concentrated caustic (sodium hydroxide) solution and 45,000 gallons of demineralized water have been added to 8D-2 from sludge washing. These volumes are included in the totals listed above.

Tank 8D-4 is full, isolated from further inflow, and contains Thorex waste. The vitrification process to begin in 1996 will result in emptying 8D-4.

Under the present scope of the WVDP, potential sources of HLW forms may be generated from future decontamination operations of plant systems and CPC waste stored in the Waste Storage Area (WSA).

c. Status of Operations

Supernatant in tank 8D-2 has been processed in an ongoing operation known as the Integrated Radioactive Waste Treatment System (IRTS), which is discussed in more detail in the chapter on LLW, and in appendix C. To date, approximately 2.32 million liters (613,000 gallons) of supernatant have been processed. The processed supernatant is reclassified as Class C LLW and is cement solidified into .27 m^3 (71 gallons) drums. These drums are then stored in the RTS Drum Cell.

The supernatant processing phase of the project is complete and the sludge washing phase has begun with the addition of caustic and water to 8D-2. The water/caustic/supernatant liquid in 8D-2 will be treated by ion exchange to remove Cesium 137, the most prevalent radionuclide. The spent ion exchange media is retained in 8D-1. The solution will be mixed with cement, solidified in 71-gallon drums, classified as LLW and stored in the RTS Drum Cell.

The sludge will then be combined with the cesium-loaded zeolite resulting from processing the supernatant and the Thorex waste from tank 8D-4. This total volume [approximately 171,000 liters (45,000 gallons)] will be blended and then slurry-fed to the vitrification facility, which is presently under construction. There it will be concentrated, blended with glass-forming chemicals, and transferred to a Slurry Fed Ceramic Melter (SFCM). This melter will operate between 2,000 and 2,200 degrees F, producing molten glass. The molten glass will be poured into stainless steel canisters, which will then be sealed by welding, decontaminated, and stored in the former Chemical Process Cell (CPC) awaiting shipment to a Federal waste management facility. Equipment and components were removed from the CPC during Phase I D&D (section G.5). Storage racks for storage of stainless steel canisters are scheduled to be placed in the CPC beginning in early 1992.

After the solidification campaign has been completed, the facilities will be decontaminated and decommissioned.

It is currently planned for the Vitrification Facility (VF) to start hot operations during the second quarter of FY96. In the near future, the melter used for test campaigns will be disassembled, examined and analyzed, and the equipment to be used for hot operations will be installed in the VF.

Additional Cost and Schedule information related to HLW vitrification and storage are provided in section E.

2. Transuranic Waste

a. Overview and Background

TRU Waste at WVDP has primarily been generated from decontamination efforts in the process building. The WVDP has a system in place to classify and assay waste for TRU determination, which includes a segmented gamma scanner, radionuclide analysis, and weight vs dose conversion program.

Contact Handled (CH) TRU waste is not being generated at this time, as in-plant major decontamination efforts are not in progress. A small amount of RH TRU waste from the spent fuel pool water treatment system is being generated on a routine basis. This waste is being stored in High Integrity Containers (HIC) in the FRS. Future D&D efforts, specifically those identified in the site closure plan, are expected to result in the generation of significant amounts of TRU waste. Current waste inventories are shown in appendix B.

b. Current Problems and Issues

DOE Order 5820.2A defines TRU waste as a radioactive waste contaminated with alpha-emitting transuranium radionuclides with

half-lives greater than 20 years and concentrations greater than 100 nCi/g. The WVDP Act defines TRU waste as material contaminated with elements which have an atomic number greater than 92, including neptunium, plutonium, americium, and curium, and which are in concentrations greater than 10 nCi/g, or in such other concentrations as the NRC may prescribe to protect the public health and safety. The WVDP currently uses NRC guidelines to classify TRU waste. The NRC has advised the WVPO that the TRU waste definition must be affirmed in the EIS process.

Within the requirements of DOE Order 5820.2A only TRU waste categorized as Defense waste is acceptable at the Waste Isolation Pilot Plant (WIPP). The WVDP TRU waste resulted from past reprocessing of spent fuels from both commercial and Defense sources. Therefore, TRU waste is not presently scheduled to be shipped to WIPP. WVDP-030, Rev. 1, is the TRU Waste Certification Program Plan for the WVDP. This plan invokes some elements of the WIPP-WAC program, but does not implement all details such as data requirements, certification requirements, or waste storage requirements. (See Appendix A, Pages 3-6 for additional information).

At present, significant amounts of TRU waste are not being generated.

Appendix A provides a status of compliance actions identified in the DOE Order 5820.2A Implementation Plan. Appendix B provides current TRU waste inventories in storage. Major TRU waste generation will not resume until Phase II D&D efforts begin. Section E provides an identification of costs associated with TRU waste management at WVDP.

3. Low-Level Waste

a. Overview and Background

Between 1982 and 1986, the WVDP disposed of approximately 5786 m^3 (204,000 ft^3) (625 curies) of LLW in the NDA. As the result of an out-of-court agreement with the Coalition on West Valley Nuclear Wastes and Radioactive Waste Campaign, LLW disposal at West Valley ceased in FY87 pending development of the site closure EIS.

The WVDP is currently utilizing the NRC waste classification system prescribed in Code of Federal Regulations (10 CFR 61) for Class A, B, & C wastes. In this regard, WVDP is unique in the DOE system, as waste programs are operated in accordance with DOE Orders, yet LLW is classified according to NRC regulations.

One significant LLW stream at WVDP has been the decontaminated supernatant from the HLW tanks. Supernatant has been processed through the Supernatant Treatment System (STS), an ion exchange process, which reduces the radionuclide concentration of the supernatant to permit reclassification to LLW, and is then transferred to the evaporative Liquid Waste Treatment System (LWTS). The evaporator bottoms are processed through the Cement Solidification System (CSS), which includes cement solidification into .27 m^3 (71 gallons) square drums. Figure 10 depicts this process. These drums are transferred to the RTS Drum Cell for storage. Figure 11 provides a view of the RTS Drum Cell. The IRTS waste form meets all current NRC and EPA disposal criteria for

waste form acceptance. Approximately 10,400 drums are currently in storage. It is anticipated about 15,000 processed CSS drums will be in storage when supernatant processing and sludge washing are completed.

Evaporator distillate from the LWTS is transferred to an interceptor tank system, then to Lagoon 2, processed through the LLWTF, a clarifier/filter/ion exchange process, and then onto Lagoon 4/5 for subsequent sampling. When discharge/release criteria are met, the final effluent is discharged to the environment under NY State Pollution Discharge Elimination System (SPDES) permit through Lagoon 3. Clarifier sludge from the LLWTF have been cement-solidified in the past; however, problems with past recipes and procedures have resulted in cessation of this practice. Analysis and evaluation is continuing to define potential alternatives to treat, store, and dispose of this waste. This waste is currently being stored in LAG storage in dewatered, uncemented form, pending these evaluations. Prior solidified drums have excess free liquid and also require further treatment. Item 3.F.(1.), Appendix A, Chapter III, Low Level Waste, identified specific actions to address this matter. Appendix C provides further detailed discussion.

LLW that is generated during general plant work, which is compactible material such as rags, bags, clothing, and some wood items, is collected in polyethylene bag lined drums and transported to a 50 ton box compactor. It is then compacted into a 2.55 m^3 (90 cu. ft) B25 metal box equipped with anti-springback devices. A volume reduction of 4 to 1 is achieved with this compactor. The compacted waste is then placed in storage.

Class A compactible materials, which are packaged in .21 m^3 (55 gallons) drums, such as small diameter piping, sheet metal, and wood products, are processed by a 1000 ton supercompactor. The drum and its contents are pressed into a compaction sleeve and overpacked into a steel box. A volume reduction of 5 to 1 is achieved by this method. Receipt criteria for both compactors exclude liquids, hazardous materials, pressurized containers, flammables, and pyrophorics.

Class B/C cemented LLW, from the CSS, is currently being put into long-term interim storage in the RTS Drum Cell in .27 m^3 (71 gallons) drums. This facility is intended to be the interim storage site for Class B/C waste generated prior to a decision on disposition.

The LAG Storage Building and associated LSA's are areas enclosed either by "hard" building (LAG storage) or engineered fabric structures. These facilities provide weather protection for packaged Class A, and some Class B/C wastes that result from operations, decontamination, maintenance, and construction activities. Packaged wastes identified as TRU or suspect TRU are stored in LAG storage. The LAG Storage Building also houses radiometric equipment to classify waste packages to the criteria of 10 CFR 61.55.

Wastes packaged and stored in the LAG storage facilities, include some compacted wastes, liquid and wet wastes immobilized in cement, equipment and hardware, and contaminated soil and concrete.

Additional storage areas are provided on outdoor gravel pads for the storage of large items, or items that are too heavy to move inside.

The WSA is a fabric storage structure that contains high-radiation items resulting from decontamination operations in the CPC, which are awaiting further conditioning and volume reduction. Also contained in this facility are concrete overpacks and boxes containing packaged waste which are used to provide shielding.

Appendix B provides currently stored LLW inventories.

Appendix C provides further detailed discussion of LLW treatment, storage and disposal facilities.

b. Current Problems and Issues

In addition to the actions defined above, the DOE 5820.2A Implementation Plan of April, 1989, identified a number of actions in the LLW area (Chapter III of DOE 5820.2A). Appendix A to this report provides an update on the status of these 5820.2A Implementation Plan action items. Appendix B provides current inventories of wastes in storage.

WVNS has completed a waste stream overview characterization flow diagram. During 1992 efforts will include a database upgrade to ensure maintenance of all required data. Also, a task force will be organized in January 1992 to verify if adequate data is available for each WVDP waste stream. The waste streams will be analyzed to determine if chemical, physical, and radiological data is available for each stream on the flow diagram. Application of this effort to waste already in storage will be a major effort with the potential need to provide a facility to open, sample, and repackage waste containers as part of characterization and certification.

Appendix A, Low Level Waste, Chapter III, Item 3.d.1 provides a discussion of this characterization program.

An additional key action identified in Appendix A is the development of a Waste Management Systems Performance Assessment.

Costs for WVDP LLW operations are included in Section E.

In November 1983, radioactive solvent was detected in a monitoring well just outside the boundary of the NRC Licensed Disposal Area. Stepped-up monitoring efforts and extensive site investigations were implemented immediately following the discovery.

An extensive network of wells has been monitored continuously since the discovery of solvent in late 1983 and the response investigations in 1984. Following the exhumation of eight 1,000 gallon tanks from Special Hole (SH)-10 and SH-11 in 1986 and the installation of wells over SH-5, -27, -28 and -29, the monitoring results remained static until August 1988, when solvent was discovered in a monitoring well next to SH-5. This well, which has been monitored since its installation in 1986, showed no prior evidence of solvent.

During 1989, activities were performed to locate and install exploratory wells to yield information on the depths and

orientation of tanks in the six special (burial) holes, contamination levels of the soils, dimensions of the special holes, and conditions of the fill soil.

In addition, direct evidence of solvent leakage was observed in four of the disposal holes.

The wells, besides giving evidence of solvent leakage, also revealed that a significant quantity of water had infiltrated into the holes. This could ultimately lead to complete filling and perhaps overflow of the disposal hole.

During 1990, the WVDP installed an interceptor trench (approximately 800 feet long) between the boundary of the NDA and Erdmann Brook. The purpose of this ditch is to intercept any migration which might be occurring along ganglia (stringers) or through fractures in the weathered till. A treatment system (LPS) has been assembled in the NDA Sprung Structure. This system will process liquids removed from the trench. Work on the treatment system for the Interceptor trench was completed on October 21, 1991. This work included installation of system components, inspection by a consultant for compliance with NYS regulations, training of system operators, and operational testing of the system. The ORRB review and NYSDEC inspection of the system are scheduled to be completed in early 1992.

4. Mixed Waste

a. Overview and Background

The WVDP submitted the Part A Resource Conservation and Recovery Act (RCRA) Interim Status permit application for the storage and treatment of hazardous wastes to the EPA and NYSDEC on June 4, 1990. This was submitted in response to RMW becoming subject to the hazardous waste regulations when NYS received authorization to regulate RMW under its hazardous waste program (effective June 6, 1990). The WVDP is currently negotiating a Federal and State Facilities Compliance Agreement (FSFCA) with the regulatory agencies in addition to a RCRA 3008(h) Consent Order.

b. Status of Operations

Two new waste structures have been constructed. RMW that meets the specific waste acceptance criteria of these structures will be permitted for storage. These waste acceptance criteria are scheduled to be developed by July, 1992. LLW determined to be RMW based on testing are stored in the Interim Waste Storage Facility (IWSF), or may be moved to the new waste structures. Liquid RMW is currently stored at the IWSF.

As of January 1991, 12 LLW storage boxes and 25 LLW storage drums were identified as containing lead as waste. Lead in these boxes and drums was mixed with other LLW materials. The contents of 9 boxes and 24 drums were inspected and segregated during 1991. The lead found was segregated by form (shaut, brick, shot, blanket, etc.) and all individual pieces of lead were measured (dimension, weight) and radiologically surveyed. The lead was repackaged into four boxes and 12 drums. Eighty-five kilograms of radiologically clean lead was separated out for use on-site.

The lead repackaging effort resulted in a reduction of approximately 4,330 kilograms of radioactive mixed waste (RMW) and 618 cubic feet of RMW volume.

A program is in development for characterization of site wastes and identification of other mixed waste. (See Section C.3.b)

The largest source of RMW at the WVDP is the HLW as discussed in section C.1. This waste is rendered non-hazardous through treatment (CSS solidification).

c. Problems and Issues

Due to the lack of commercial treatment facilities permitted to accept RMW, both the WVDP and the entire DOE complex have been forced to maintain these wastes in storage, though treatment of HLW is underway. Negotiations are continuing between the WVDP and Federal and State regulatory agencies in an effort to resolve a number of permit issues related to RCRA interim status requirements and the Land Disposal Restrictions. For certain site-specific issues, such as container inspection for RMW, equivalency is being requested between hazardous waste requirements, the As Low As Reasonable Achievable (ALARA) policy, and radiological engineering barriers. These issues are expected to be resolved during 1992.

Current mixed waste inventories are shown in Appendix B. (HLW inventories are not included, see Section C.1)

D. HAZARDOUS WASTE MANAGEMENT

1. Overview and Background

The Hazardous Waste Management Plan, WVDP-073, governs the handling of non-radioactive hazardous waste at WVDP.

The Environmental Compliance Group oversees regulatory aspects of environmental concerns at the WVDP. This group ensures that project generators of hazardous waste properly handle, label, and classify their waste according to RCRA regulations. The Environmental Compliance Department also identifies required remedial actions if hazardous material releases were to occur.

A WVDP Environmental Training Matrix has been developed as a compliance vehicle to track mandatory environmental, safety and health (ES&H) training requirements for all personnel who perform work at the WVDP. The hazardous material waste training requirements are included within this matrix. To ensure compliance to the matrix, the WVDP Training & Development department will conduct detailed self-assessments against the requirements. This program satisfies the requirements of 40 CFR 262; NYCRR, Title 6, Part 373; and 29 CFR 1910.120.

2. Status of Operations

There is no on-site disposal of hazardous waste at the WVDP. Hazardous waste is shipped off-site for disposal by licensed and approved transporters to permitted commercial Treatment, Storage, and Disposal (TSD) facilities. In 1991, there were 5 shipments off-site for disposal and one shipment off-site to recycling facilities.

On May 17, 1991, DOE-HQ established a "Hazardous Waste Moratorium" which has temporarily suspended hazardous waste shipments from WVDP. As requested by DOE-HQ, WVDP furnished a "Historical Data Report" in September 1991 and in November 1991 submitted the "Demonstration of Compliance Addendum with EM-331 Performance Objective."

On December 20, 1991 the WVDP received notification from DOE-HQ that the moratorium had been conditionally lifted. This response will allow the WVDP to resume hazardous waste shipments under the new performance objective.

Transportation of hazardous wastes has been and will continue to be in accordance with Standard Operating Procedure (SOP) 300-3 (Off-Site Transportation of Hazardous Waste), which ensures compliance with applicable DOT and EPA hazardous waste regulations.

Four free-standing structures are utilized for hazardous waste storage. These structures have been included in the WVDP's Interim Status Permit Application. Operation of this facility is conducted in accordance with SOP 300-6 (Hazardous Waste Storage Facility Operation).

Hazardous wastes generated on-site from defined waste streams are accumulated in 90 day Satellite Accumulation Areas (SAAs) before transfer to the HWSF for storage prior to off-site shipment. Hazardous waste is accumulated at the following SAA's:

Location	SAA	Purpose
Blueprint Area	20 gallon drum 30 gallon drum	Ammonium Hydroxide Developer Solution
Darkroom	1 gallon poly containers	Various developer and rinse solutions
Maintenance	55 gallon drum	Oily rags and wipes
Hot Lab	4 liter glass bottle	Plutonium extract waste
CTS Lab	10 liter poly bottle	Acidic wastes from TCLP/EP toxicity tests

Wastes are stored in the IWSF if sampling/analysis is required to determine the radiological and chemical classification of the wastes.

3. Current Problems and Issues

Due to the redefinition of radiological characterization across the DOE complex, the amount of radiologically uncharacterized containers in storage has increased during the first half of 1991. The number of containers becoming classified as mixed waste may increase and the cost for characterizing these containers may be affected.

E. COST AND SCHEDULE SUMMARY

The following presents summaries of the schedules and major milestones associated with waste management activities at the WVDP. Cost summaries associated with these schedules are found on Table 2.

1. High-Level Waste Vitrification

FY-92

Continue modifications of former Chemical Process Cell to store HLW canisters from vitrification process.

Begin mechanical/electrical construction activities in the vitrification facility. Prepare Safety Analysis Reports for Vitrification Facility and HLW Interim Storage Facility.

Construction activities relevant to further progress on the Vitrification Facility include initiation of mechanical/electrical construction activities in the Vitrification Facility, continuation of fabrication and installation of jumpers, installation of the new melter, and continuation of canister racks fabrication and delivery. Analysis Reports will be prepared for the Vitrification Facility and the HLW Interim Storage Facility.

FY-93

Preparations for vitrification will continue, with activities including: mechanical/electrical construction, EDR Loadout facility design, completion of turntable modifications, and procurement of melter, transfer carts, jumpers, and sludge transfer equipment. The waste form qualification activities will continue. Component and subsystem checkout will continue. Procurement of spares and supplies for vitrification checkout operations start.

Extended Schedule Efforts

- Cold operations and remote checkout for hot operations of the vitrification system will be completed during early FY-96.
- The vitrification campaign will commence in the third quarter of FY-96.
- The vitrification campaign will be completed in the fourth quarter of FY-98.

2. Low-Level and TRU Waste Handling (Incl. IRTS)

FY-92

Effective management of radioactive, hazardous, and mixed wastes will continue. Other waste form recipes will be developed and tested as waste streams become defined. Ongoing maintenance of a documentation system, which includes the WVDP Annual Waste Management Plan (WVDP-019) and that specifies criteria and plans for management of radioactive wastes from generation to storage and ultimate disposal, will continue. NDA monitoring and waste sample analysis will continue to address the hazardous and mixed waste management concerns of DOE Order 5820.2A.

Operational elements include initiation of sludge washing and processing of sludge wash liquid through the Integrated Radwaste Treatment System.

Continue management (i.e., collection, storage, and monitoring) of radioactive mixed waste. Continue operation of the Size Reduction Facility and supercompactor.

FY-91

Effective management of radioactive, hazardous, and mixed wastes will continue. Other waste form recipes will be developed and tested as waste streams become defined. Ongoing maintenance of a documentation system, which includes the WVDP Annual Waste Management Plan (WVDP-019) and that specifies criteria and plans for management of radioactive wastes from generation to storage and ultimate disposal, will continue. NDA monitoring and waste sample analysis will continue to address the hazardous and mixed waste management concerns of DOE Order 5820.2A.

Sludge wash operations and process of sludge wash liquid through the IRTS continues. Site Operations continues to be supported. Management of radioactive mixed wastes and size reduction operations also continue.

Continue management (i.e., collection, storage, and monitoring) of radioactive mixed waste. Continue operation of the Size Reduction Facility and Supercompactor.

F. ENVIRONMENTAL MONITORING

1. Overview

The environmental monitoring program for the West Valley Demonstration Project began in February 1982. This program has been developed to detect any changes in the environment resulting from project activities and to assess the effect of any such changes on the human population and the environment surrounding the site. This monitoring program addresses both the radiological and nonradiological environment. Details and results of the monitoring program are available in the WVDP Site Environmental Monitoring Report for CY 1990. The 1991 report is now in preparation, but will not be available for use until the middle of 1992.

This monitoring program will be continued by the DOE until the WVDP is completed. Continued operation of the monitoring program will be the responsibility of the State of New York for the period of institutional control.

The WVDP operates within the radiological guidelines of DOE Orders for the protection of health, safety, and the environment. The Project did not exceed or approach any of the limits on radioactivity or radiation doses in 1990, including the emission standards promulgated by the EPA and incorporated in DOE Orders.

The LLWTF contributes most of the activity released from the site in liquid effluents through the Lagoon 3 weir. The 1990 annual average liquid effluent concentrations of radionuclides were below DOE release guidelines at the point of discharge. During this period, the average concentration of radionuclides present in the Lagoon 3 effluent were less than 30% of release guidelines.

The main ventilation stack (ANSTACK) sampling system remained the most significant airborne effluent point in 1990. Variations in monthly concentrations of airborne radioactivity reflect the level of Project activities within the facility. However, at the point of discharge, average radioactivity levels were already below concentration guidelines for airborne radioactivity in an unrestricted environment. Further dilution from the stack to the site boundary reduces the concentration by an average factor of about 200,000.

Effects of Project activities upon site groundwaters are regulated by NYSDEC and the EPA. Groundwater sampling and analyses confirm that groundwater quality has been and continues to be affected both radiologically and nonradiologically by past facility operations. Increased well drilling and sampling activities in 1990 intensified the investigation of these effects. Although definite radiological and nonradiological effects upon on-site groundwaters can be seen, these do not affect public health or the off-site environment.

In 1990 there were nine instances when individual water quality parameters exceeded permitted levels. (Table 3) Six of these deviations resulted from the sewage treatment plant operating beyond its rated capacity. One excursion was attributed to a minor upset that released solids slightly above the permitted limits. Another unrelated excursion of high iron content in the low-level waste treatment system effluent resulted from what is believed to be a natural iron buildup. This condition is being evaluated to determine how the potential for its recurrence can be reduced.

In each case, appropriate actions were taken to stabilize the condition and to notify NYSDEC in accordance with permit requirements. These deviations resulted in no significant effect on the environment. [illegible] the sewage treatment plant operation is being modified to prevent recurrences.

Several changes were made in the routine environmental monitoring program in 1990 as part of a continuing effort to improve existing monitoring points and in response to regulatory changes (see summary Table 4).

The Project's modified SPDES permit expanded monitoring of location WNSP001, the primary point of liquid effluent batch release from the site, to include analyses for several additional chemical parameters. To demonstrate compliance with DOE Order 5400.5, which was effective May 1990, monitoring of sanitary waste sludge from the sewage treatment plant for radiological parameters was added to the program.

The existing monitoring program was expanded by adding several sampling locations: a new outfall collection point on-site, new locations for collection of site drinking water, and an underdrain collection point to better monitor subsurface drainage in the high-level waste storage and processing area. Additional analyses of

samples from existing locations, tritium analysis of beef and deer samples, and uranium analysis of selected soil samples were added in the 1990 program.

One on-site surface water monitoring point was upgraded for automated sample collection. This point monitors surface waters draining from the Lag storage area, where additional waste storage buildings have been added and elevated monitoring needs are anticipated.

2. Nonradiological Monitoring

Nonradiological plant effluents are regulated by the NYSDEC and the EPA. New York State inspects nonradiological air emission points periodically although air effluent monitoring is not currently required because of the very limited discharges.

Nonradiological liquid discharges are monitored as a requirement of the State Pollutant Discharge Elimination System (SPDES). Liquid is discharged at permitted outfalls or points of final release to surface waters. Project effluents are monitored for biochemical oxygen demand (BOD), suspended solids, ammonia, iron, pH, oil and grease, and other water quality indicators. Monitoring indicated that non-radiological liquid discharges had no effect on the off-site environment.

The 1990 groundwater monitoring network included on-site wells for surveillance of solid waste management units and off-site wells for determining water monitoring. The on-site system of seventeen monitoring points was expanded in 1990 to 106 points. These wells provided upgradient and downgradient monitoring of the LLWTF lagoons, the high-level waste tank complex, the NDA, and other solid waste management units. Wells comprising the existing on-site groundwater monitoring network were each sampled eight times during 1990. All new wells were developed to produce water suitable for analysis and several solid waste management units were sampled for a complete set of parameters. After initial physical measurements at each well, samples were collected and analyzed for a variety of radiological and water quality parameters. The range of analyses performed was determined by regulatory requirements and site-specific concerns or needs. Statistical tests were performed to identify significant differences between up and downgradient wells.

3. Radiological Monitoring

The 1990 environmental monitoring program provided radiological measurements of site effluent discharges and of related on-site and off-site samples. Analysis of animal, soil, and vegetation samples from the facility environs provided data from which the risk of exposure to radioactivity through ingestion pathways could be determined. Control or background samples were taken to compare with on- or near-site samples.

Radiation doses estimated from maximum consumption rates of locally produced foods are similar in magnitude to the values reported in previous years.

The dose assessment described in the 1990 Site Environmental Report predicts an insignificant impact on the public's health as a result of radiological releases from the WVDP.

Airborne particulate radioactivity was sampled continuously at five site perimeter and four remote locations during 1990. Sample filters were collected weekly and analyzed for gross alpha and beta radioactivity. Airborne gross activity around the site boundary was, in all cases, indistinguishable from background concentrations measured at the remote locations and was well below the DOE limits. Direct monitoring of airborne effluents at the main plant stack and other permitted release points showed all discharges to be well below DOE or EPA effluent limitations.

The largest single source of radioactivity released to surface waters from the Project is the discharge from the LLWTF through the Lagoon 3 weir WNSP001 into Erdman Brook, a tributary of Frank's Creek. There were four batch releases totaling about 42 million liters in 1990. The effluent was grab-sampled daily during the forty-four days of release and analyzed.

Six automatic samplers collected surface water at locations along site drainage channels. Samples were analyzed for gross alpha, gross beta, gamma activity, tritium, and strontium-90. Analyses of carbon-14, iodine, 129, and americium-241 were added to the program requirements for several sampling points. As a result both of past site activities and continuing treated liquid releases, average gross radioactivity concentrations continued to be higher in Buttermilk Creek below the West Valley project site than at the upstream background sample point. Yearly average concentrations in water below the Project site in Cattaraugus Creek during 1990 were indistinguishable from background concentrations measured in Buttermilk Creek upstream of the Project facilities. All Cattaraugus Creek concentration observed are well below regulatory limits. Concentrations of Cesium-137, strontium-90, and tritium were below DOE guidelines at all locations, including Frank's Creek at the inner site security fence more than three miles from Cattaraugus Creek.

Direct environmental radiation was measured quarterly in 1990, as in previous years, using thermoluminescent dosimeters (TLD's). Monitoring is carried out at forty-one points distributed around the site perimeter and access road, at the waste management units, at the inner facility fence, and at various background locations. No significant differences were noted among exposure rates measured at background stations and the WNYNSC perimeter locations. Some TLD data were also collected within the restricted area boundary to monitor the exposure from nearby radioactive waste handling and storage facilities.

Data from groundwater monitoring around the LLWTF lagoons indicate that radionuclides from past plant operations have affected groundwater quality. Compared to background both tritium and gross beta concentrations are elevated in groundwater surrounding the lagoon system. However, the level of tritium contamination has declined steadily since 1982, as indicated by measurements at the french drain outfall. Levels of gross beta activity appear to be rising slightly in some locations, as measured at the french drain outfall and at wells monitoring groundwater in the vicinity of the LLWTF lagoons (WNW86-03, WNW86-04, WNW86-05). Other measured

parameters such as pH and conductivity have shown significant differences between upgradient and downgradient locations. Most notable are the sodium and chloride concentrations at the upgradient well (WNW86-06) within this unit. It is believed that these elevated salt concentrations are due to migration from the sludge ponds located just upgradient of well WNW86-06.

Data from monitoring wells around the high-level waste tanks do not suggest any effect of the stored high-level radioactive waste on the groundwater. However, significant radiological differences between upgradient and downgradient wells do indicate that previous site activities have affected groundwater in this area. Most notable are elevated levels of gross beta activity and greater-than-detectable concentrations of 1,1-dichlorethane at wells WNW86-09 and WNW86-12.

Groundwater monitoring around the NDA indicates no discernable effects on the deeper deposits in the area, as indicated primarily by measurements for tritium. However, one shallow well in the vicinity of the NDA (WNW82-4A1) has consistently shown elevated tritium levels. In addition, continued organic solvent migration was detected in other shallow wells within the NDA. Migration of contaminated solvent is currently the focus of a control and remediation effort within the NDA (see Special Monitoring).

The potential effect of Project activities on nearsite groundwater is monitored by annual sampling of groups of designated private drinking water wells as well as by the on-site measurements. Monitoring of drinking water wells off-site continues to demonstrate that the site has had no effect on residential drinking water supplies.

4. Special Monitoring

In November 1983, organic contamination was encountered in USGS series-82 groundwater monitoring well near the NRC-licensed disposal area. Waste organic solvent composed of n-dodecane mixed with tributyl phosphate had been buried in tanks when the NFS, Inc. reprocessing facility had been operating. Wells were drilled from 1984 to 1986 to monitor and recover the solvent from the disposal area. The apparent movement of solvent away from the buried location in 1988 initiated more extensive monitoring and characterization of the area.

Changes in the organic solvent levels that were observed in some wells monitored in November 1989 by the WVNS waste management group renewed concerns of migration.

In December 1989 nonroutine sampling of wells 85-I-9, 89-5-N, and 89-14-E was carried out to determine the chemical and radiological makeup of the solvent-contaminated groundwater. These wells are selected because they had exhibited increases in organic levels.

Samples collected from the wells were submitted for a variety of analyses including volatile and semi-volatile organics, pesticides, PCBs, and tributyl phosphate. A sufficient sample volume collected from well 85-I-9 allowed for additional testing. Metals, biological and chemical oxygen demand, water quality, and selected radiological and nonradiological parameters were included in the analyses.

Analytical results of an independent laboratory were presented in the 1989 Site Environmental Report. Their findings yielded results below analytical detection limits with only a few exceptions (see WVDP Site Environmental Report for Calendar Year 1989). Additional positive results for a variety of unknown compounds, mainly saturated hydrocarbons, were also reported. These findings support beliefs that the detected compounds originated from the organic solvent used during reprocessing operations.

In response to the migrating organic solvent, an interceptor trench bordering the northeast and northwest boundaries of the NDA was installed in 1990. The trench, measuring approximately 250 meters (800 ft.) in length and having a maximum depth of 6.4 meters (21 feet), was constructed over an eighteen-month period. The purpose of the trench system is to intercept and collect any organic solvent contaminated groundwater. Once in the trench, the contaminated groundwater will be routed to the LPS where solvent will be separated from the water and the water will be pre-treated to remove iodine-129. The remaining water will be directed to the LLWTF for further processing. The LPS is scheduled to be approved for operation in early 1992.

Monitoring of 85- and 89-series wells continued through 1990 by the WVNS waste management group. Wells are examined routinely for water and solvent level. Several new 90-series wells located along the northeast corner of the NDA were sampled in 1990 for selected parameters, including analysis for volatile organics. The results, as determined by a subcontracted laboratory, indicated no volatile organic contamination.

Monitoring of critical wells and liquid drainage to the trench will continue in an effort to track the migration patterns of the solvent contaminated groundwater. The LPS will be capable of handling an estimated flow rate of 11 liters (3 gal.) per minute through the trench. This would result in an annual treatment of approximately 6 million liters (1.6 million gal.) of contaminated water.

The interceptor trench and LPS will be operated within the limits of DOE orders and other applicable state and federal regulations. The system as a whole has been designed and is begin operated in such a manner as to prevent the spread of organic solvent into the surface waters of New York State.

The following descriptions of waste management units provide basic information about the super solid waste management units (SSWMUs) as detailed in the site's Sampling and Analysis Plan (SAP): Groundwater Monitoring Network (WVNS 1990). Monitoring wells were installed and well development was completed for all super solid waste management units (SSWMUs) during 1990.

SSWMU #1 - LLWTF

The LLWTF is comprised of four active lagoons: Lagoons 2, 3, 4, and 5 and Lagoon 1, an inactive lagoon that has been filled in and covered

Lagoons 1, 4, and 5 were constructed in the surficial sand and gravel strata and Lagoons 2 and 3 penetrate into the Lavery till beneath the surficial sand and gravel. Lagoons 4 and 5 have membrane liners. a

french drain (sampling point WNSP008) had been installed on the north and west sides of Lagoons 2 and 3 by the original operator of the reprocessing plant, NFS, in order to intercept and reduce groundwater seepage into Lagoons 2 and 3. The drain consists of a 15-cm diameter perforated pipe buried approximately 3 meters below grade. The drain extends almost to the top of the Lavery till and discharges to Erdman Brook, east of Lagoon 3.

During 1990 SSWMU #1 was monitored by six existing wells, a ground seep, and monitoring point WNSP008.

Under the expanded monitoring network the seep, WNSP008, and the 86-series wells were combined with the twelve new 90-series wells for a more comprehensive monitoring program. This new monitoring system was sampled for selected contamination indicator parameters during December 1990.

SSWMU #2 - Miscellaneous Small Units

SSWMU #2 consists of four small facilities east of the southern end of the former reprocessing plant. They were grouped together as a super solid waste management unit because of their close proximity and because of the similarity of subsurface conditions beneath the units.

The individual facilities in SSWMU #2 are:

The sludge pond, which contains demineralized backwash sludges from the process plant water treatment system. The sludge pond consists to two shallow, excavated beds in the surficial sand unit.

The solvent dike, was used to catch and temporarily retain runoff from the reprocessing plant's solvent storage terrace. This unit has been closed and backfilled.

The effluent mixing basin, which receives mixed non-radioactive utility room and treated sanitary waste waters before discharge.

The paper incinerator, which was used to dispose of cartons received in the warehouse and general paper waste generated in non-radioactive areas of the facility.

Monitoring of SSWMU #2 will focus on the surficial sand and gravel layer and the till-sand unit.

The upgradient and downgradient wells used to monitor SSWMU #2 are shown in section 3.0, "Groundwater Monitoring", of the 1990 Site Environmental Report.

SSWMU #3 - Liquid Waste Treatment System

The LWTS contains decontaminated liquid effluent from the supernatant treatment system (SSWMU #4). The liquid effluent from the LWTS is processed by the cement solidification system, producing a solid, low-level radioactive waste form suitable for disposal.

The wells used to monitor SSWMU #3 are shown in section 3.0, "Groundwater Monitoring", of the 1990 Site Environmental Report. Since monitoring of the two upper sand units (the surficial sand and gravel and till-sand) will provide evidence of a release, the lacustrine-kame delta deposits will not be monitored.

SSWMU #4 - High-level Waste Storage and Processing Area

The high-level waste storage (HLWS) and processing area includes the high-level radioactive waste tanks, the supernatant treatment system, and the vitrification facility. The high-level waste is stored in underground steel tanks inside reinforced concrete vaults. The vaults extend 40 feet below the surface into the Lavery till. It is this high-level waste that will be processed into a stable, glass waste form.

The 1990 monitoring network used a series of four monitoring wells: One upgradient well, WNW80-02, and three downgradient wells, WNW86-07, WNW86-08, and WNW86-09. Two additional sampling locations (WNW86-12 and WNDMPNE) were monitored with this unit to provide comparisons with a representative upgradient well. These additional locations monitor the former nonradioactive construction and demolition debris landfill (CDDL), which was closed in 1986. The CDDL is now classified as a separate SSWMU in the new program.

The expanded monitoring network will phase out previously existing well WNW80-02 and incorporate eleven new wells for a total of fourteen monitoring locations.

SSWMU #5 - Maintenance Shop Sanitary Leach Field

Groundwater monitoring will focus on a former leach field once used by the plant's maintenance shop to process sewage that the shop generated.

Two wells - one upgradient well (WNW0501) and one downgradient (WNW0502) - were added to this unit. As the upgradient well is downgradient of many other super solid waste management units, the background conditions will be monitored by wells WNW0301 and WNW0401.

SSWMU #6 - Low-Level Waste Storage Area

The LLWS includes metal and fabric structures housing low-level radioactive wastes being stored for future disposal. Currently the area contains one metal and five fabric storage structures. Additional downgradient wells will be used from adjacent SSWMUs. The area also includes the site of the old hardstand, which was used by NFS to temporarily store radioactive materials. The hardstand and the soils around it are still slightly radioactively contaminated.

SSWMU #7 - Chemical Process Cell Waste Storage Area

The CPC waste storage area is a fabric-covered structure placed on a compacted gravel floor. The CPC waste storage area contains packaged pipes, vessels, and debris from the decontamination and cleanup of

the chemical process cell in the former reprocessing plant that are being stored until they can be conditioned in the planned noncontact size reduction facility for eventual disposal.

Seven new 90-series wells will be used for this groundwater monitoring network. Samples were collected from these wells for selected contamination indicator parameters during 1990.

SSWMU #8 - Construction and Demolition Debris Landfill

The disposal area was used by both NFS and WVDP to dispose of nonhazardous and non-radioactive materials. There is no record of disposal of hazardous materials in this facility; however, there is also no evidence of waste acceptance procedures that would exclude them. The unit was approved for closure by NYSDEC and closed in 1986 by a covering of a compacted clay till.

Four new 90-series wells will be used along with wells WNW86-03 and WNW86-12 to monitor SSWMU #8. The new 90-series wells were sampled for selected contamination indicator parameters during 1990.

SSWMU #9 - NDA

The NDA contains radioactive wastes generated by NFS and the WVDP, including leached fuel assembly hulls and ends, sludges, spent solvents, discarded vessels and piping and other miscellaneous items. Groundwater monitoring of the NDA will use eight of the new 90-series wells and two previously existing 86-series wells (WNW86-10 and WNW86-11). Background information will be provided by wells WNW1008b and WNW1008c. Upgradient conditions will be monitored by three new 90-series wells. Locations of the wells are shown in section 3.0, "Groundwater Monitoring", of the 1990 Site Environmental Report.

SSWMU #10 - Integrated Radioactive Waste Treatment System Drum Cell

The IRTS drum cell contains stored cement-stabilized low-level radioactive waste produced in the cement solidification system of the liquid waste treatment system (SSWMU #3). In the future, cement-stabilized sludge wash water and cleaning water from the noncontact size reduction facility will be stored here. This waste is currently classified as nonhazardous. The new 90-series monitoring wells will surveil the groundwater in this area.

SSWMU #11 - SDA

The NYSDEC requested that the SDA be monitored. This function is a NYSERDA project and as such is not part of the WVDP. Twenty-one groundwater wells have been installed to monitor both the weathered and unweathered till and the lacustrine deposits beneath the SDA.

The SDA was operated by Nuclear Fuel Services, Inc. as a commercial low-level disposal facility. In addition to a wide variety of utility, industrial, and institutional customers, the SDA received a large volume of wastes from the NFS reprocessing operations. Between 1963 and 1975, 2.35 million cubic feet of low-level radioactive waste was disposed of in the SDA trenches.

The groundwater monitoring program for 1990 included sampling the twenty-one wells for gross alpha, gross beta, tritium, and gamma emitters. The full groundwater monitoring program for the SDA is planned to begin in mid-1991.

5. Problems and Issues

On-site areas where soils could have been contaminated from past or present storage activities need to be characterized to determine if stabilization or near-term remediation is warranted. This is a part of the Phase II Site Characterization program which is currently being implemented.

G. RELATED SUBJECTS

1. Quality Assurance

The overall Quality Assurance Program at WVDP is established in accordance with ASME NQA-1 1989 and DOE/RW-0214, Rev. 4, and the current revisions of DOE Order 5700.6C, "Quality Assurance", and DOE-ID 5700.6C, "Quality Assurance" are being incorporated. The Quality Assurance Program is defined in the WVNS Quality Assurance Program Plan (WVDP-002) which includes the Quality Management Manual (QMM). Quality Assurance procedures are contained in the Quality Assurance Procedures Manual.

Departments at the WVDP involved in waste management are responsible for establishing and implementing policies and procedures which control the quality of their work in accordance with the QMM. Responsibility for compliance to this plan and related procedures rests with all involved personnel.

2. Personnel Training

A formal waste management operator specific training program designed to comply with DOE order 5480.5 has been established at the WVDP. This program consists of an initial generic Waste Management Qualification Standard, "Waste Management B", which requires approximately four months to complete. This training is followed by specific "A" operator training in one of five areas; RTS Drum Cell, Waste Management Storage Operations, Waste Management Handling Operations, Waste Management Radiological Projects, and Hazardous Waste Operations. Each of these specific qualification standards require 6 to 9 months to complete which includes 2 to 3 months on-the-job training (OJT). All of this training is defined in qualification standards that prescribe testing requirements, annual refresher training requirements, and requalification requirements every 2 years.

3. Technology Demonstration

Two areas in the West Valley Waste Management Program are appropriate for discussion as technology development efforts.

First, the vitrification of HLW (the primary project mission) is undergoing a continuing process of testing and evaluation in conjunction with the NRC and the DOE OCRWM to ensure that the waste form and the canister meet the specifications for acceptance at a Federal Waste Management Facility. International experience in waste solidification from the Federal Republic of Germany, France, and Japan have been factored into this development program. Waste sludge mobilization experience from Savannah River Plant and Hanford have also been integrated into project development.

A second related technology demonstration process developed at WVDP is that of the treatment and solidification of supernatant from the HLW storage tanks. This overall IRTS produces a cement-solidified waste form contained in .27 m^3 (71 gallons) drums, which meets current EPA and NRC waste disposal requirements, as Class C low-level waste. The RTS Drum Cell is the storage facility for the .27 m^3 (71 gallons) drums. Future plans include evaluation of this facility as a tumulus-type final disposal system.

The IRTS process is described in detail in Appendix C of this report.

4. Waste Management Data Base

The data base developed at the WVDP has provided input to the DOE Integrated Data Base (IDB) Program starting in FY85. The 1989 data base information for WVDP has been upgraded and transmitted to Oak Ridge National Laboratory.

The WVDP uses a computerized waste inventory system to manifest waste package data with the physical and chemical characteristics of all waste, volume of waste, weight of waste, and major radionuclides and their concentrations. This program will characterize waste with sufficient accuracy to permit proper segregation, treatment, storage and disposal. The procedures associated with this system were revised during 1990.

5. Decontamination and Decommissioning Programs

Past decontamination activities at WVDP have included clean up of the old process building CPC that will be utilized for interim storage of HLW glass filled canisters. In addition, the XC-3 extraction cell, Product Purification Cell (PPC) extraction cell, extraction chemical room (XCR), chemical crane room, EDR, the solvent storage terrace, and associated valve cubicles have been cleaned up for reuse.

Old radiochemistry laboratories have been cleaned out and now house new laboratory facilities in support of the HLW treatment process. The Extraction Sample Aisle is being reused for laboratory storage. Figure 12 provides a status of past D&D completions in the major areas of the process building.

Several of the decontamination efforts have primarily been in support of the IRTS which is the primary operation leading up to HLW Vitrification.

There are currently no active decontamination programs at WVDP. Also, there are no facilities declared surplus at this time.

Future D&D activities will be determined by operational needs and final closure requirements being developed for the EIS process now in progress.

A study of alternative postsolidification activities is being prepared to provide the DOE a basis for Phase II budget planning. The requirements of the WVDP Act and the NYSERDA/DOE Cooperative Agreement, the NRC/DOE MOU, and requirements of interim storage and transportation of solidified HLW and TRU wastes, site maintenance, disposal of LLW and final D&D are being considered in the study preparation.

The NRC and the U.S. EPA are currently coordinating efforts to develop residual radioactivity standards for decommissioned NRC-licensed plants. Criteria for decommissioning have been developed by the NRC. These criteria do not establish the residual radioactivity level standards at this time (USNRC 1985). The WVDP Act of 1980 required that the decommissioning of project facilities be done in accordance with criteria established by the NRC. The WVDP and NRC have had several meetings regarding project completion. Agreement has been reached, in principle, that NRC will be a cooperating agency for the WVDP Phase II EIS. The cooperating agency status will expedite resolution of the D&D criteria through the EIS process.

The EIS will use a programmatic approach to develop the necessary safety and environmental documentation required to support decisions on final D&D of Project facilities. The EIS will focus on issues, analysis, and review to assure orderly development of the final D&D plans including timely completion and approval of the necessary safety and environmental documentation. Additionally, issues pertinent to specific Project premises and facilities which require further investigations and regulatory decisions for resolution will be addressed.

A broad range of alternatives for project completion and site closure will be evaluated in the EIS process. Most major facilities, areas, and systems at WVDP present several viable courses of action. These will be considered both individually and in combination with one another. Six closure alternatives are proposed for study as follows:

- O Greenfield
- O Exhumation, on-site waste storage and perpetual care
- O In-situ decommissioning and on-site low-level waste disposal
- O In-situ decommissioning with limited reuse and no new on-site disposal areas
- O Storage followed by in-situ decommissioning
- O No action

6. Environmental Impact Statement Status

The current schedule for major milestones associated with development of the EIS are as follows:

ACTIVITY	TARGET/ACTUAL COMPLETION DATE
Publish Notice of Intent (NOI)	December 30, 1988 (complete)
Scoping Meetings	February 9, 1989 (complete)
Scoping Period Closes	February 23, 1989 (complete)
Implementation Plan Approval	In Progress

EIS Contract Award	October, 1992
Draft EIS (DEIS) Notice of Availability	June, 1994
Close of DEIS Comment Period	December, 1994
Final EIS (FEIS) Notice of Availability	March, 1995
Record of Decision Published	October, 1995
Follow-On Environmental and Safety Reviews	TBD

H. REFERENCES

1. Waste Management Documentation (References)

This section lists the required principal documentation applicable to HLW, TRU, LLW and D&D waste management operations specified by DOE Order 5820.2A. Applicable documentation for hazardous waste is also included.

High-level Waste

a. Safety Analysis Reports (SARs)

1. WVDP, Vitrification System, WVNS-SAR-003, Vol. III, Sec C., Rev. 1, 8/25/88.

2. WVDP, Existing Plant and Operations, WVNS-SAR-002, Vol II, Sec. B, Rev. 2, 06/22/89.

3. WVDP, Supernatant Treatment System, WVNS-SAR-004, Vol III, Sec. D, Rev. 6, 10/16/91.

b. Assessments of HLW Storage Tasks

1. WVDP, Maintenance of Carbon Steel High-Level Waste Tank Integrity, OSR-IRTS-1, Rev. 3, 8/27/91.

2. WVDP, Maintenance of Spare HLW Storage Capacity, OSR-IRTS-3, Rev. 3, 8/27/91.

3. WVNS Co., Inc., Waste Tank Operations, SOP 8-1, Rev. 20 FC#1 10/91, FC#2 10.91, FC#3 12/91

c. Contingency Actions of the Past Year
Contingency Actions on the HLWTF are currently being upgraded. Day-to-day contingency actions have been employed to monitor the HLW tanks to determine if any leaks or spills occur.

TRU WASTE

a. Waste Certification Plan

1. U.S. DOE, Data Package Format for Certified TRU Waste for WIPP. WIPP-DOE-157, Rev. 1, 9/85.

2. U.S. DOE, TRU Waste Acceptance Criteria for WIPP. WIPP-DOE-069, Rev. 2, Carlsbad, New Mexico, 9/85.

3. WVDP, TRU Waste Certification Program Plan for WVDP, (WVDP-030), Rev. 1, 8/84.

4. U.S. DOE, Defense Waste Management Plan for Defense TRU Waste Program. DOE-JIO-023, Albuquerque, New Mexico, 7/87.

b. Operating and Closure Plans for Interim Storage

1. WVDP, WVNS-SAR-009, Volume IV for Lag Storage and Supercompactor Operations, See J.7, Waste Confinement and Management, (EH:86:0010), Rev. 1, 8/23/88.

2. DOE 1540.1 and 49 CFR 173. Waste shipments and vehicles must comply with these documents.

3. WVDP, Storage Requirements for LLW, OSR-TR-GP-6, Rev. 2, 8/27/91

4. Vol 53, No. 251, Federal Register, U.S. DOE Notice of Intent to Prepare an EIS, 12/88.

c. Major Documents for Buried TRU

1. WVDP Radioactive Waste Disposal Records

2. Final Closure EIS

Low-Level Waste

a. Overall Waste Management Systems Performance

1. WVDP, Project Overview and General Information, Volume I & II (WVNS-SAR-001), Rev. 0, 08/23/88.

2. WVDP, SAR for Cement Solidification System, See G.7.0, Waste Confinement and Management, (WVDP-037), SAR-008, Volume IV, Rev. 1, 09/07/88.

3. WVDP, SAR for Liquid Waste Treatment System, See H.7.0, Waste Confinement and Management, (WVDP-049), WVNS-SAR-005, Rev. 3, 09/27/91.

4. WVDP, Low-Level and TRU Waste Assay and Methodology, Supplement J.7.2. WVNS Co., Inc., DOE/NE/44139--16, 3/87.

5. WVDP, Existing Plant and Operations, (WVNS-SAR-002), Volume II Rev. 2, 06/22/89 - ECN Pending.

b. Storage and Disposal Facilities

1. WVDP, SAR for Low-Level Class B and Class C Radioactive Waste Handling and Storage Operations for

the Radwaste Treatment System Drum Cell, (DOE/EA-0295), SAR-007, Rev. 2, 8/23/88.

2. WVDP, SAR for Low-Level Class A Radioactive Waste Handling and Disposal Operations, See K.7.0, Waste Confinement and Management, (DOE/EA-0295), SAR-006, Rev. 1, 09/07/88.

3. U.S. DOE, Environmental Assessment for Disposal of Project Low-Level Waste, (DOE/EA-0295), WV, New York, 04/86.

4. WVDP, Operational Safety Requirements, Storage Requirements for Low-Level Waste, OSR/TR-GP-6, Rev. 2, 8/27/91

5. WVDP, Storage Canister Loading and Spacing, OSR/GP-11, Rev. 2. 12/21/88.

c. Disposal Site Closure Plan and Waste Forecasts

1. Final closure EIS.

2. DOE Integrated Data Base for 1989, DOE (IDB) for 1988: Spent fuel and Radioactive Waste Inventories, Projections, and Characteristics, (DOE/RW-0006), Rev. 5, November 1989.

d. Decommissioning of Radioactive Contaminated Facilities

1. WVDP, SAR for Existing Plant and Operations, Sec. B.6.0, Decontamination of Primary Cells in the Support of the HLW Solidification, SAR-002, Rev. 2, 6/22/89. - ECN Pending

2. Final closure EIS.

3. WVNS, WVDP Post-Solidification Project Decommissioning Alternatives Study, Feb. 1989.

Hazardous Waste

1. WVDP-073, Hazardous Waste Management Plan, Rev. 3, 6/15/89

2. WV-660, Off-Site Transportation of Hazardous Materials/Waste, Rev. 5, 07/26/91

3. WV-996, Hazardous Waste Management Program, Rev. 1, 6/15/90

General References

1. WVNS, DOE 5820.2A Implementation Plan, 09/26/88

2. WVNS, WVDP Site Environmental Monitoring Report for CY1990, Final Draft, 5/91

3. WVDP-019, Annual Waste Management Plan, Rev. 9, 2/91

4. WVDP-077, Mixed Waste Management Plan, Rev. 0, 11/89

TABLE 1 - MAJOR PLANNED ACTIVITIES

ACTIVITY AREA	PLANNED ACTIVITY	SCHEDULE/ MILESTONES
HLW Sludge Wash	Initiate sludge washing and process through IRTS.	FY92
Vitrification Facility	Continue modifications of former Chemical Process Cell to store High Level Waste Canisters from the vitrification process.	FY92
	Begin mechanical/electrical construction activities in the vitrification facility.	FY92
	Design Equipment Decontamination Room loadout facility and procure sludge transfer equipment.	FY93
	Vitrification hot operations start	FY96
	Vitrification operations completed	FY98
TRU Fuel Assemblies	Ship remaining fuel assemblies from the fuel storage pool to another DOE site for ultimate storage and/or disposal.	TBD
LLW	Develop new procedures, install equipment, and place new solidification process for unprocessed sludge into operation.	TBD
EIS Contract Award	Determine contractor to prepare the EIS.	FY93
	Record of Decision Published for EIS.	FY96

NOTE: Refer to Program Schedule Status for further details (Appendix A)

TABLE 2

SUMMARY OF WASTE MANAGEMENT COSTS

(Thousands of Dollars)

TASK(S) / WORK AREA	FY-91	FY-92	FY-93	FY-94	FY-95
HLW VITRIFICATION (1)	40,008	43,519	48,763	41,799	28,023
TOTAL - BUDGET:					
LLW/TRU/HAZARDOUS WASTE MANAGEMENT	15,319	16,995	15,775	14,348	13,111
MISCELLANEOUS BUDGETS: WITHIN LLW/TRU/HAZ WASTE MANAGEMENT BUDGET					
WASTE OPERATIONS MANAGEMENT	879	1,039	1,061	1,064	926
RADIOACTIVE WASTE OPS SUPPORT	868	512	469	469	469
STORAGE STRUCTURES	9	219	54	54	54
SLUDGE REMEDIATION	97	171	293	293	293
WASTE ENGINEERING MANAGEMENT	176	242	248	248	248
HAZARDOUS WASTE MANAGEMENT	303	404	337	337	337
WASTE SAMPLING AND ANALYSIS	772	410	411	359	359
RAD. WASTE CHARACTERIZATION/ CLASSIFICATION	0	150	47	47	47
WASTE MINIMIZATION	0	66	47	47	47
MIXED WASTE MANAGEMENT	13	23	99	99	99
INTERCEPTOR TRENCH OPERATIONS	483	46	47	47	47
STEAM JET REMOVAL	291	114	0	0	0
HAZ WASTE TRANSPORTATION DEPT	86	279	188	188	188
HLW TANK MANAGEMENT	210	187	242	242	240
STS OPERATIONS (2)	674	*	*	*	*
LWTS OPERATIONS (3)	262	*	*	*	*
CSS OPERATIONS	237	*	*	*	*
DRUM CELL OPERATIONS	227	*	*	*	*
SLUDGE WASHING	0	1,721	104	0	0
SUPER COMPACTOR OPERATION	23	108	85	85	86
CONTACT SIZE REDUCTION FACILITY OPERATIONS	212	223	229	229	231
TRU WASTE PLANNING	0	0	141	141	0
PHASE II -- EIS	3,843	6,309	11,667	11,771	27,047

(1) -- Includes design, construction, installation, and check out of all equipment and facilities

NOTE: These costs are constant year dollars (non-escalated) and do not contain reserves, etc.

* -- No information available at time of printing

TABLE 3
WEST VALLEY DEMONSTRATION PROJECT 1990 SPDES NONCOMPLIANCE EPISODES

Date	Outfall	Parameter	Limit	Value	Comments
Feb 90	Sum 001,007 008	NH_3	2.1 mg/L	3.46 mg/L	STP Flow Through
Feb 90	Sum 001,007 008	NH_3	2.1 mg/L	3.86 mg/L	STP Flow Through
Feb 90	Sum 001,007 008	NH_3	2.1 mg/L	3.27 mg/L	STP Flow Through
Feb 90	Sum 001,007 008	NH_3	2.1 mg/L	2.81 mg/L	STP Flow Through
Feb 90	Sum 001,007 008	NH_3	2.1 mg/L	5.21 mg/L	STP Flow Through
Feb 90	Sum 001,007 008	NH_3	2.1 mg/L	3.97 mg/L	STP Flow Through
Feb 90	Sum 001,007 008	BOD-5	5.0 mg/L	12.04 mg/L	Related to above
Nov 90	Sum 001,007 008	Fe	0.31 mg/L	0.87 mg/L	001 Fe high
Nov 90	007	Settle-able Solids	0.3 mL/L	0.5 mL/L	Floc material

TABLE 4

Summary of Monitoring Program Changes Implemented in 1990

WNSP001 Analyses added to routine site sampling: To routine discharge grab samples added dichlorodifluoromethane, trichlorofluoromethane, 3,3-dichlorobenzidine, tributylphosphate, and vanadium. To semiannual grab samples added bis (2-ethylhexyl) phthalate and 4-dodecene.

WNSTPBS New sample location/type added: Sampling of sanitary waste sludge for alpha/beta, H-3.

WNSW74A Existing site upgraded: Automated sampling put on line in 1990. In 1989 site was grab sampled monthly and analyzed for gross alpha/beta, H-3 and pH. In 1990, composite sampled weekly for gross alpha/beta, H-3, pH and conductivity, a monthly composite analyzed for gamma isotopic and Sr-90, and a quarterly composite analyzed for C-14, I-129, Pu/U isotopic and Am-241.

WN8D10R New sampling location added: Added weekly sampling of high-level waste tank farm underdrain for Gross alpha/beta, H-3, pH, and monthly composite for gamma isotopic and Sr-90.

WNDRNKW 1989 point WNDRNKW (site drinking water) replaced by four new points monitoring drinking water in the Environmental Laboratory (WNDENKEL), maintenance shop (WNDNKMS), storage tank (WNDNKUR), and main plant (WNDNKMP).

ANRGFOP New fallout pot at rain gauge by Met tower on site.

SFRSPRD, SFBOEHN and SFGRVAL Added U isotopic analysis at these three soil collection sites.

BFB---, BFD--- Added tritium analysis to beef and deer samples.

WVDP Summary Project Schedule

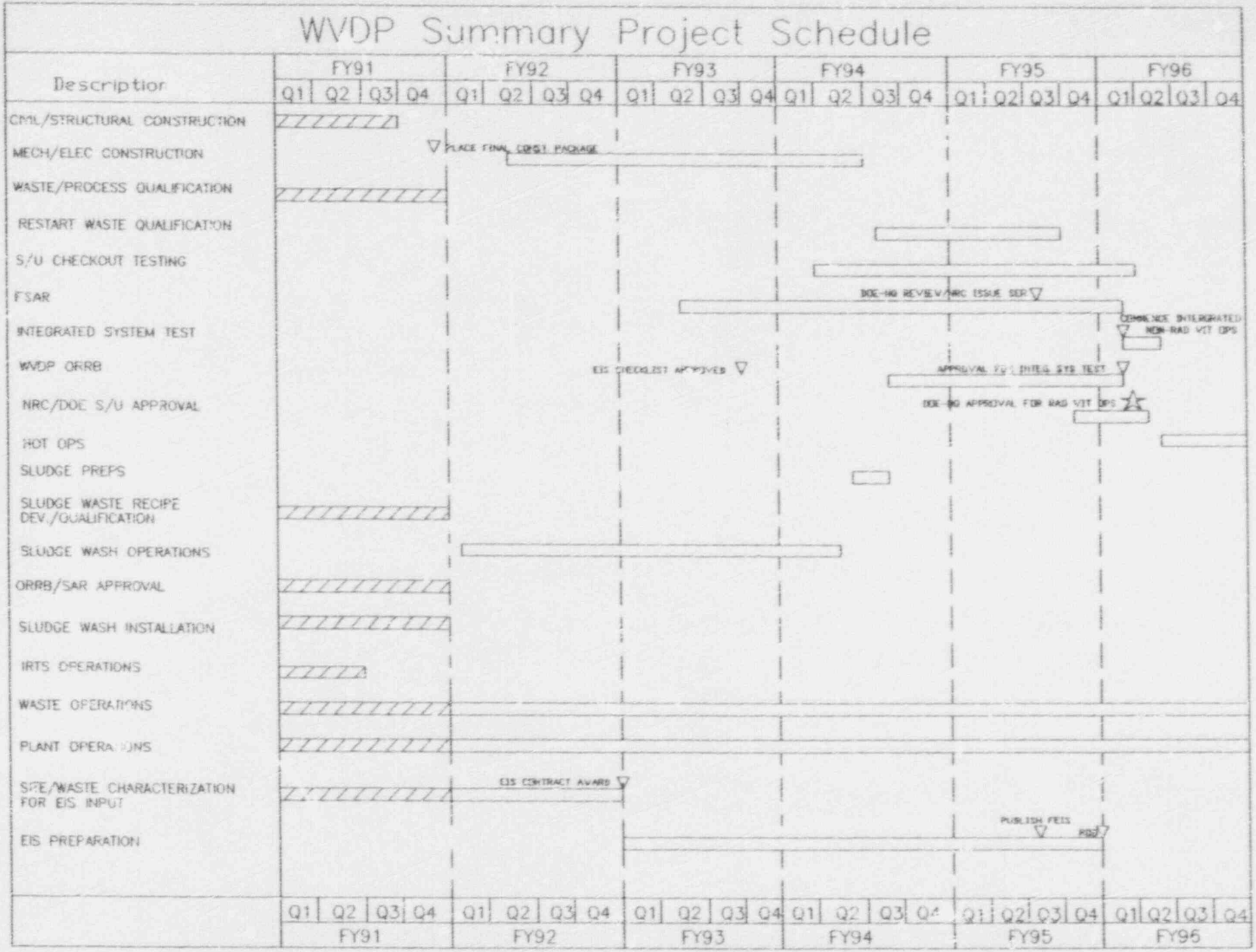
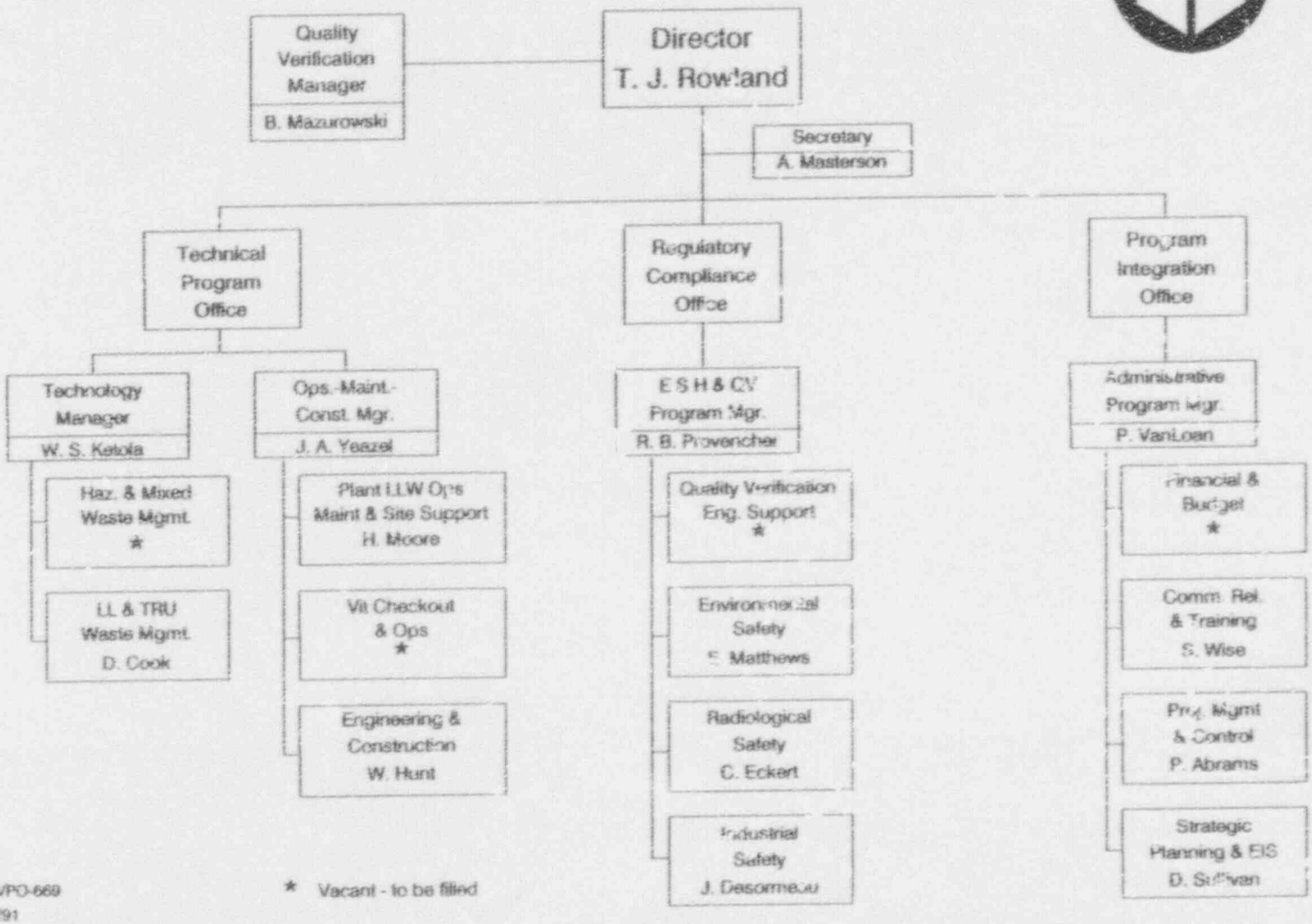


FIGURE 1

West Valley Project Office



* Vacant - to be filled

PP-WVPO-669
11/25/91

FIGURE 2

WVDP-019
Rev. 10

WEST VALLEY NUCLEAR SERVICES

PP-WVNS-668 QA

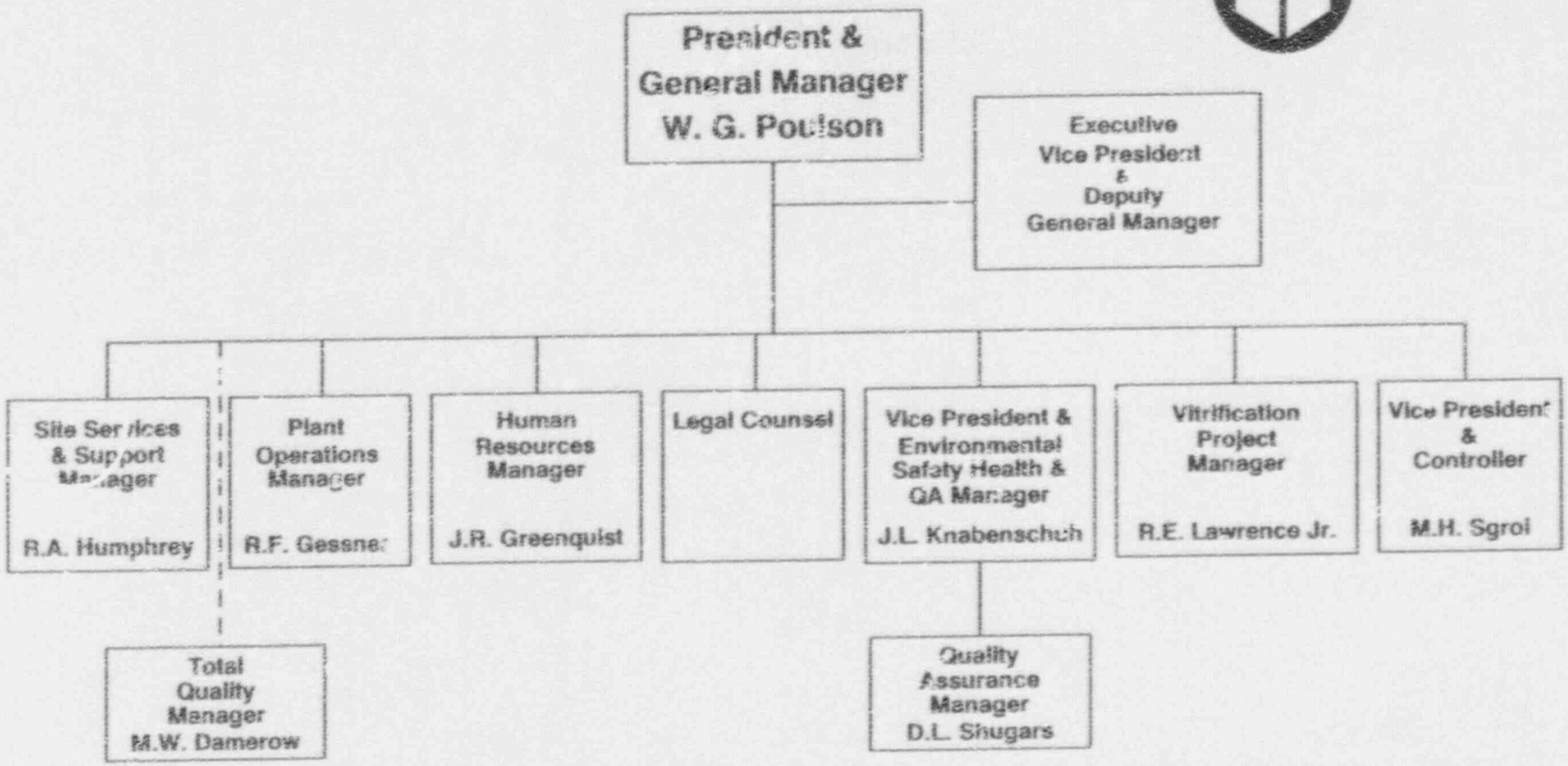


FIGURE 3

FIGURE 4

SITE LOCATION OF WNYNSC

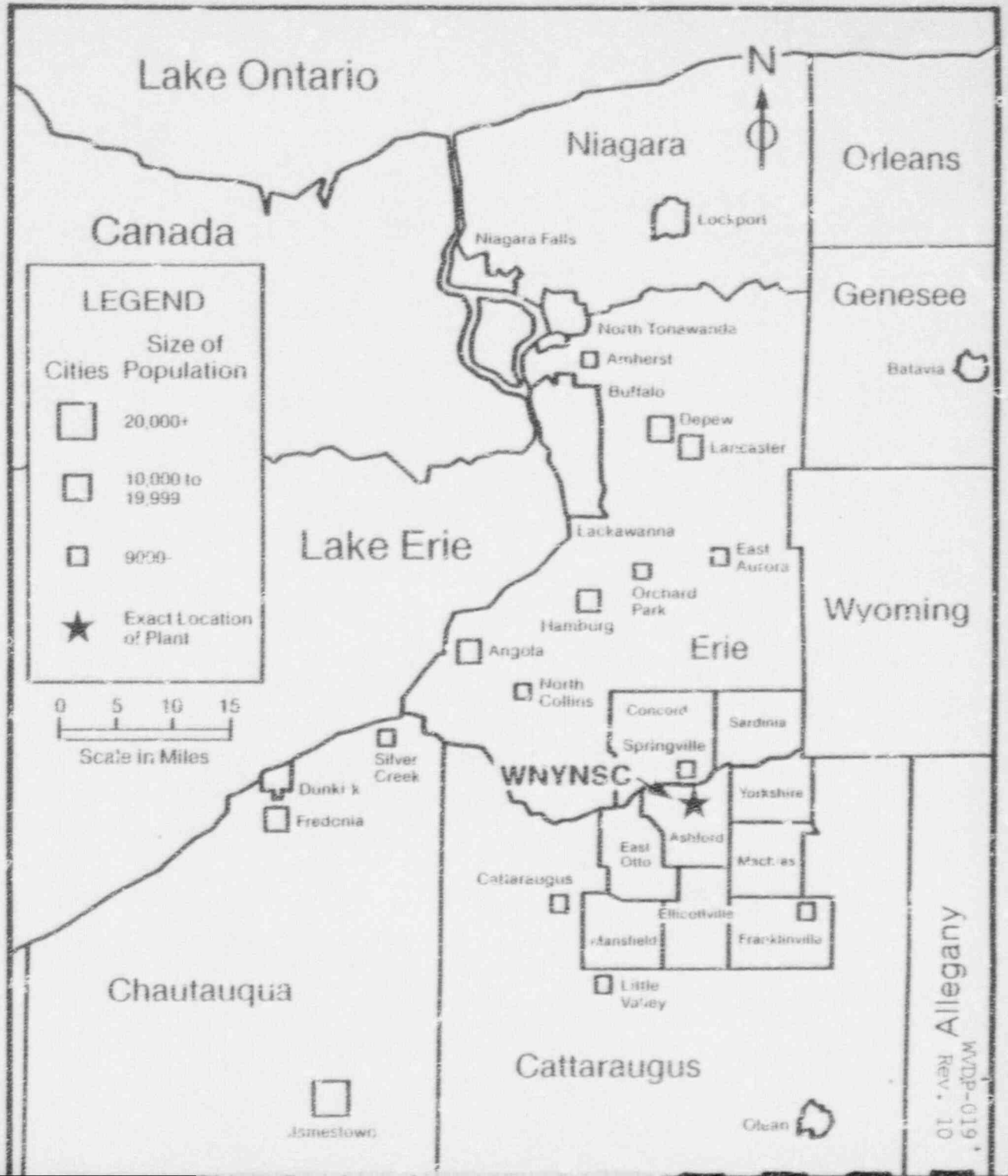


FIGURE 5

WVDP SITE PLAN

WEST VALLEY CONCEPTUAL HLW REMOVAL SYSTEM

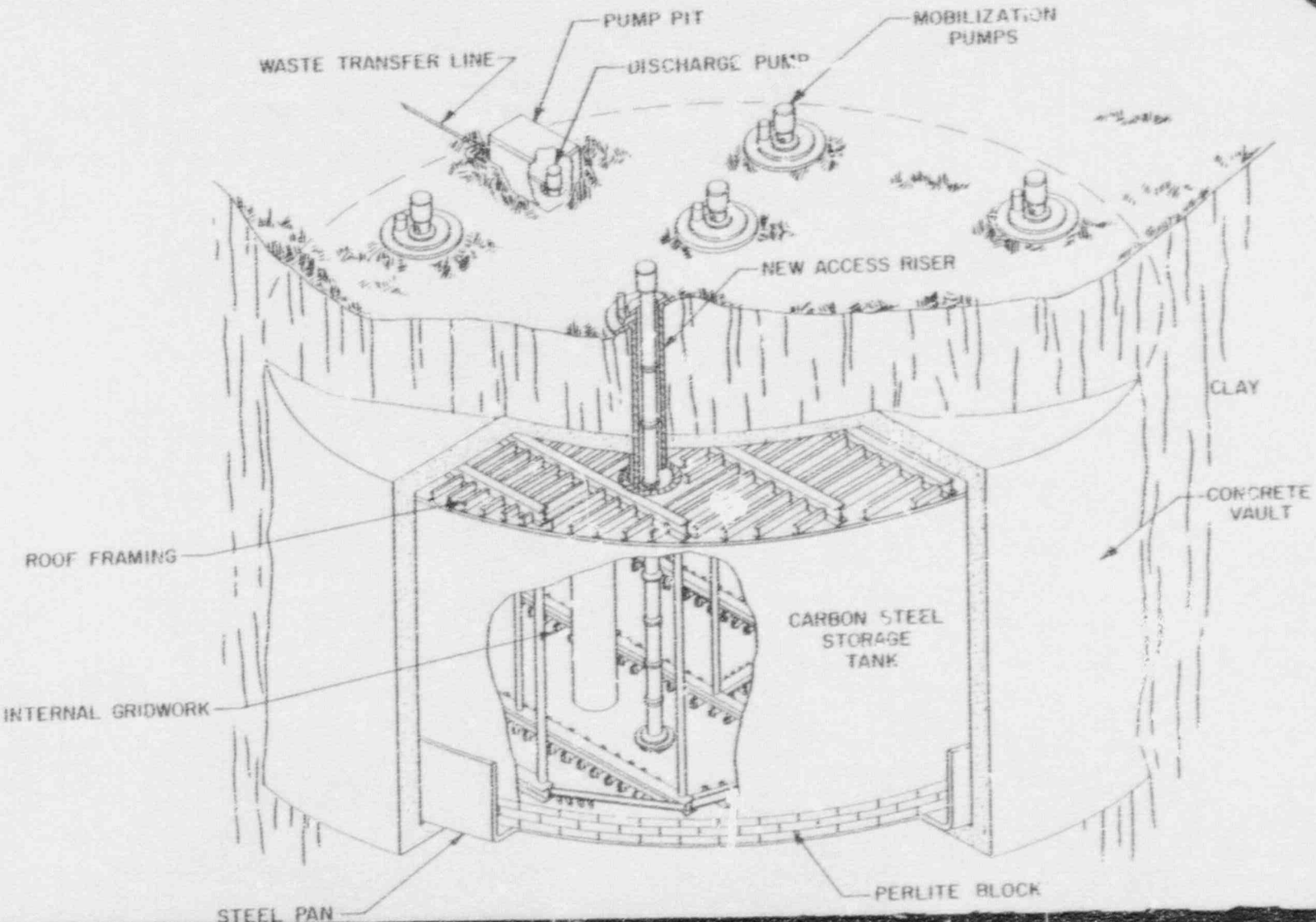


FIGURE 6

WVDP-019, Rev. 10

FIGURE 7
West Valley Demonstration Project Waste Streams

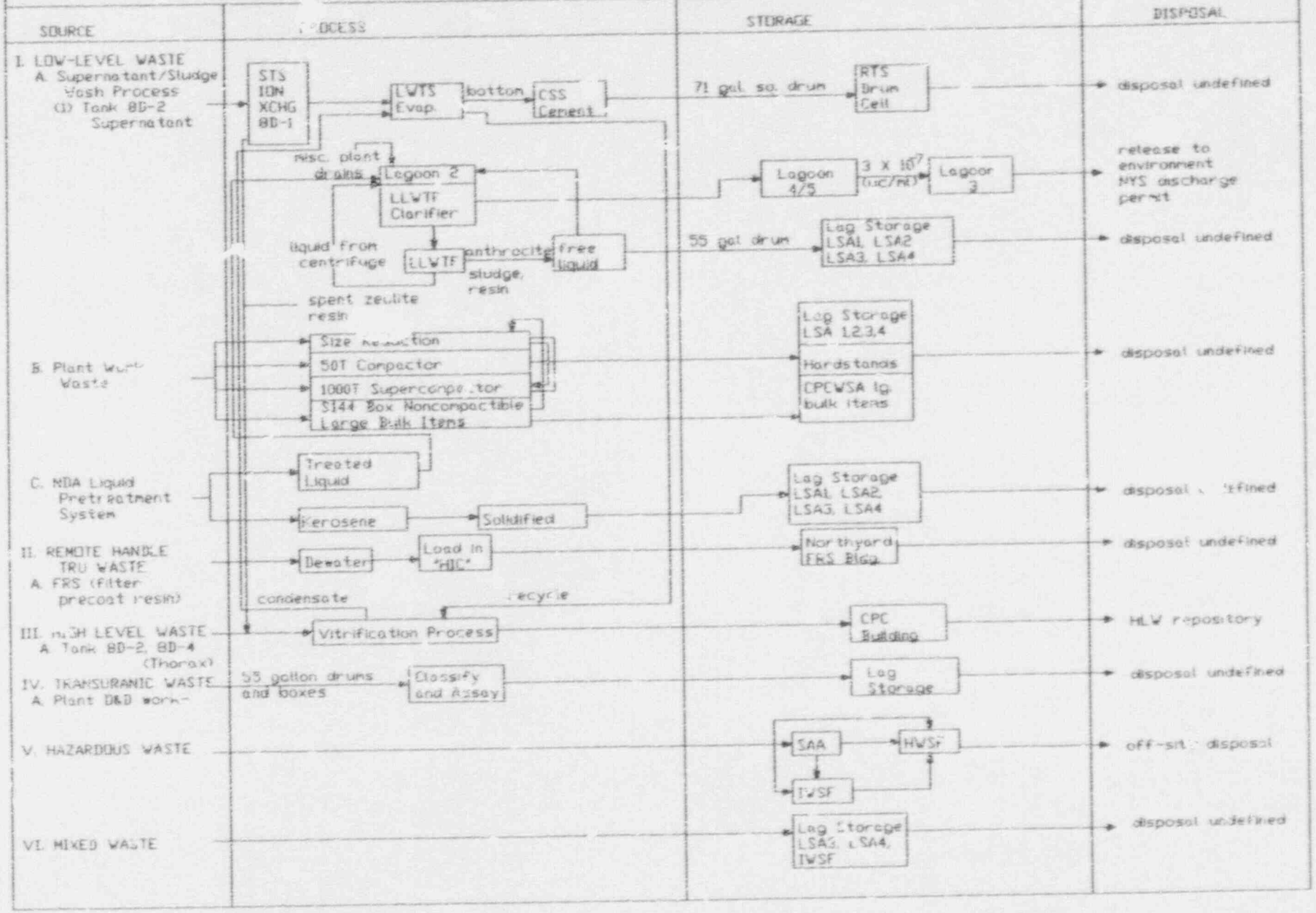
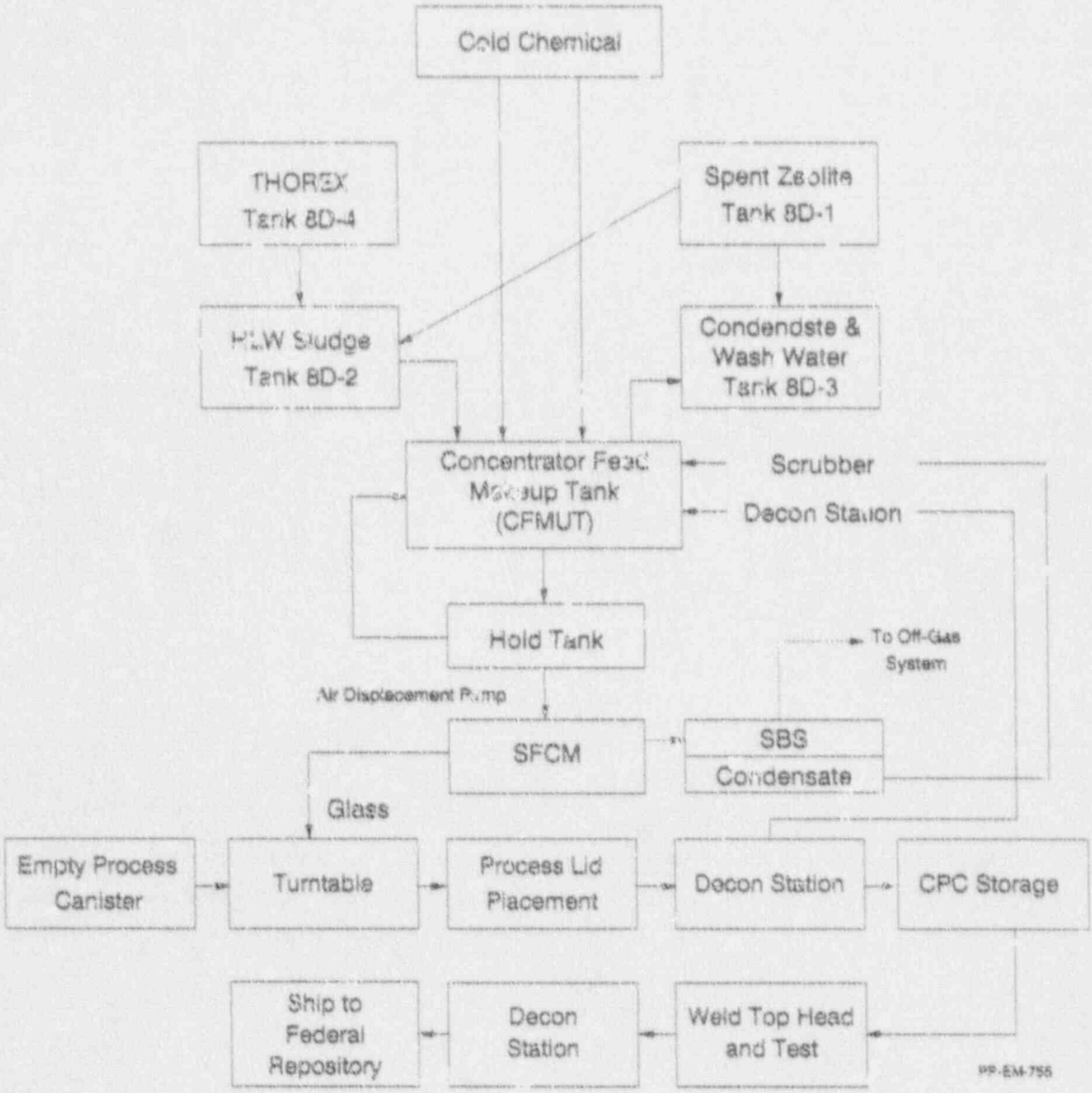


FIGURE 8

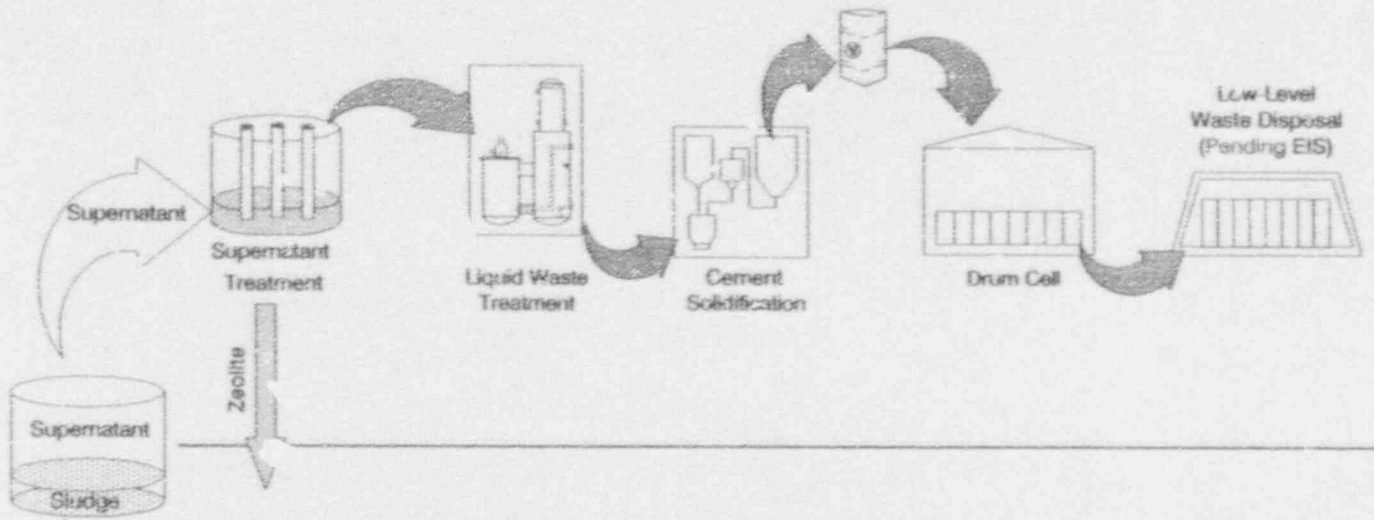
Process of HLW Vitrification for WVDP

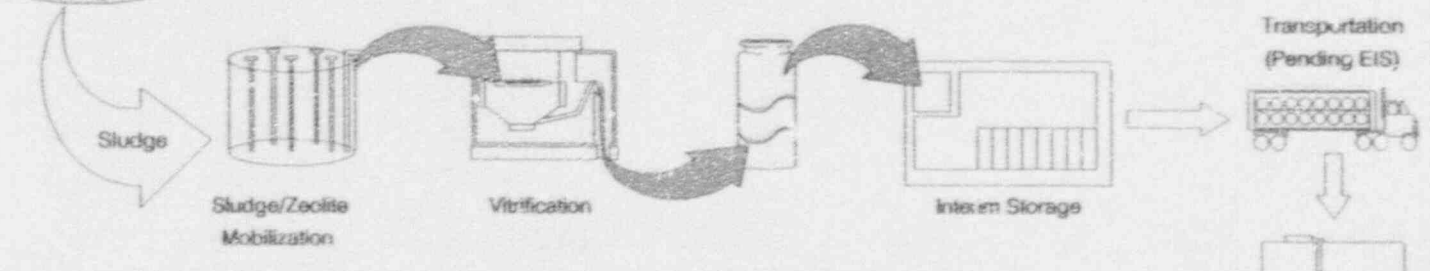


Process Overview

PP-PON-9352

Low-Level Waste Processing Cycle





High-Level Waste Processing Cycle

FIGURE 9

Simplified Process Flow Diagram

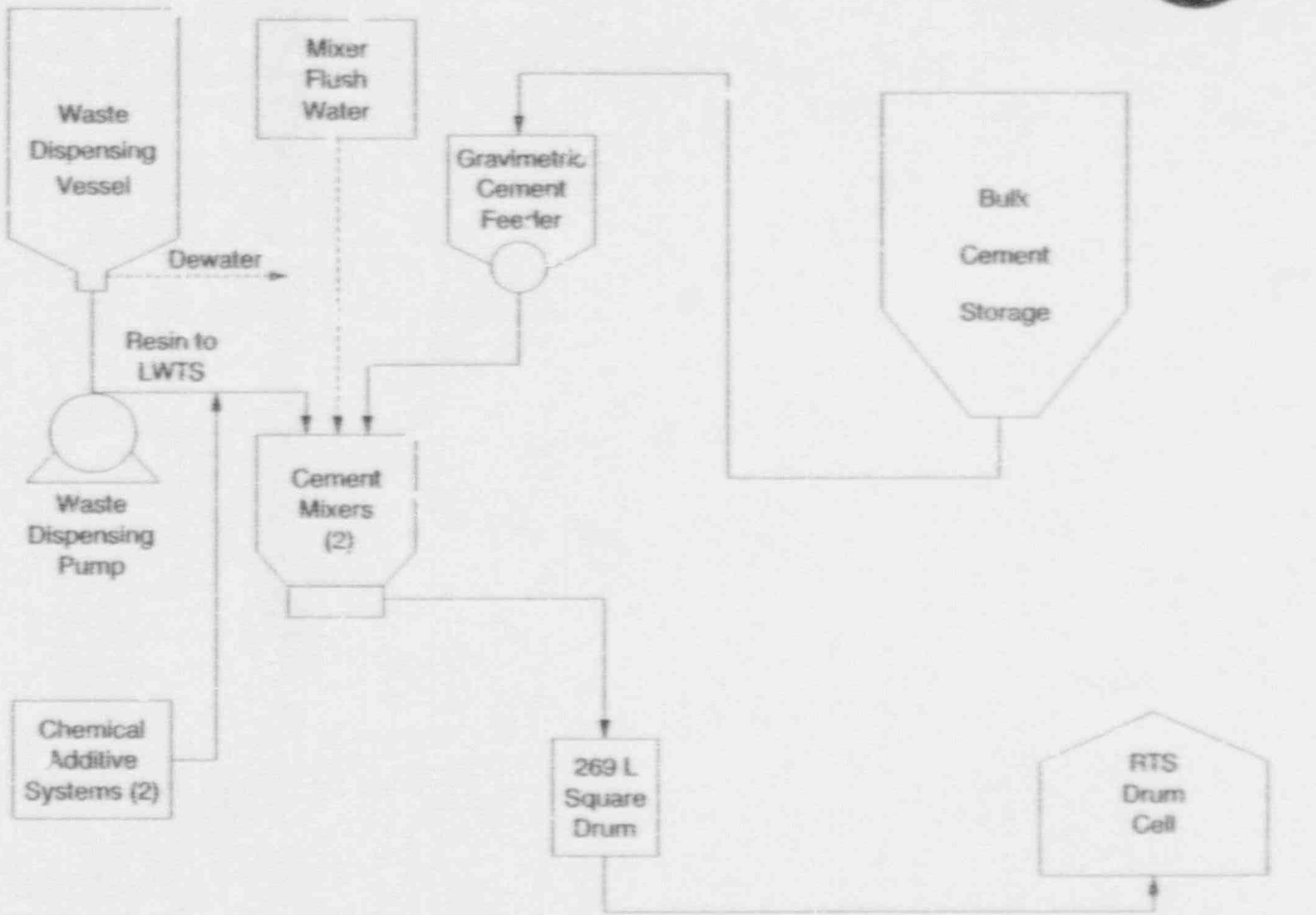


FIGURE 10

Radwaste Treatment System: Drum Cell

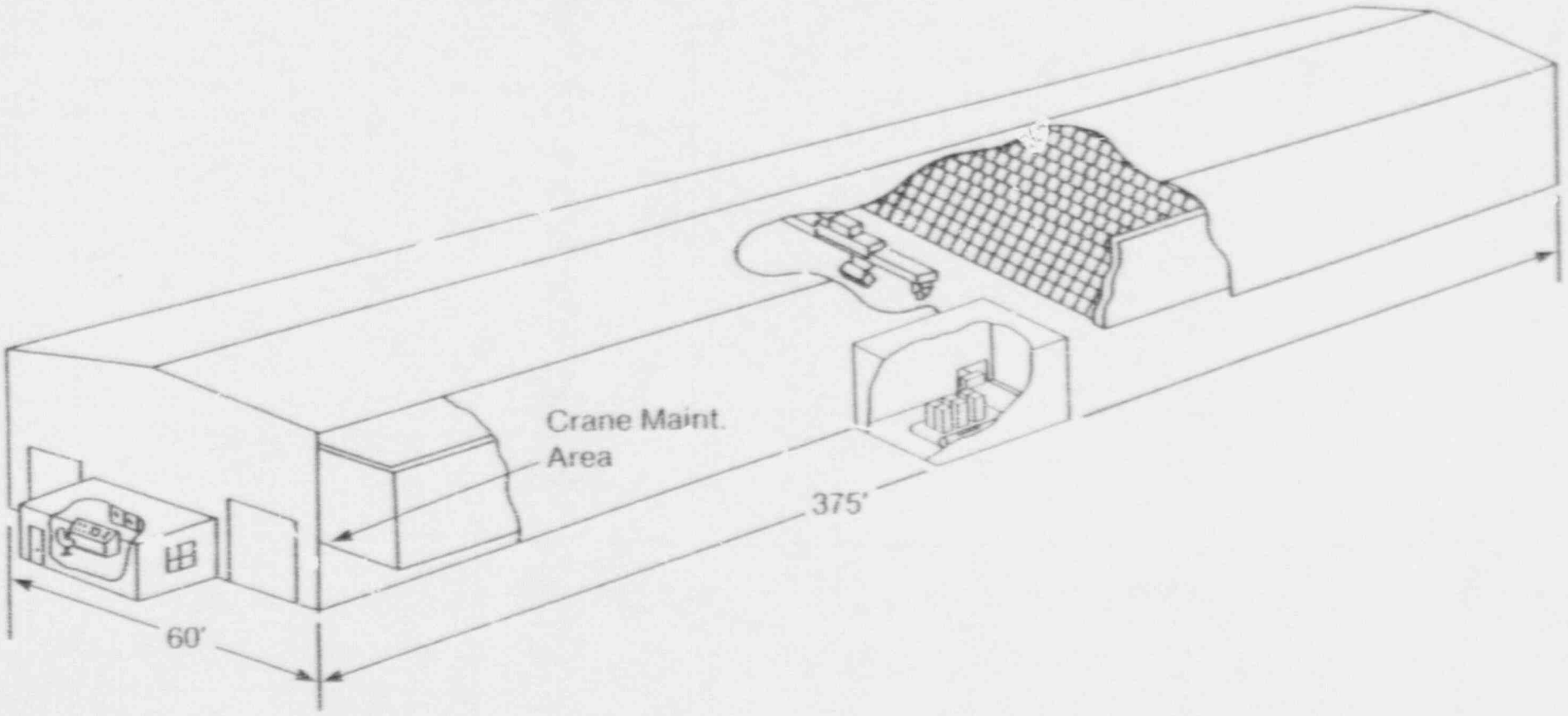


FIGURE 11

WVDP DECONTAMINATION ACTIVITY 12-87

Area	Status
MSM Shop	Complete
Extraction Cell Room	Complete
XC-1	Future
XC-2	Future
XC-3	Complete
Product Purification Cell	Complete
Analytical Lab	Complete
Radiochemistry Lab	Complete
Counting Lab	Complete
Component Test Stand Lab	Complete
Sample Storage Cell	Complete
Plutonium Product Handling	Future
Equipment Decontamination Room	Complete
Chemical Crane Room	Complete
Chemical Process Cell	Complete
Extraction Sample Aisle	Complete
RAM Equipment Room	Complete
Alpha Lab	Complete
Uranium Lab	Complete
Upper Warm Aisle	Complete
Lower Warm Aisle	Complete
Uranium Loadout	Complete
Uranium Product Cell	Complete
Process Mechanical Cell	Future
General Purpose Cell	Future
Scrap Removal Room	Complete
Process Chemical Room	Complete
Hot Acid Cell	Future
Heat End Ventilation Building	Future

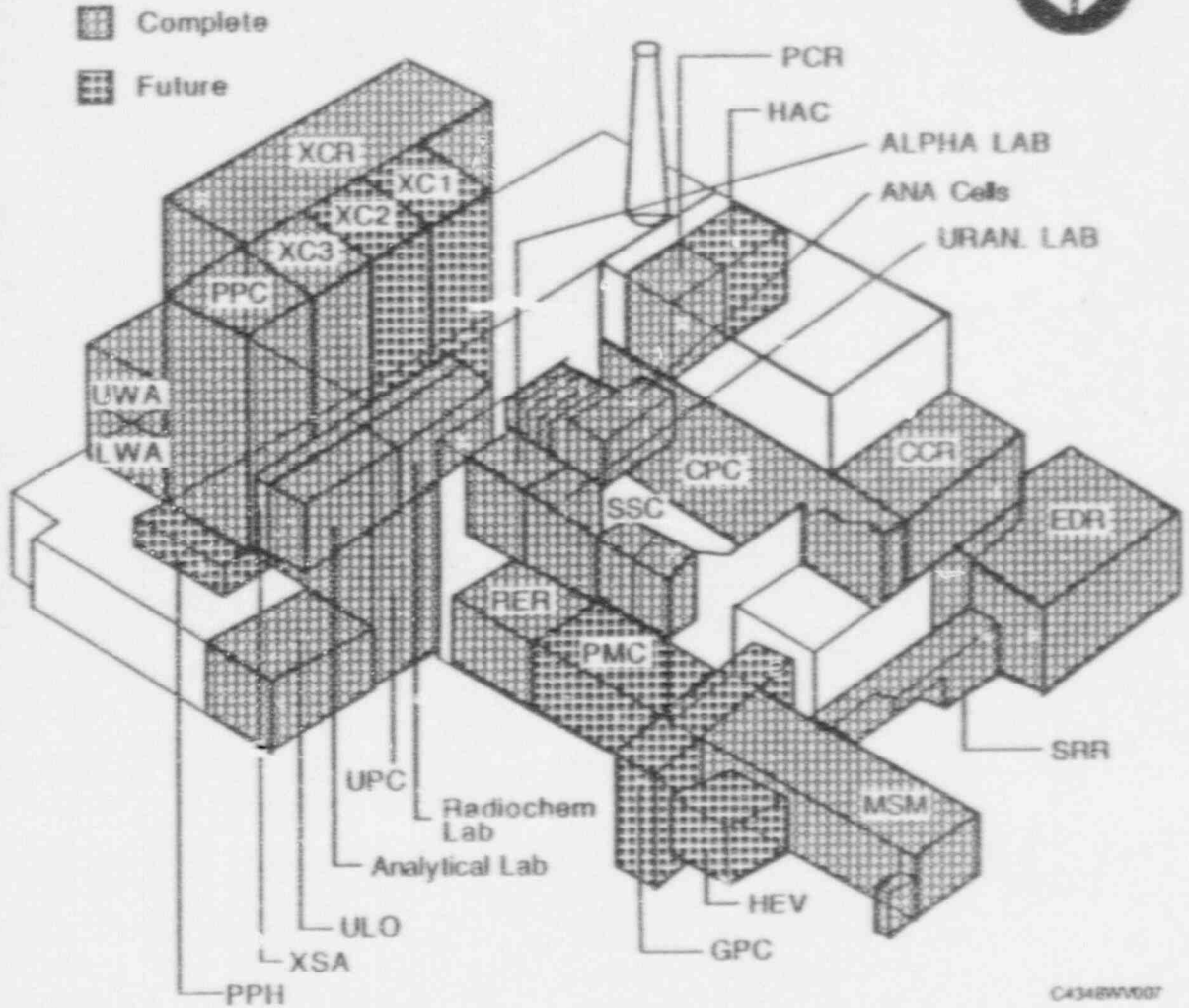


FIGURE 12

Appendix A: Program Schedule Status

The following "Implementation Summary Table", for the DOE Orders 5820.2A Implementation Plan has been updated to reflect progress during the past year. Cost and schedule projections have been revised as necessary to reflect current estimated completion dates. Items completed prior to 1991 have been deleted.

Appendix A: Program Schedule Status
DOE Order 5820.2A

IMPLEMENTATION SUMMARY TABLE

WEST VALLEY NUCLEAR SERVICES
Chapter I - High-Level Waste

(1) Refer to the West Valley Implementation Plan and the Final Assessment Report
(2) Arranged in order of proposed priority.

5820.2A Order Number	Current Practice/Statement of Need	Action Required	Estimated Costs	Detailed Schedule
3.a.(1)(b)	DOE Order 6430.1, 40 CFR 264 and EH orders are being evaluated. Actions to be taken will be determined during this evaluation. Complete evaluation of 6430.1 and define requirements.	Part I of this effort has been performed. Part II is required to complete this action.		Complete
3.b.(2)(h)	Operational control are set at 80% maximum tank level on process 3 of 4 tanks. Level indications and alarms are provided and monitored. Tank 8D-4 is full. Alarms have been reset and recalibrated. Tank 8D-4 has been isolated from all inflow.	Vitrification of HLW will process the contents of tank 8D-4.	None	October, 1993

Appendix A: Program Schedule Status
DOE Order 5820.2A

IMPLEMENTATION SUMMARY TABLE

WEST VALLEY NUCLEAR SERVICES
Chapter II - Transuranic Waste

(1) Refer to the West Valley Implementation Plan and the Final Assessment Report
(2) Arranged in order of proposed priority.

5820.2A Order Number	Current Practice/Statement of Need	Action Required	Estimated Costs	Detailed Schedule
3.a.(1) 3.b.(2) 3.b.(3)	WV TRU waste has not been assayed or classified for hazardous materials. A program to assess and determine hazardous characteristics of West Valley TRU waste should be developed and RCRA requirements should be included. New York State is scheduled to receive RCRA primacy in calendar year 1989. At that time, this classification program will be required.	Review records of existing TRU waste, develop a characterization mixed waste program and issue required procedures.	TBD	TBD
		Characterize TRU waste in storage.	TBD	TBD
3.b.(1)	West Valley generates only minor quantities of RH TRU waste from the spent fuel pool water treatment system CH TRU waste generation has primarily been a result of major decontamination work which is not being performed at this time. Future (Phase II) D&D will result in the generation of significant amounts of CH TRU and RH TRU waste.			
	A waste generation reduction program, meeting the intent of DOE Order 5820.2A, should be developed and implemented for future TRU waste generating activities.	Develop a TRU waste minimization program which applies to the Phase II D&D program activity.	TBD	TBD

Appendix A: Program Schedule Status
DOE ORDER 5820.2A

IMPLEMENTATION SUMMARY TABLE

WEST VALLEY NUCLEAR SERVICES
Chapter II - Transuranic Waste

(1) Refer to the West Valley Implementation Plan and the Final Assessment Report
(2) Arranged in order of proposed priority.

5820.2A Order Number	Current Practice/Statement of Need	Action Required	Estimated Costs	Detailed Schedule
3.c.(8)	At the present time, TRU waste disposition at West Valley is not defined. WV TRU is presently not scheduled to be shipped to WIPP as it was generated under commercial contract. WVDP-030, Rev. 1, is the TRU Waste Certification Program Plan for the WVDP. This plan invokes some elements of the WIPP-WAC program, but does not implement all details such as data requirements, certification requirements, or waste storage requirements. The WVDP requested DOE assistance to identify an off-site facility for the disposal of WVDP TRU wastes in letter WD:90:0494, dated May 4, 1990. When direction is received from DOE a schedule will be developed to revise the current certification plan and prepare the necessary procedures.	Develop a TRU waste certification program and issue the required procedures	TBD	TBD

Appendix A: Program Schedule Status
DOE ORDER 5820.2A

IMPLEMENTATION SUMMARY TABLE

WEST VALLEY NUCLEAR SERVICES
Chapter II - Transuranic Waste

(1) Refer to the West Valley Implementation Plan and the Final Assessment Report
(2) Arranged in order of proposed priority.

5820.2A Order Number	Current Practice/Statement of Need	Action Required	Estimated Costs	Detailed Schedule
3.f.(1)	TRU waste disposal has not been defined for West Valley. WV TRU is presently not scheduled to be shipped to WIPP as it was generated under commercial contract. For these reasons current shipping plans for West Valley TRU waste are not developed. As identified in item 3.c.(8), these items will be scheduled when direction is received from DOE.	Develop and issue a TRU waste shipping plan.	TBD	TBD
		Define and provide facilities to load and ship TRU waste.	TBD	TBD-Pending EIS
3.g.(2)	These criteria are for new interim storage facilities. New facilities will be required at West Valley in support of Phase II D&D. These facilities should be developed to satisfy certified/uncertified waste segregation, RCRA requirements and all requirements of 5820.2A. During 1991, WVDP formed a task force to develop a strategic plan for waste management. The product of this task force, "Waste Management Strategic Directions" has been developed in draft version. The WVPO conveyed its support of this effort in letter DW:91:0616, dated August 9, 1991, and acknowledged that the strategic planning effort superseded the development of a Long Range Storage Plan.	Issue a West Valley overall waste storage plan.		Complete

Appendix A: Program Schedule Status
DOE ORDER 5820.2A

IMPLEMENTATION SUMMARY TABLE

WEST VALLEY NUCLEAR SERVICES
Chapter II - Transuranic Waste

(1) Refer to the West Valley Implementation Plan and the Final Assessment Report
(2) Arranged in order of proposed priority.

5820.2A Order Number	Current Practice/Statement of Need	Action Required	Estimated Costs	Detailed Schedule
3.g.(5)	West Valley has data requirements, for current storage defined in the SOP system. As identified in item 3.c.(8), necessary actions will be performed when direction is received from DOE.	Upgrade SOP requirements for waste package data.	TBD	TBD

Appendix A: Program Schedule Status
DOE ORDER 5820.2A

IMPLEMENTATION SUMMARY TABLE

WEST VALLEY NUCLEAR SERVICES
Chapter III - Low-Level Waste

(1) Refer to the West Valley Implementation Plan and the Final Assessment Report
(2) Arranged in order of proposed priority.

5820.2A Order Number	Current Practice/Statement of Need	Action Required	Estimated Costs	Detailed Schedule
3.b.(2)	A waste management system performance assessment of this scope has not been performed at West Valley. DOE/LLW-63T, "Guidance for Conduct of Waste Management Systems Performance Assessment" dated June 1988, has been issued and provides guidance for conducting the performance assessment.	A system performance assessment to determine specific compliance with DOE Order 5820.2A should be scheduled and performed.	$100K	TBD
3.c.(1) 3.c.(2)	Waste minimization/reduction goals are established. WVNS has developed a Waste Minimization Plan, issued on March 27, 1991, which identifies waste reduction/minimization goals for WVDP. Based on this document training modules are being implemented by WVDP.	Upgrade and implement a formal waste generation reduction program.		Complete

Appendix A: Program Schedule Status
DOE ORDER 5820.2A

IMPLEMENTATION SUMMARY TABLE

WEST VALLEY NUCLEAR SERVICES
Chapter III - Low-Level Waste

(1) Refer to the West Valley Implementation Plan and the Final Assessment Report
(2) Arranged in order of proposed priority.

5820.2A Order Number	Current Practice/Statement of Need	Action Required	Estimated Costs	Detailed Schedule
3.d.(1) 3.f.(3)(a)	Currently, radioactive LLW is classified in accordance with 10 CFR 61 requirements. SOP's for material status determination for hazardous materials and storage and record keeping for hazardous waste have been issued. A waste stream certification program for LLW should be developed and implemented as part of a LLW characterization program in order to formalize and retain data on a long term basis. A task force will be organized during January 1992 to initiate the development of this characterization program.	Develop, implement and perform a formal characterization program.		TBD

Appendix A: Program Schedule Status
DOE ORDER 5820.2A

IMPLEMENTATION SUMMARY TABLE

WEST VALLEY NUCLEAR SERVICES
Chapter III - Low-Level Waste

(1) Refer to the West Valley Implementation Plan and the Final Assessment Report
(2) Arranged in order of proposed priority.

5820.2A Order Number	Current Practice/Statement of Need	Action Required	Estimated Costs	Detailed Schedule
3.f.(1) 3.i.(5)(b)	LLWTF System sludge and zeolite are presently being stored in a dewatered uncemented form. The prior cemented form is unacceptable and requires resolution. Approximately 2000 drums of prior cemented waste and 1300 drums of recently generated dewatered waste are in storage as of December 9, 1991.	Complete revised recipe development and order new equipment.		April 30, 1989 (complete)
		Develop new procedures, install equipment, and place new solidification process in operation.	TBD	TBD
	Approximately 220 drums are to be initiated on a production remediation effort basis scheduled to be completed by May 1992.	Resolve approximately 3300 drums in storage.	TBD	TBD
	The LLWTF system has been upgraded to improve treatment processing. The chemicals used for flocculation/ clarification were replaced. Previously used were ferrous sulfate, caustic, carbonate, and polyelectrolyte. The LLWTF process is now using potassium ferrate, potassium hydroxide, and polyelectrolyte. This change has resulted in an up to 83% reduction in the sludge produced by the system.			Complete

Appendix A: Program Schedule Status
DOE ORDER 5820.2A

IMPLEMENTATION SUMMARY TABLE

WEST VALLEY NUCLEAR SERVICES
Chapter III - Low-Level Waste

(1) Refer to the West Valley Implementation Plan and the Final Assessment Report
(2) Arranged in order of proposed priority.

5820.2A Order Number	Current Practice/Statement of Need	Action Required	Estimated Costs	Detailed Schedule
3.f(3)(a)	A waste characterization program as discussed in 3.d.(1) above supports this requirement. In addition the overall system performance assessment of 3.b.(2) will support the definition of specific requirements.	Develop, implement and perform the waste characterization program defined in 3.d.(1) above.	See 3.d.(1) above.	TBD
		Develop and issue a document that analyzes waste stream characterization for selection of treatment options.		TBD
3.h.(3)(a) 3.h.(3)(b)	Past storage facilities have been obtained as needed and have been justified on a short range requirement basis. A detailed review of future waste storage requirements should be conducted. This is particularly appropriate in view of the fact that LLW waste disposal paths are currently unresolved for West Valley. A comprehensive long-range storage plan, that considers ALARA, waste segregation and RCRA regulations should be developed.	Issue a West Valley Long Range Storage Plan. Interface with Chapter II item 3.g.(2).		Complete

Appendix A: Program Schedule Status
DOE ORDER 5820.2A

IMPLEMENTATION SUMMARY TABLE

WEST VALLEY NUCLEAR SERVICES
Chapter III - Low-Level Waste

(1) Refer to the West Valley Implementation Plan and the Final Assessment Report
(2) Arranged in order of proposed priority.

5820.2A Order Number	Current Practice/Statement of Need	Action Required	Estimated Costs	Detailed Schedule
3.h.(3)(b) (cont)	During 1991, WVDP formed a task force to develop a strategic plan for waste management. The product of this task force, "Waste Management Strategic Directions" has been developed in draft version. The WVPO conveyed its support of this effort in letter DW:91:0616, dated August 9, 1991, and acknowledged that the strategic planning effort superseded the development of a Long Range Storage Plan.			

Appendix A: Program Schedule Status
DOE ORDER 5820.2A

IMPLEMENTATION SUMMARY TABLE

WEST VALLEY NUCLEAR SERVICES
Chapter V - Decommissioning of Radioactively Contaminated Facilities

(1) Refer to the West Valley Implementation Plan and the Final Assessment Report
(2) Arranged in order of proposed priority.

5820.2A Order Number	Current Practice/Statement of Need	Action Required	Estimated Costs	Detailed Schedule
3.a.(2)	A Nuclear Fuel Services document, dated June 12, 1981, provides a "History of Decontamination", 1971-1981. Facility characterization data are available in the Facilities Utilization Report, WVDP-017, West Valley main process facilities prior to 1983.	Update the Facility Utilization Report.	$40K-$50K	TBD
3.a.(3)	Decontamination program work is not currently being performed at West Valley. For future D&D work a comprehensive D&D Plan that defines all steps to initiate and complete a D&D project, and provides criteria for selection of alternatives, characterization, reporting, and data keeping requirements should be developed.	Prepare and issue a comprehensive D&D Plan.	TBD	TBD

Appendix A: Program Schedule Status
DOE ORDER 5820.2A

IMPLEMENTATION SUMMARY TABLE

WEST VALLEY NUCLEAR SERVICES
Chapter V - Decommissioning of Radioactively Contaminated Facilities

(1) Refer to the West Valley Implementation Plan and the Final Assessment Report
(2) Arranged in order of proposed priority.

5820.2A Order Number	Current Practice/Statement of Need	Action Required	Costs	Estimated Detailed Schedule
3.c.(1)(c)	West Valley currently has no active D&D projects. Final D&D actions will be determined by Phase II D&D program (post vitrification) and the site EIS. West Valley does not currently have a RCRA compliance program for D&D type work. These requirements should be developed for future D&D work.	Establish RCRA program requirements and incorporate with the D&D program plan prior to Phase II D&D work.	$100K-$150K	TBD-FY 1993

Appendix B: WVDP Waste Volumes in Storage

As Of November 15, 1991

		Volume or Mass	
Waste in Storage:			
IRTS Drum Cell (Class C)		95,400 ft^3	(2,702 m^3)
Other Low Level Waste (by Class)	A	138,440 ft^3	(4,487 m^3)
	B	18,132 ft^3	(513 m^3)
	C	3,672 ft^3	(104 m^3)
TRU Waste (Includes Suspect TRU)		8,844 ft^3	(250 m^3)
Undetermined/Unclassified Status		81,200 ft^3	(2,300 m^3)
CPC Waste/High Radiation Items		30,000 ft^3	(850 m^3)
Roll-off Containers of Soil		26,460 ft^3	(750 m^3)
Mixed Waste - Lead in Storage		14,042 kg	
Mixed Waste in Interim Waste Storage Facility		1,868.5 lb	
Hazardous Waste		507 lb	
Recyclable Oil		1,023 lb	

Appendix C: Low Level Waste System and Facility Description

A. Low-Level Waste Categories

The LLW is divided into three categories based upon physical properties: (1) trash and miscellaneous dry solids, (2) liquid and wet solid wastes immobilized in cement; and (3) equipment and hardware.

1. Trash and miscellaneous dry solids consist of radioactively contaminated protective clothing, paper, plastic, and other dry solid materials. The bulk density of these wastes is assumed to be 0.53 g/cm^3 (33.09 lbs/ft^3) after compaction. Alternative processing techniques are under consideration and will be used if they are determined to be cost-effective and would reduce the potential environmental impacts for each particular waste stream. Such processing will not alter the curie content of the waste but might alter its physical form.

2. Liquid and wet solid wastes immobilized in cement include solidified uranyl nitrate solution, decontaminated supernatant, and sludge wash solution. All of these wastes will be solidified in cement with an average density of approximately 1.7 g/cm^3 (106.13 lbs/ft^3) and packaged in standard .21 m^3 (55 gallon) round drums and .27 m^3 (71 gallon) square drums filled to at least 85 percent of their capacity.

3. Equipment and hardware are basically contaminated metallic objects requiring disposal. These components will be segregated, as practical, and volume-reduced. The bulk density of this waste form is assumed to be 2 g/cm^3 (124.86 lbs/ft^3) after compaction.

B. The Integrated Radioactive Waste Treatment System

1. The IRTS essentially consists of four parts: the STS; the LWTS; the CSS; and the RTS Drum Cell.

   The STS is basically a batch ion-exchange system utilizing zeolite as the exchange medium for extracting Cesium-137. This is depicted in figure 11. The zeolite ion-exchange columns are installed in tank 8D-1. When the zeolite in a column has become loaded with Cesium, it is dropped into the bottom of tank 8D-1, and new zeolite is added to the column.

   The LWTS consists of two parallel process streams, one for processing decontaminated supernatant and other liquid waste streams with high total dissolved solids (TDS), and the second one for processing low TDS waste. The high TDS waste processing train includes evaporation and ion exchange polishing of condensates. Evaporator concentrates are pumped to the CSS for solidification. The low TDS waste processing train includes filtration and ion exchange.

   The CSS is a batch process system, which is automatically controlled to provide the optimum mixing time and waste-to-cement ratio for the particular liquid waste to be processed. The CSS consists of three subsystems: 1) the waste encapsulation system, which consists of the high-shear mixer and associated equipment; 2) the cement storage and transfer system, which consists of the silo, the cement storage bin for the day's operation, and the transfer system for metering the cement to the mixer; and 3) the material handling system, which moves

and monitors the drums from the drum storage mixing station, capping station, survey station, and through waste storage and loadout. The heart of the CSS is the high-shear mixer system. This has the ability to encapsulate the decontaminated supernatant by providing a strong mechanical action resulting in excellent waste/cement homogeneity. A simplified flow sheet for the CSS is shown in figure 12.

The Drum Cell is a shielded facility constructed for storage and potential disposal of the solidified LLW (see figure 13). It has the capacity for 17,600 square drums, which are handled remotely using a computerized crane system. The stacked drums are surrounded by a 20-inch thick concrete shield wall and the facility is heated during winter for cement curing.

2. Low-Level Waste Treatment Facility (LLWTF)

Waste water sources from plant drains, surface runoff, cooling tower blowdown, NWS disposal area, and the laundry are currently treated by the existing LLWTF.

The LLWTF is located in a two-story concrete block building 7.3 m x 9.4 m x 8.8 m high (24 ft x 31 ft x 29 ft high). Additional equipment is located outside adjacent to the building. The facility is an addition to the original plant and was put into service in 1971. It currently operates 25 weeks per year and processes as much as 56 x 10^6 liters (15 x 10^6 gallons) of liquid waste per year. The LLWTF system can presently process a maximum of 760,000 liters (200,000 gallons) per day. A high percentage of the equipment and piping is stainless steel and is instrumented to operate unattended for several hours at a time. The facility has a controlled ventilation system with air passing through High Efficiency Particulate Air (HEPA) filters before release to the atmosphere. The facility is supplied with steam, air, softened water and chemicals from the main plant systems.

The waste streams are treated in the LLWTF using a scavenging-precipitation, ion-exchange process developed at Oak Ridge National Laboratory. The system, which can process at an optimum rate of 380 liters (100 gallons) per minute [maximum process rate of 530 liters/minute (140 gpm)] is specifically designed to remove Cs-134, Cs-137, Sr-89, and Sr-90.

The overflow from the clarifier goes to a surge tank and then is pumped to an anthracite filter. The 2-foot deep filter removes particles greater than 5 microns. The filter is periodically backwashed with previously filtered water which is then sent to Lagoon 2.

The filtered water is passed through one of two ion-exchange columns to remove the remaining (50 to 70 weight percent) cesium and strontium. The columns are in parallel so that one can be eluted while the other is on-line. Each column, 1.2 m (4 feet) in diameter by 2.7 m (9 feet) high, contains up to 1.8 m^3 (65 ft^3) of a zeolite resin mixture (IE-95 and A-51). The effluent is released to Lagoon 4 or 5 through an acid blender, which reduces the pH. Each column is on-line an average of 11.4 million liters (3 million gallons) throughput before Cs-137 breakthrough occurs.

C. Size and Volume Reduction

1. Contact Size Reduction

The project also requires a capability for size reduction and TRU decontamination of materials collected during the D&D process. The CSRF was originally intended to be located entirely in the former FRS area. Due to the delay in FRS availability, a work-around plan was developed which provided a CSRF in both the Master Slave Manipulator Repair Shop (MSMRS) and LAG storage buildings. A Liquid Abrasive Decontamination Booth and a Supercompactor were procured. Hot operations started in November 1987 after receiving an EPA permit.

This facility is used to size reduce contaminated process tanks, piping, and other metallic scrap and then either package these pieces for disposal or feed the material to the Supercompactor for further volume reduction. The sectioning of metallic equipment is performed in a room which has stainless steel covering the walls, floor, and ceiling. The purpose of the stainless steel skin is to facilitate decontamination of the room when necessary.

Volume reduction in the CSRF is accomplished using an air plasma arc torch, but standard mechanical tools such as nibblers and portable band saws are also available. A ventilation system with several stages of filtration was installed for this facility to capture the large quantities of smoke produced by the air plasma arc torch.

Located adjacent to the cutting room are two decontamination facilities. One facility is a walk-in spray booth where large items can be washed down with a hydrobrush or steam cleaned. The second facility is a Liquid Abrasive Decontamination System (LADS). The LADS uses a stream of abrasive particles, water, and air to clean contaminated surfaces. The abrasive slurry is recycled to reduce the volume of secondary waste generated. The work is enclosed in a booth and the operator works through glove ports to direct the abrasive stream on the work piece.

2. Supercompaction

The Supercompactor arrived at the WVDP in FY87 and was installed adjacent to the LAG Storage Building. Cold operations were successfully completed and hot operations started in October 1987 after receiving an air discharge permit for the HEPA filter system. An average of 44 drums can be accommodated in a single 2.55 m^3 (90 ft^3) waste box; the maximum quantity that was achieved was 51. The average Volume Reduction Factor (VRF) is 5:1.

D. NDA Liquid Pretreatment System

Liquid collected by the interceptor trench will be a mixture of water and small amounts of solvent contaminated with radionuclides. The solvent, n-dodecane with up to 30 percent TBP, was used to recover fissile material when the NFS fuel reprocessing plant operated in 1965-1972. The degraded solvent was transferred to 1000 gallon tanks and buried in the NDA. The NDA Interceptor Trench LPS is housed inside a sprung steel structure. The system will process the collected liquid in two phases: solvent separation

and water pretreatment (to remove iron and I-129). The solvent which has a lower density than the water, will be skimmed from the 1000 gallon tanks once approximately 100 gallons have accumulated. It will then be stored in 55 gallon drums until arrangements are made for a contractor to solidify the solvent into a stable waste form meeting the USNRC's Branch Technical Position on Waste Form.

The LPS consists of a heated enclosure which houses a particulate removal filter connected in series with two Granular Activated Carbon (GAC) units. The former will be used to remove most of the iron from the water, while the latter will be used to remove organic material with which the I-129 is complexed. Liquid waste passes through the system will be transferred to Lagoon 2. Water from Lagoon 2 is pumped to the 02 plant for further treatment and eventual release off-site through the Lagoon 3 outfall.

E. Waste Storage and Disposal

1. LLW/TRU Waste Storage Building

In FY84, a preengineered metal storage building was constructed and placed into service. The building provides LAG or surge storage for packaged LLW and long-term storage of packaged TRU waste for eventual off-site disposal.

The building is equipped with ventilators, insulation, interior, exterior, and personnel door exit lighting, remote actuated roll up door, ionization smoke detectors, and radiation monitors.

The building stores CH waste packages (<100 mR/hr) only.

In FY87, a section of the LAG Storage Building was converted to a waste assay area and a staging area for the Supercompactor. The assay area is comprised of the segmented gamma scanner and passive 4 Pi neutron detector systems.

2. CPC Waste Storage Building

In FY85, a tension weather structure was constructed and placed into service. The building contains high-radiation items resulting from decontamination operations in the CPC. This waste is contained in boxes in the center of the structure. Concrete overpacks containing packaged waste are located around the inside perimeter of the facility to provide shielding.

3. LSA #1 and LSA #2

In FY87 - 88 two additional tension weather structures were constructed to accommodate the storage of packaged LLW.

4. LSA #3 and LSA #4

Construction of two new tension weather structures began in 1990. The facilities will accommodate the storage of low-level and radioactive mixed wastes. Storage in these facilities began on June 18, 1991.

5. NRC-Licensed Disposal Area (NDA)

The NDA has a gross area of 20,000 m^2 (215,300 ft^2). Waste generated and buried by the former owner, NFS has used more than half of this area. At the present time, the WVDP has used a 61 m x 82 m (200 ft x 269 ft) area of the NDA of which approximately 4,600 m^2 (49,500 ft^2) remain. Based on a utilization factor of 1.5 cubic meters per square meter, this area could receive 7,100 m^3 (250,700 ft^3) more waste if it is used for further disposal.

1990 EFFLUENT ON-SITE AND OFF-SITE MONITORING PROGRAM

The following schedule represents the WVDP routine Environmental Monitoring Program which was in place in 1990. This schedule meets or exceeds the minimum program needed to satisfy the requirements of DOE Order 5400.1, which superseded DOE 5484.1A, Chapter III, in late 1988. It also meets requirements of DOE 5400.5 and Draft DOE Order 5400.6. Specific methods and recommended monitoring program elements are referenced in DOE/EP-0096, "Effluent Monitoring" and DOE/EP-0023 (Environmental Surveillance), and are the bases for selecting most of the schedule specifics. Additional monitoring is mandated by OSRs and air and water discharge permits (40 CFR 61 and SPDES), which also requires a formal report generation. These specific cases are identified in the schedule under Monitoring/Reporting Requirements. The overall Environmental Program schedule is referenced in OSR-GP-4.

SCHEDULE OF ENVIRONMENTAL SAMPLING

The following table presents a schedule of environmental sampling. Locations of the sampling points are shown on Figures D-3 through D-9. The headings for the tables are explained in the following paragraphs. An index is provided to locate sample information and to provide an overview of sample types and names.

Sample Location and I.D. Code - The physical location where the sample is collected is described. The I.D. is a seven-character code, the first character of which identifies the sample medium as Air, Water, Soil/Sediment, Biological, or Direct Measurement. The second character specifies on-site or off-site. The remaining characters describe the specific location (e.g., AFGRVAL is Air Off-site at Great Valley).

Monitoring/Reporting Requirements - The basis for monitoring that location and any additional references to permits or OSRs are noted, as well as the reports generated from sample data.

Sampling Type/Medium - Describes collection method, and the physical characteristics of the medium.

Collection Frequency - Sample collection frequency.

Total Annual Samples - Discrete physical samples collected annually, not including composites of collected samples.

Analysis Performed/Composite Frequency - Describes the individual analyses on the samples or composites of samples, and the frequency of analysis.

INDEX OF ENVIRONMENTAL MONITORING PROGRAM SAMPLE POINTS

*Not detailed on map.

*Not detailed on map.

1990 EFFLUENT AND ON-SITE MONITORING PROGRAM

SAMPLE LOCATION AND I.D. CODE	MONITORING/REPORTING REQUIREMENTS	SAMPLING TYPE/MEDIUM	COLLECTION FREQUENCY	TC / ANNUAL ES	ANALYSES PERFORMED/ COMPOSITE FREQUENCY
Main Plant Ventilation Exhaust Stack ANSTACK	Airborne radioactive effluent point including LWTS and Vitrification Off-Gas	Continuous off-line air particulate monitor	Continuous measurement of fixed filter, replaced weekly	N/A	Real time alpha and beta monitoring
Supernatant Treatment System (STS) Ventilation Exhaust ANSTSTK	Required by: OSR/TR-GP-1 40 CFR 61	Continuous off-line air particulate filter	Weekly	104 (52 per location)	Gross alpha/beta, gamma isotopic.* Quarterly composite for Sr-90, Pu/U isotopic, Am-241, gamma isotopic
	Reported: Monthly Environmental Monitoring Trend Analysis	Continuous off-line desiccant column for water vapor collection	Weekly	104 (52 per location)	H-3
	Annual Effluent and On-Site Discharge Report	Continuous off-line charcoal cartridge	Weekly	104 (52 composited to 4 per location)	Quarterly composite for I-129
	Annual Environmental Monitoring Report				
	Air Emission Annual Report (NESHAP)				

*Weekly gamma isotopic only if gross activity rises significantly

SAMPLE LOCATION AND I.D. CODE	MONITORING/REPORTING REQUIREMENTS	SAMPLING TYPE/MEDIUM	COLLECTION FREQUENCY	TOTAL ANNUAL SAMPLES	ANALYSES PERFORMED/ COMPOSITE FREQUENCY
Cement Solidification System (CSS) Ventilation Exhaust **ANCSSTK**	Airborne radioactive effluent point Required by: OSR/TR-GP-1 40 CFR 61	Continuous off-line air particulate monitor during operation	Continuous measurement of fixed filter, replaced weekly	N/A	Real time alpha and beta monitoring
Contact Size Reduction Facility Exhaust **ANCSRFK**	Reported: Monthly Environmental Monitoring Trend Analysis	Continuous off-line air particulate filter	Weekly	104 (52 per location)	Gross alpha/beta, gamma isotopic.* Quarterly composite for Sr-90, Pu/U isotopic, Am-241, gamma isotopic.
	Annual Effluent and On-site Discharge report	Continuous off-line charcoal cartridge.	Weekly	104 (52 composited to 4 per location)	Quarterly composite for I-129
	Annual Environmental Monitoring Report Air Emissions Annual Report (NESHAP)				

*Weekly gamma isotopic only if gross activity rises significantly.

SAMPLE LOCATION AND I.D. CODE	MONITORING/REPORTING REQUIREMENTS	SAMPLING TYPE/MEDIUM	COLLECTION FREQUENCY	TOTAL ANNUAL SAMPLES	ANALYSES PERFORMED/ COMPOSITE FREQUENCY
Supercompactor Exhaust ANSUPCV	Airborne radioactive effluent point Required by: OSR/TR-uP-1 40 CFR 61 Reported: Monthly Environmental Monitoring Trend Analysis Annual Effluent and On-site Discharge Report Annual Environmental Monitoring Report Air Emissions Annual Report (NESHAP)	Continuous off-line air particulate monitor during operation Continuous off-line air particulate filter, (maximum of 26 operating weeks expected)	Continuous measurement of fixed filter, collected and replaced every seven operating days, or at least monthly when unit is operated	N/A 26 26 composited to 4	Real time beta monitoring Filters for gross alpha/beta, gamma isotopic* upon collection Quarterly composites: filters for Sr-90, Pu/U isotopic, Am-241, gamma isotopic

* Weekly gamma isotopic only if gross activity rises significantly.

SAMPLE LOCATION AND I.D. CODE	MONITORING/REPORTING REQUIREMENTS	SAMPLING TYPE/MEDIUM	COLLECTION FREQUENCY	TOTAL ANNUAL SAMPLES	ANALYSES PERFORMED/ COMPOSITE FREQUENCY
Lagoon 3 Discharge Weir WNSP001	Primary point of liquid effluent batch release Required by: DSR/TR-GP-2 SPDES Permit Reported: Monthly NPDES NMR	Grab liquid	Daily, during Lagoon 3 discharge	40-80	Daily: gross beta, conductivity, pH. Every sixth daily sample: gross alpha/beta, H-3, Sr-90, gamma isotopic. Weighted monthly composite of daily samples: gross alpha/beta, H-3, C-14, Sr-90, I-129, gamma isotopic, Pu/U isotopic, Am-241
	Annual Effluent and Onsite Discharge Report	Composite liquid	Twice during discharge, near start, and near end	8-10	Two 24 hour composites for Al, NH_3, As, BOD-5, Fe, Zn, pH, suspended solids; SO_4, NO_3, NO_3, Cr^{+6}, Cd, Cu, Pb, Ni
	Annual Environmental Monitoring Report	Grab liquid	Twice during discharge, same as composite	8-10	Settleable solids, pH, cyanide, amenable to chlorination, oil and grease, Dichlorodifluoromethane, Trichlorofluoromethane, 3,3-Dichlorobenzidine, Tributylphosphate, Vanadium
		Composite liquid	Annually	1	Annually, a 24 hour composite for: Cr, Se, Ba, Sb
		Grab liquid	Annually	1	Chloroform
		Grab liquid	Semiannually	2	Bis(2-Ethylhexyl) Phthalate, 4-Dodecene

1990 EFFLUENT AND ON-SITE MONITORING PROGRAM

SAMPLE LOCATION AND I.D. CODE	MONITORING/REPORTING REQUIREMENTS	SAMPLING TYPE/MEDIUM	COLLECTION FREQUENCY	TOTAL ANNUAL SAMPLES	ANALYSES PERFORMED/ COMPOSITE FREQUENCY
Erdman Brook at Security Fence **WNSP006**	Combined facility liquid discharge Required by: OSR/TR-GP-2 Reported: Monthly Environmental Monitoring Trend Analysis Annual Environmental Monitoring Report	Flow proportioned continuous composite liquid	*Weekly	52	Gross alpha/beta, H-3, pH, conductivity. Monthly composite: gamma isotopic and Sr-90. Quarterly composite: Cm-244, Pu/U isotopic, Am-241.
Sanitary Waste Discharge **WNSP007**	Liquid effluent point for sanitary and utility plant combined discharge	24 hour composite liquid	3/month	36	Gross alpha/beta, H-3, suspended solids, NH_3, BOD-5, Fe
	Required by: SPDES Permit	Grab liquid	Weekly	52	pH, settleable solids
	Reported: Monthly NPDES DMR	Grab liquid	Annually	1	Chloroform
	Monthly Environmental Monitoring Trend Analysis Annual Effluent and On-site Discharge Report Annual Environmental Monitoring Report	In-line monitor with alarm	Continuous	N/A	pH
Sanitary Waste Sludge **WNSTPBS**	Operational STP Monitoring	Grab sludge	On demand (at least monthly)	12	Alpha/Beta, H-3

*Samples were collected simultaneously for NYSDOH.

1990 EFFLUENT AND ON-SITE MONITORING PROGRAM

SAMPLE LOCATION AND I.D. CODE	MONITORING/REPORTING REQUIREMENTS	SAMPLING TYPE/MEDIUM	COLLECTION FREQUENCY	TOTAL ANNUAL SAMPLES	ANALYSES PERFORMED/ COMPOSITE FREQUENCY
N.E. Swamp Drainage WNSWAMP	Site surface drainage	Grab liquid	Monthly	12	Gross alpha/beta, H-3, pH
North Swamp Drainage WNSW74A	Reported: Annual Effluent and On-site Discharge Report	Timed continuous composite liquid	Weekly	52	Gross Alpha/beta, H-3, pH, conductivity Monthly composite: gamma isotopic, Sr-90. Quarterly composite: C-14, I-129, Pu/U isotopic Am-241
High-Level waste farm underdrain WN8D1DR	Drains subsurface water from HLW storage tank area. Reported: Monthly Environmental Monitoring Trend Analysis	Grab liquid	Weekly	52	Gross alpha/beta, H-3, pH. Monthly composite: gamma isotopic, Sr-90.
French Drain WN8P008	Drains subsurface water from LLWT Lagoon area	Grab liquid	3/month	36	pH, conductivity, BOD-5, Fe
	Required by: SPDES Permit		Monthly	12	Gross alpha/beta, H-3
	Reported: Monthly SPDES DMR		Annually	1	Ag, Zn
	Annual Effluent and On-Site Discharge Report				
	Annual Environmental Monitoring Report				

*Samples collected simultaneously for NYSDOH.

SAMPLE LOCATION AND I.D. CODE	MONITORING/REPORTING REQUIREMENTS	SAMPLING METHOD	COLLECTION FREQUENCY	TOTAL ANNUAL SAMPLES	ANALYSES PERFORMED/ COMPOSITE FREQUENCY
Condensate and Cooling Water Ditch WNSP005	Combined drainage from facility yard area	Grab liquid	Monthly	12	Gross alpha/beta, H-3, pH
	Reported: Internal Review				
Cooling Tower Basin WNCOOLW	Cools plant utility steam system water	Grab liquid	Monthly	12	Gross alpha/beta, H-3, pH
	Reported: Internal Review				
Site Potable Water WNDRNKW	Source of water within site perimeter	Grab liquid	Monthly	48 (12 per location)	Gross alpha/beta, H-3, pH
	Reported: Internal Review		Annually	2	Toxic metals, pesticides chemical pollutants
Maintenance					
Site Drinking Water WNDNKMS					
Potable Water Storage Tank (UR) WNDNKUR					
Main Plant Drinking Water WNDNKMP					
SDA Holding Lagoon WNSP003	State Disposal Area Holding Lagoon	Grab liquid	Annually (as required)	1	Gross alpha/beta, H-3, C-14, pH, gamma isotopic, Sr-90, I-129, Pu/U isotopic
	Reported: Annual Environmental Monitoring Report NYSERDA				

SAMPLE LOCATION AND I.D. CODE	MONITORING/REPORTING REQUIREMENTS	SAMPLING TYPE/MEDIUM	COLLECTION FREQUENCY	TOTAL ANNUAL SAMPLES	ANALYSES PERFORMED/ COMPOSITE FREQUENCY
Frank's Creek E of SDA **WNFRC87**	Drains NYS Low-Level Waste Disposal Area	Grab liquid	*Monthly	12	Gross alpha/beta, H-3, pH
	Reported: Internal review NYSERDA				
Erdman Brook N of Disposal Areas **WNERB53**	Drains NYS and WVDP disposal areas	Grab liquid	Weekly	52	Gross alpha/beta, H-3, pH
	Reported: Internal review NYSERDA		*Monthly		
Ditch N of WVDP NDA & SDA **WNNDADR**	Drains WVDP disposal and storage area	Timed continuous composite liquid	Weekly	52	pH Monthly composite: gross alpha/beta, gamma isotopic, H-3. Quarterly composite: Sr-90, I-129
	Reported: Internal review Environmental Monitoring Trend Analysis				
Drainage S of Drum Cell **WNDCELD**	Reported: Internal review	Grab liquid	Weekly	52	pH Monthly composite: gross alpha/beta, gamma isotopic, H-3. Quarterly composite: Sr-90, I-129

*Samples were collected simultaneously for NYSDOH.

1990 EFFLUENT AND ON-SITE MONITORING PROGRAM

SAMPLE LOCATION AND I.D. CODE	MONITORING/REPORTING REQUIREMENTS	SAMPLING TYPE/MEDIUM	COLLECTION FREQUENCY	TOTAL ANNUAL SAMPLES	ANALYSES PERFORMED/ COMPOSITE FREQUENCY
On-site Standing Water (ponds not receiving effluent) Test Pit N of HLW Area **WNSTAW1** Slough SW of RTS Drum Cell **WNSTAW2** Pond SE of Heinz Road **WNSTAW3** Border Pond S of AFRT240 **WNSTAW4** Border Pond SW of DFTLD13 **WNSTAW5** Borrow Pit NE of Project Facilities **WNSTAW6** Pond SW of Project Facilities W of Rock Springs Road **WNSTAW7** Slough N of Quarry Creek **WNSTAW8** North Reservoir Near Intake **WNSTAW9** Background Pond at Sprague Brook Maintenance Building **WNSTAW8**	Water within vicinity of plant airborne or ground water effluent Reported: Internal Review	Grab liquid	Annually	7-10*	Gross alpha/beta, H-3, pH, conductivity, chloride, Fe, Mn, Na, phenols, sulfate

*Number of points sampled will depend upon on-site ponding conditions during the year.

1990 EFFLUENT AND ON-SITE MONITORING PROGRAM

SAMPLE LOCATION AND I.D. CODE	MONITORING/REPORTING REQUIREMENTS	SAMPLING TYPE/MEDIUM	COLLECTION FREQUENCY	TOTAL ANNUAL SAMPLES	ANALYSES PERFORMED/ COMPOSITE FREQUENCY
On-site Groundwater	Groundwater monitoring wells around site solid waste management units	Grab liquid	4 times semiannually (8 samples yearly per well)**	144	Gross alpha/beta, H-3, gamma isotopic, chloride, sulfate, phenols, F, nitrate, TOC, TOH, As, Ba, Cs, Cr, Fe, Pb, Mn, Hg, Se, Ag, Na
HLW Tank GW Monitoring Unit - Wells: WNW 80-2 86-7 86-8 86-9 86-12* Surface: WNDMPNE*	Reported: Annual Environmental Monitoring Report	Direct measurement of sample discharge water	Before and after grab sample collection	288 (2 measurements per sample collection event)	Temperature, pH, conductivity
Lagoon GW Monitoring Unit - Wells: WNW 86-6 86-3 86-4 86-5 80-5 80-6 Surface: WNGSEEP WNSP008					
NDA GW Monitoring Unit - Wells: WNW 83-1D 86-10 86-11 82-1D					

*Serves former Construction and demolition debris landfill (CDDC)

**Sampling and analysis conducted as outlined in the RCRA Groundwater Technical Enforcement Guidance Document (EPA OSWER 9950.1) and the Statistical Analysis of Monitoring Data at RCRA Facilities (EPA/530-SW-89-026).

1990 EFFLUENT AND ON-SITE MONITORING PROGRAM

SAMPLE LOCATION AND I.D. CODE	MONITORING/REPORTING REQUIREMENTS	SAMPLING TYPE/MEDIUM	COLLECTION FREQUENCY	TOTAL ANNUAL SAMPLES	ANALYSES PERFORMED/ COMPOSITE FREQUENCY
On-site Groundwater	Groundwater monitoring wells around site facilities	Grab liquid	Semiannually	22* (2 per location)	Gross alpha/beta, H-3, gamma isotopic
Facility/Plant Area Wells: WNW 80-3 80-4	Reported: Annual Environmental Monitoring Report	Direct measurement of sample discharge water	Before and after grab sample collection	44* (two measurements per sample collection event)	Temperature, pH, conductivity
NDA Area Wells: WNW 1A 1B 1C 2-2B 82-2C 82-3A 82-4A1 82-4A2 82-4A3					
Fuel Storage Tank Subsurface Monitoring Well: WNW 86-13	Reported: Annual Environmental Monitoring Report	Grab liquid	Semiannually	2	Gross alpha/beta, H-3, gamma isotopic, phenols, TOC, benzene, toluene, xylene
		Direct measurement of discharge water	Before and after grab sample collection	4	Temperature, pH, conductivity

*Number of samples variable; occasionally wells are dry.

1990 EFFLUENT AND ON-SITE MONITORING PROGRAM

SAMPLE LOCATION AND I.D. CODE	MONITORING/REPORTING REQUIREMENTS	SAMPLING TYPE/MEDIUM	COLLECTION FREQUENCY	TOTAL ANNUAL SAMPLES	ANALYSES PERFORMED/ COMPOSITE FREQUENCY
Cattaraugus Creek at Felton Bridge **WFFELBR**	Unrestricted surface waters receiving plant effluents Reported: Monthly Environmental Monitoring Trend Analysis Annual Environmental Monitoring Report	Timed continuous composite liquid	Weekly *Weekly for monthly composite	52	Gross alpha/beta, H-3, pH. Flow-weighted monthly composite for gamma isotopic and Sr-90
Buttermilk Creek, Upstream of Cattaraugus Creek Confluence at Thomas Corners Road **WFBCTC8**	Restricted surface waters receiving plant effluents Reported: Annual Environmental Monitoring Report	Timed continuous composite liquid	*Biweekly	26	pH. Monthly for gross alpha/beta, H-3. Quarterly composite for gamma isotopic and Sr-90
Buttermilk Creek near Fox Valley **WFBCBKG**	Restricted surface water background Reported: Monthly Environmental Monitoring Trend Analysis Annual Environmental Monitoring Report	Timed continuous composite liquid	*Biweekly	26	pH. Monthly for gross alpha/beta, H-3. Quarterly composite for gamma isotopic and Sr-90

*Samples are split with NYSDOH.

SAMPLE LOCATION AND I.D. CODE	MONITORING/REPORTING REQUIREMENTS	SAMPLING TYPE/MEDIUM	COLLECTION FREQUENCY	TOTAL ANNUAL SAMPLES	ANALYSES PERFORMED/ COMPOSITE FREQUENCY
WFWEL Series Wells near WVDP outside WNYNSC Perimeter 3.0 km WNW WFWEL01 1.5 km NW WFWEL02 4.0 km NW WFWEL03 3.0 km NW WFWEL04 2.5 km SW WFWEL05 29 km S WFWEL06 (background) 4.0 km NNE WFWEL07 2.5 km ENE WFWEL08 3.0 km SE WFWEL09 7.0 km N WFWEL10	Drinking supply groundwater near facility Reported: Annual Environmental Monitoring Report	Grab liquid	Annual	10	Gross alpha/beta, H-3, gamma isotopic, pH, conductivity

SAMPLE LOCATION AND I.D. CODE	MONITORING/REPORTING REQUIREMENTS	SAMPLING TYPE/MEDIUM	COLLECTION FREQUENCY	TOTAL ANNUAL SAMPLES	ANALYSES PERFORMED/ COMPOSITE FREQUENCY
3.0 km SSE at Fox Valley **AFFXVRD**	Particulate air samples around WNYNSC perimeter	Continuous air particulate filter	Weekly	468 (52 per location)	Gross alpha/beta
3.7 km NNW at Thomas Corners Road **AFTCORD**	Reported: Annual Environmental Report				Quarterly composite for Sr-90, gamma isotopic
2.0 km NE on Route 240 **AFRT240**	Monthly Environmental Monitoring Trend Analysis (four sites only+)	Continuous desiccant column for water vapor collection	Weekly (2 sites **)	104 (52 per site)	H-3
1.5 km NW on Rock Springs Road **AFRSPRD**		Continuous charcoal cartridge	[illegible]	104 (52 per site)	Quarterly composite for I-129
29 km S at Great Valley (background) **AFGRVAL**					
7 km N at Springville **AFSPRVL**					
6 km SSE at West Valley **AFWEVAL**					
50 km W at Dunkirk (background) **AFDNKRK**					
2.3 km SW on Dutch Hill Road **AFBOEHN**					

+ AFRT240, AFRSPRD, AFGRVAL and AFBOEHN.
** AFRSPRD and AFGRVAL.

1990 EFFLUENT AND ON-SITE MONITORING PROGRAM

SAMPLE LOCATION AND I.D. CODE	MONITORING/REPORTING REQUIREMENTS	SAMPLING TYPE/MEDIUM	COLLECTION FREQUENCY	TOTAL ANNUAL SAMPLES	ANALYSES PERFORMED/ COMPOSITE FREQUENCY
2.5 km SW AFDHFOP 3.0 km SSE AFFXFOP 3.7 km NNW AFTCFOP 2.0 km NE AF24FOP Met Tower on-site ANRGFOP	Collection of fallout particulate and precipitation around WNYNSC perimeter Reported: Annual Environmental Report	Integrating liquid	Monthly	60 (12 per site)	Gross alpha/beta, H-3, pH
Surface Soil (at each of nine air samplers plus 26 km SSW at Little Valley)	Long-term fallout accumulation Reported: Annual Environmental Monitoring Report (year of collection)	Surface plug composite soil	Annually	10	Gamma isotopic, Sr-90, Pu-239, Am-241 U-isotopic at SRFSPRD, SFBOEHN and SFGRVAL
SF Soil Series:					
Buttermilk Creek at Thomas Corners Road SFTCSED**	Deposition in sediment downstream of facility effluents	Grab stream sediment	Semiannually 1st sample of SFBCSED and SFSDSED each spring*	10	Gross alpha/beta, isotopic gamma and Sr-90
Buttermilk Creek at Fox Valley Road (background) SFBCSED**	Reported: Annual Environmental Monitoring Report		Annually (2 sites only**)	2	U/Pu isotopic, Am-241
Cattaraugus Creek at Springville Dam SFSDSED					
Cattaraugus Creek at Bigelow Bridge (background) SFBISED					
Cattaraugus Creek at Felton Bridge SFCCSED					

*Sample to be split with NYSDOH.

**Analysis on one of two semiannual collections at SFTCSED and SFBCSED.

SAMPLE LOCATION AND I.D. CODE	MONITORING/REPORTING REQUIREMENTS	SAMPLING TYPE/MEDIUM	COLLECTION FREQUENCY	TOTAL ANNUAL SAMPLES	ANALYSES PERFORMED/ COMPOSITE FREQUENCY
Cattaraugus Creek downstream of the Buttermilk Creek Confluence **BFFCATC***	Fish in waters up and downstream of facility effluents Reported: Annual Environmental Monitoring Report	Individual collection, biological	Semiannually	5 (each sample is 10 fish)	Isotopic gamma and Sr-90 in edible portions of each individual fish
Control Sample from nearby stream not affected by WVDP (7 km or more upstream of site effluent point) **BFFCTRL***					
Cattaraugus Creek downstream of Springville Dam **BFFCATD**			Annual	1 (each sample is 10 fish)	Gamma isotopic and Sr-90 in edible portions of each individual fish
Dairy Farm, 3.8 km NNW **BFMREED***	Milk from animals foraging ground facility perimeter Reported: Annual Environmental Monitoring Report	Grab biological	Monthly (*BFMREED, BFMCOBO, BFMCTLS, BFMCTLN)	48 (12 per site)	Gamma isotopic, Sr-90, H-3 and I-129 on annual samples and quarterly composites of monthly samples
Dairy Farm, 1.9 km WNW **BFMCOBO**					
Dairy Farm, 3.5 km SE of site **BFMWIDR**			Annual (BFMWIDR, BFMHAUR)	2	
Dairy Farm 2.5 km SSW **BFMHAUR**					
Control location 25 km S **BFMCTLS**					
Control location 30 km N **BFMCTLN**					

*Samples shared with NYSDOH

1990 EFFLUENT AND ON-SITE MONITORING PROGRAM

WVDP-
Rev.

SAMPLE LOCATION AND I.D. CODE	MONITORING/REPORTING REQUIREMENTS	SAMPLING TYPE/MEDIUM	COLLECTION FREQUENCY	TOTAL ANNUAL SAMPLES	ANALYSES PERFORMED/ COMPOSITE FREQUENCY
Nearby locations **BFVNEAR**	Fruit and vegetables grown near facility perimeter downwind if possible	Grab biological (3 each)	*Annually, at harvest	6	Gamma isotopic and Sr-90 analysis of edible portions, H-3 in free moisture
Remote locations (16 km or more from facility) **BFVCTRL**	Reported: Annual Environmental Monitoring Report				
Beef cattle forage from near site location N **BFHNEAR**		Grab biological	Annually	2	Gamma isotopic, Sr-90
Milk cow forage from control south location or north location **BFHCTLS** or **BFHCTLN**					
Beef animal from nearby farm in downwind direction **BFBNEAR**	Meat-beef foraging near facility perimeter, downwind if possible	Grab biological	Semiannually	4	Gamma isotopic and Sr-90 analysis of meat, H-3 in free moisture
Beef animal from control location (16 km or more from facility) **BFBCTRL**	Reported: Annual Environmental Monitoring Report				
In vicinity of the site (3) **BFDNEAR**	Meat-deer foraging near facility perimeter	Individual collection biological	*Annually, during hunting season	3	Gamma isotopic and Sr-90 analysis of meat, H-3 in free moisture
Control animals (3) (16 km or more from facility) **BFDCTRL**	Reported: Annual Environmental Monitoring Report		*During year as available	3	

*Sample to be split with NYSDOH

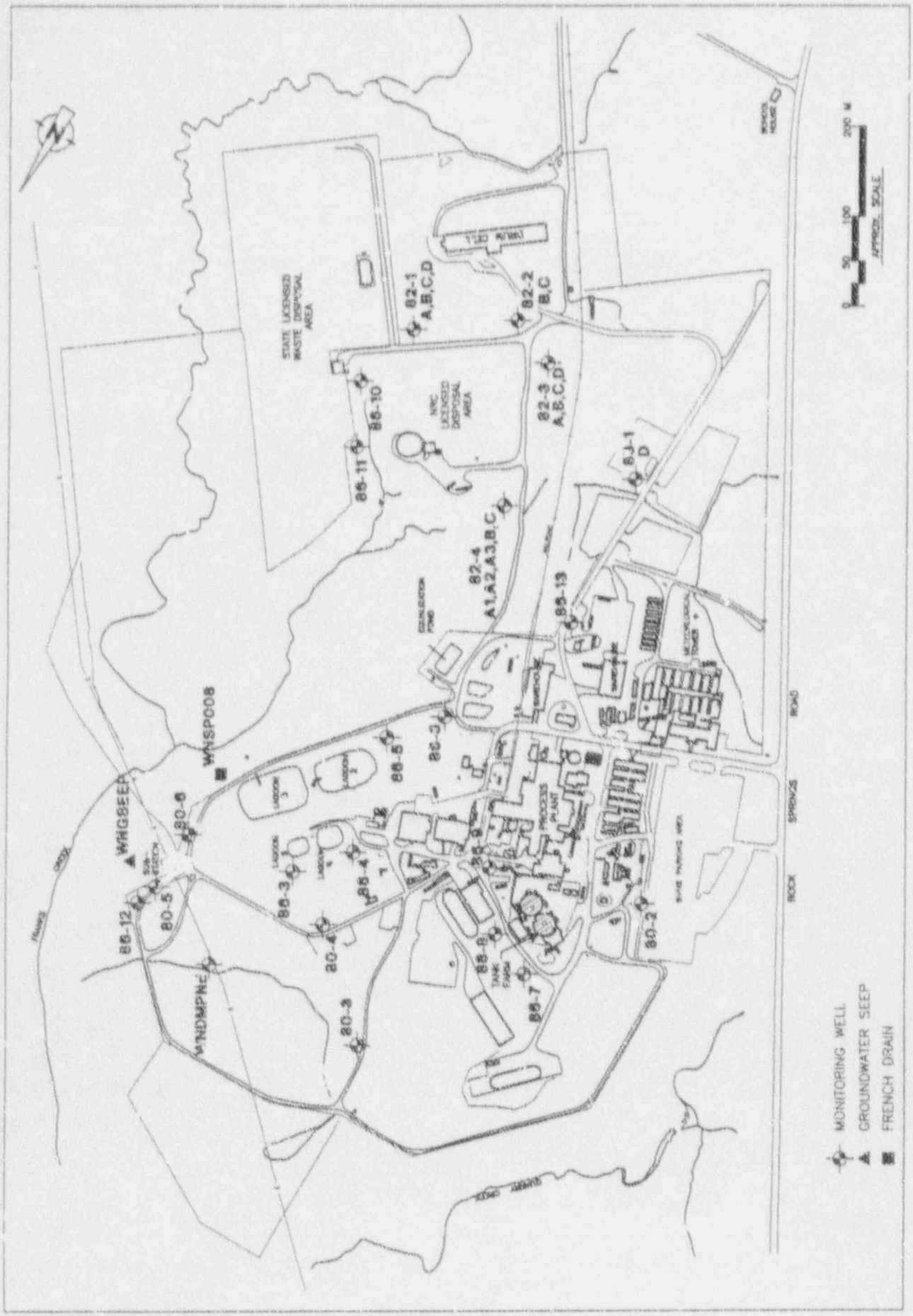
SAMPLE LOCATION AND I.D. CODE	MONITORING/REPORTING REQUIREMENTS	SAMPLING TYPE/MEDIUM	COLLECTION FREQUENCY	TOTAL ANNUAL SAMPLES	ANALYSES PERFORMED/ COMPOSITE FREQUENCY
Thermoluminescent Dosimetry (TLD) off-site: DFTLD Series	Direct radiation around facility	Integrating LiF TLD	Quarterly	460 (5 TLD's at each of 23 locations, collected 4 times per year)	Quarterly gamma radiation exposure
At each of 16 compass sectors, at nearest accessible perimeter point #1-16	Reported: Monthly Environmental Monitoring Trend Analysis Annual Environmental Monitoring Report				
"5 Points" land-fill, 19 km SW (background) #17					
1500 m NW (downwind receptor) #20					
Springville 7 km N #21					
West Valley 5 km SSE #22					
West Valley, 8 km S (background) #23					
Dunkirk, 50 km NW (background) #37					
Sardinia-Savage Rd. 24 km NE (background) #41					

SAMPLE LOCATION AND I.D. CODE	MONITORING/REPORTING REQUIREMENTS	SAMPLING TYPE/MEDIUM	COLLECTION FREQUENCY	TOTAL ANNUAL SAMPLES	ANALYSES PERFORMED/ COMPOSITE FREQUENCY
Thermoluminescent Dosimetry (TLD) on-site: DNTLD Series	Direct radiation on facility grounds	Integrating LiF TLD	Quarterly	360 (5 TLD's at each of 18 sites collected 4 times per year)	Quarterly gamma radiation exposure
At three corners of SDA #18, 19, 33	Reported: Monthly Environmental Monitoring Trend Analysis				
(9) at security fence around site #24, 26-34	Annual Environmental Monitoring Report				
(5) On-site near operational areas #35, 36, 38-40					
Rock Springs Road 500 m NNW of plant #25					

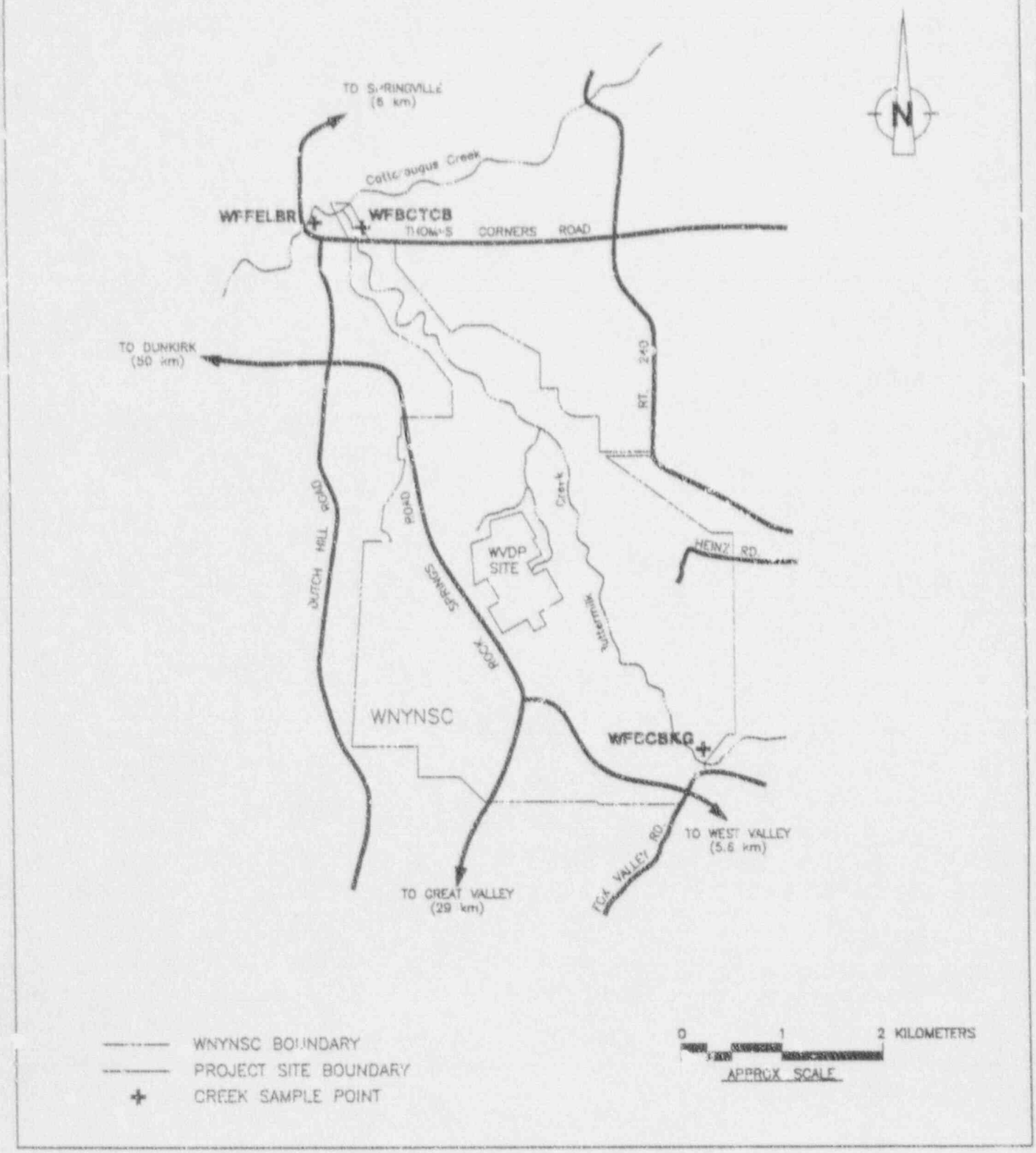
FIGURE D-1

Location of On-Site Air Effluent Points.

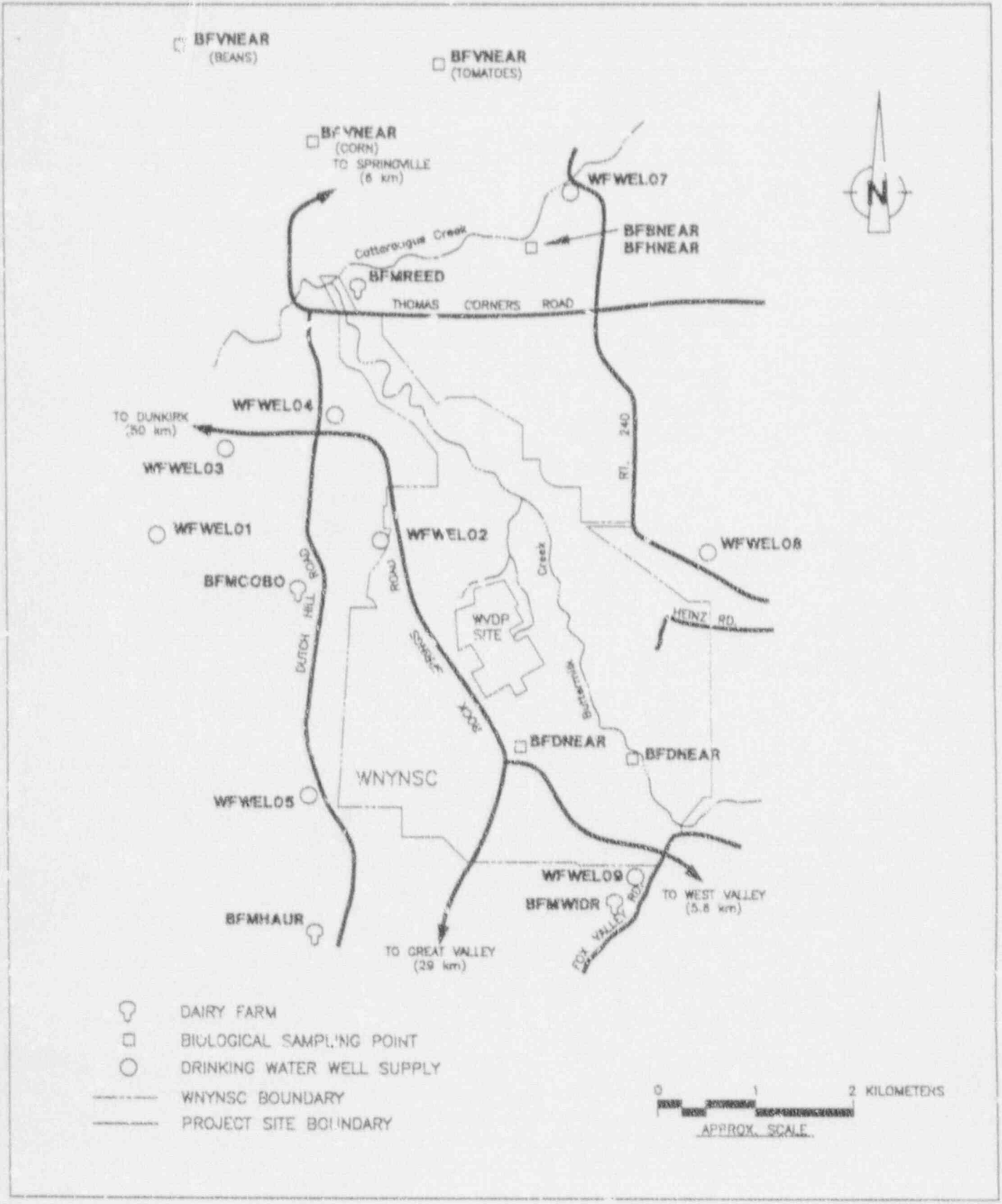
Sampling Locations for On-Site Surface Water



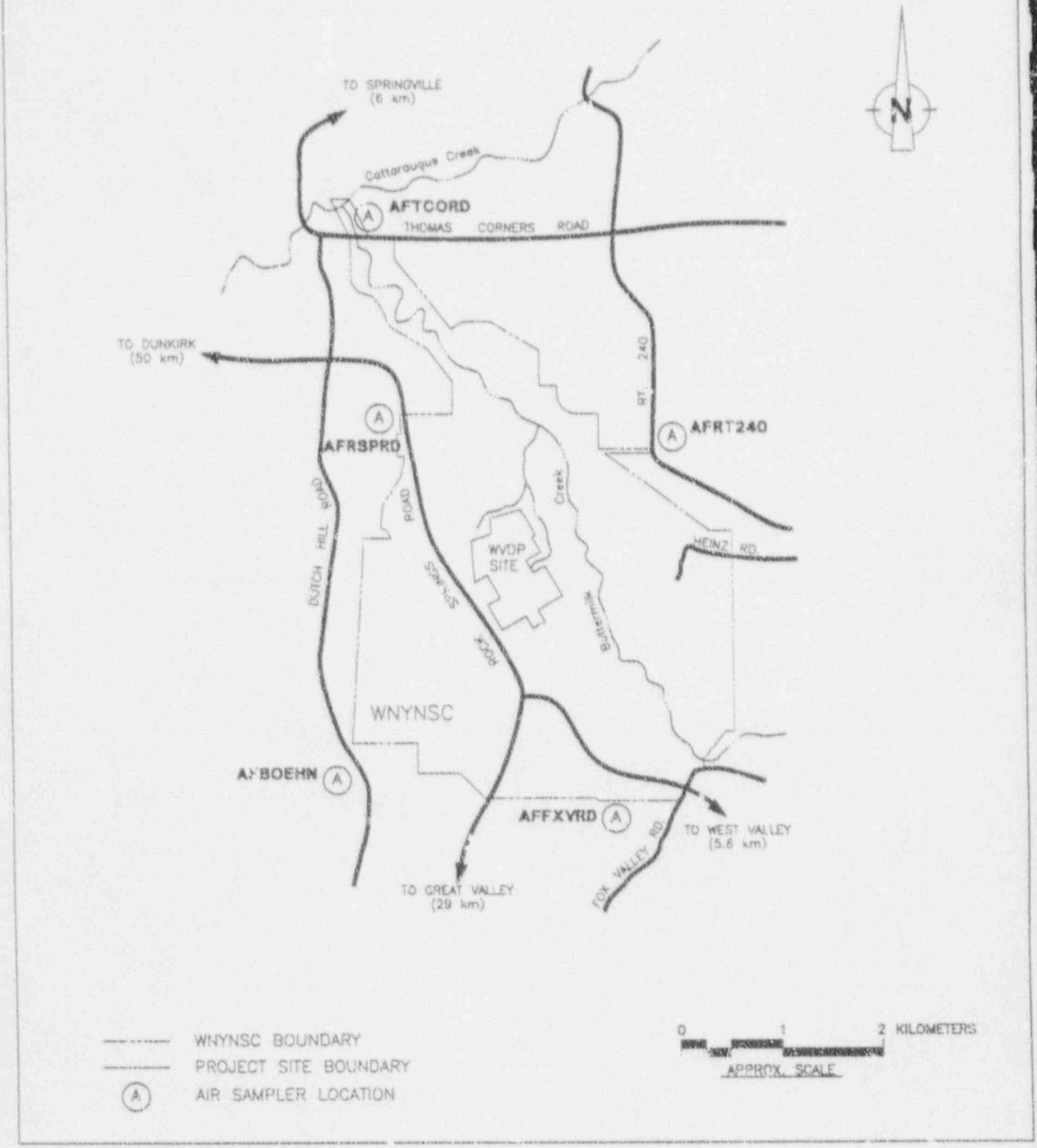
Location of On-Site Groundwater Monitoring Points.



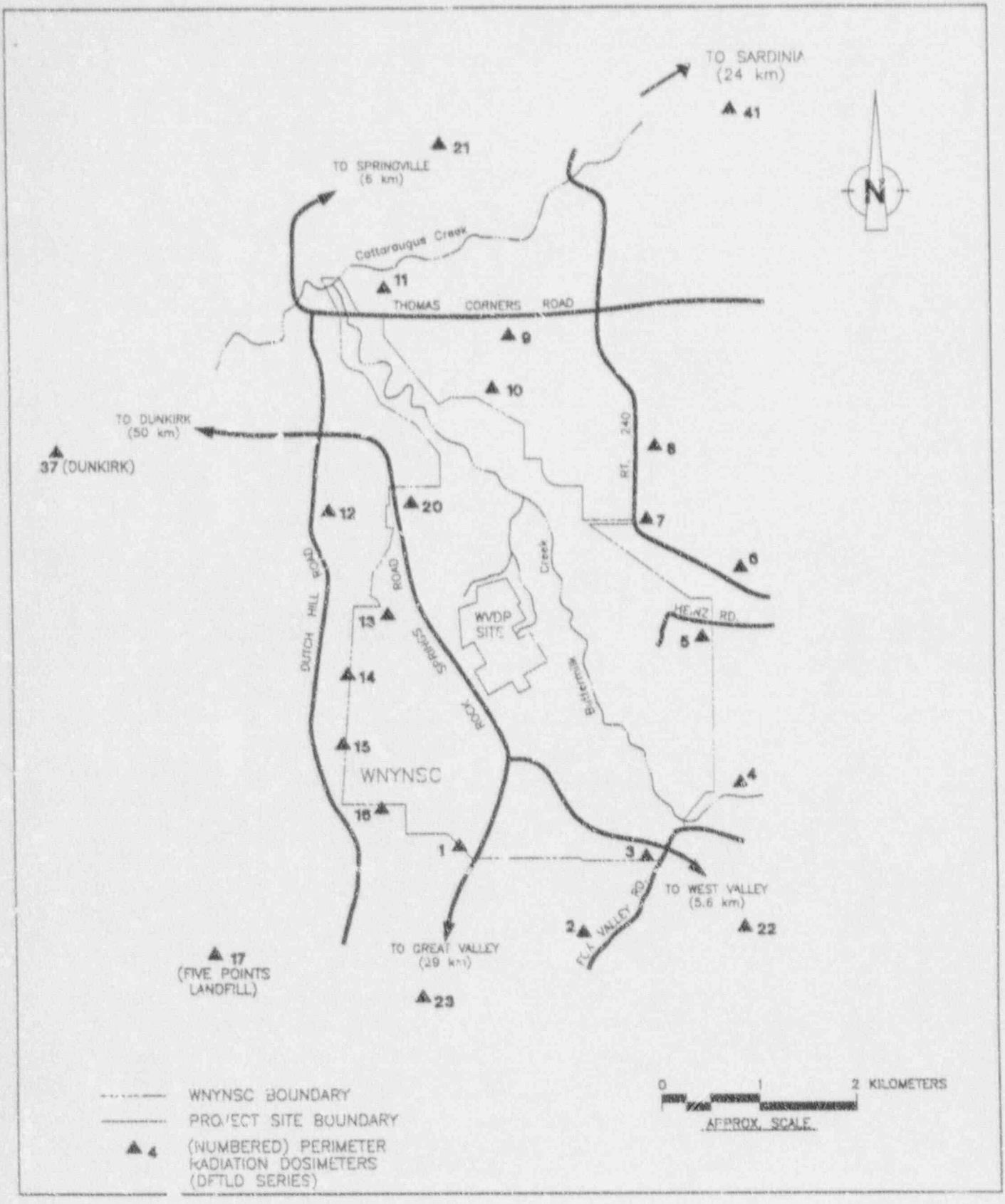
Location of Off-Site Surface Water Samplers



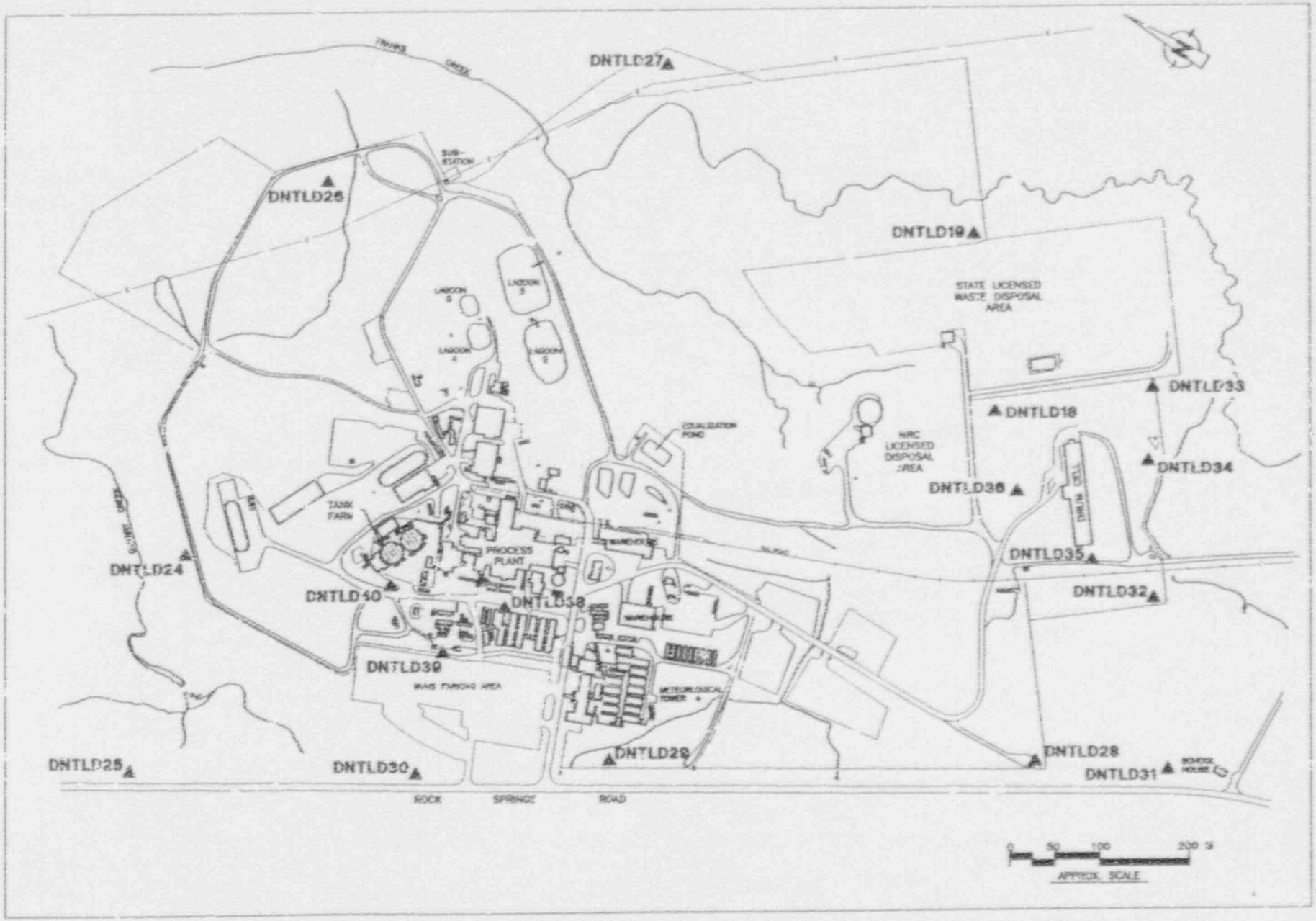
Near–Site Drinking Water and Biological Sample Points



Location of Perimeter Air Samplers.

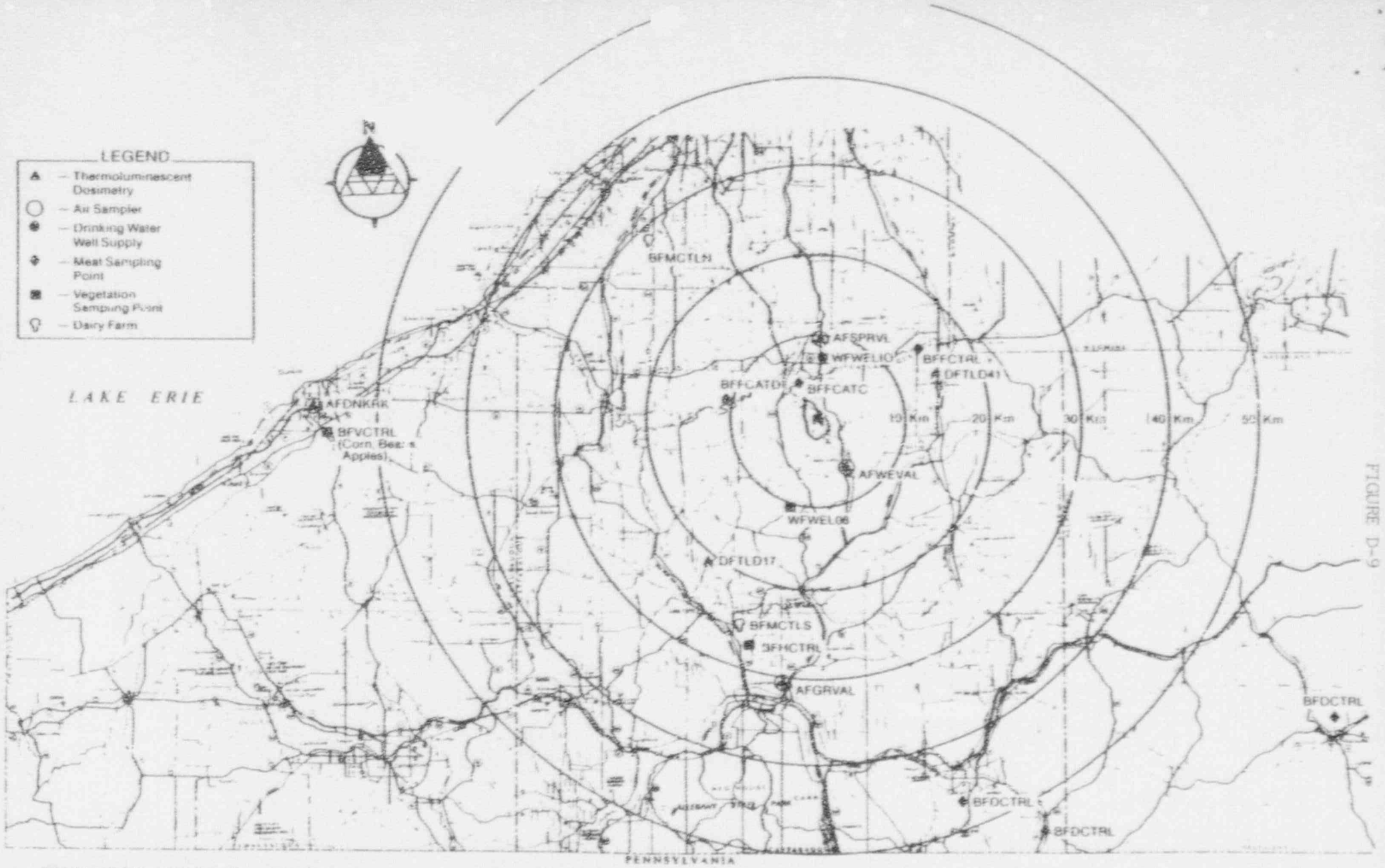


Location of Off-Site Thermoluminescent Dosimetry (TLD).



Location of On-Site Thermoluminescent Dosimetry (TLD).

FIGURE D-8



REF: NYSDOT, New York State Map — West Sheet, 1:250,000, Revised :982

0 5 10 15 20 25K

ENVIRONMENTAL SAMPLE POINTS MORE THAN 5 KM FROM THE WVDP SITE

FIGURE D-9

Appendix E: Acronyms

8D-1	Spare High-Level Waste Tank
8D-2	High-Level Waste Tank
8D-3	STS Hold Tank
8D-4	Thorex Waste Storage Tank
AEC	Atomic Energy Commission
ALARA	As Low as Reasonably Achievable
CFR	Code of Federal Regulations
CH	Contact Handled
CPC	Chemical Process Cell
CSRF	Contact Size Reduction Facility
CSS	Cement Solidification System
CTS	Component Test Stand
CY	Calendar Year
D&D	Decontamination and Decommissioning
D&M	Dames and Moore
DEIS	Draft Environmental Impact Statement
DOE	Department of Energy
DOE-HQ	U.S. Department of Energy-Headquarters
DOE-ID	U.S. Department of Energy-Idaho Operations Office
DOT	Department of Transportation
DWPF	Defense Waste Processing Facility
EDR	Equipment Decontamination Room
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
FEIS	Final Environmental Impact Statement
FRS	Fuel Receiving and Storage
FSFCA	Federal & State Facilities Compliance Agreement
FY	Fiscal Year
HEPA	High Efficiency Particulate Air Filter
HIC	High Integrity Container
HLLW	High-Level Liquid Waste
HLW	High-Level Waste
HWMP	Hazardous Waste Management Program
HWSF	Hazardous Waste Storage Facility
IDB	Integrated Data Base
IRTS	Integrated Radwaste Treatment System
IWSF	Interim Waste Storage Facility
LADS	Liquid Abrasive Decontamination System
LAG	LAG or Surge Storage
LLW	Low-Level Waste
LLWT	Low-Level Waste Treatment
LLWTF	Low-Level Waste Treatment Facility
LSA	LAG Storage Area
LWTS	Liquid Waste Treatment System

MOU	Memorandum of Understanding
mR/hr	Milli Rem Per Hour
MSMRS	Master Slave Manipulator Repair Shop
MWMP	Mixed Waste Management Program
nCi/gm	Nano Curie Per Gram
NDA	NRC Licensed Disposal Area
NE	Office of Assistant Secretary for Nuclear Energy
NEPA	National Environmental Policy Act of 1969
NESHAP	National Emission Standards for Hazardous Air Pollutants
NFS	Nuclear Fuel Services
NOI	Notice of Intent
NRC	U.S. Nuclear Regulatory Commission
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
NYSERDA	New York State Energy Research and Development Authority
OCRWM/DP	Office of Civilian Radioactive Waste Management/Assistant Secretary for Defense Program
OJT	On-the-Job Training
OSR	Operational Safety Requirements
QMM	Quality Management Manual
RCRA	Resource Conservation and Recovery Act
RFRF	Reactor Fuel Reprocessing Facility
RH	Remote Handled
RTS	Radioactive Waste Treatment System
SAA	Satellite Accumulation Area
SAR	Safety Analysis Report
SDA	State Licensed Disposal Area
SFCM	Slurry-Fed Ceramic Melter
SGN	Societe Generale pour les Techniques Nouvelles
SH	Special Hole
SOP	Standard Operating Procedure
SPDES	State Pollution Discharge Elimination System
STP	Sewage Treatment Plant
STS	Supernatant Treatment System
TBP	Tributyl Phosphate
TDS	Total Dissolved Solvents
TLD	Thermatumineseent Dosimeters
TRU	Transuranic
TSP	Treatment, Storage, and Disposal
USGS	United State Geological Survey
VF	Vitrification Facility
VRF	Volume Reduction Factor

WCP	Waste Form Compliance Plan
WIPP	Waste Isolation Pilot Plant
WNYNSC	Western New York Nuclear Service Center
WSA	Waste Storage Area
WSB	Waste Storage Building
WVDP	West Valley Demonstration Project
WVNS	West Valley Nuclear Services Company, Inc.
WVPO	West Valley Project Office
XCR	Extraction Chemical Room