NMED/DOE/AIP- 93/2

INITIAL INSPECTION OF SITE WATER SYSTEMS AND WELLS AT DOE FACILITIES IN NEW MEXICO

New Mexico Environment Department
DOE Oversight and Monitoring Program
P.O. Box 26110
Santa Fe, New Mexico 87502

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New Mexico Environment Department

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INTRODUCTION

The Department of Energy (DOE) Oversight Program of the New Mexico Environment Department (NMED) was initiated in October 1990. The Ground Water Protection and Remediation Bureau (GWPRB) is responsible for oversight of general ground-water quality issues at DOE facilities and the Surface Water Quality Bureau (SWQB) is responsible for oversight of surface-water quality issues.

This report satisfies X.A.B.3, Action No. 17 of the DOE/NMED Agreement in Principle (AIP): "The state will inspect all the facilities' drinking water, wastewater treatment and land-application systems and injection, monitoring and production wells and will identify any modifications or improvements needed." NMED AIP staff met with appropriate personnel at the Los Alamos National Laboratory (LANL), Sandia National Laboratories, NM (SNL), Inhalation Toxicology Research Institute (ITRI) and Waste Isolation Pilot Plant (WIPP) for tours of the pertinent sites and interviews with staff on the systems involved. In keeping with the AIP, the recommendations herein are offered in the spirit of technical comment rather than regulatory orders. As such, no formal response is required on the part of the facilities. However, we would welcome comments, especially regarding any differences of opinion concerning implications of facts.

Some explanatory remarks on the organization/makeup of the report are in order. First, a standard outline of subtopics was adopted for discussing systems at the facilities. This not only provides for consistent and parallel coverage but also enables the reader to locate items of interest more readily. Second, although it is beyond the scope of this report to describe the hydrogeology of the sites in any detail, brief summaries of the setting of each area are included for general information. References cited in these should be consulted for more comprehensive discussions of geology and hydrology of the facilities. Finally, Figures and Tables are placed at the end of the report, between the References and Appendices. Tables 1 - 5 summarize the systems inspected.

LOS ALAMOS NATIONAL LABORATORY

SETTING

Los Alamos National Laboratory (LANL) is located west of the Rio Grande in Los Alamos County, 40 mi northwest of Santa Fe, New Mexico (Figure 1). Geologically, it sits on the Pajarito Plateau, an area of deeply dissected Quaternary-aged volcanic deposits and Tertiary fill of the Espanola Basin (Figure 2). The volcanics belong to the Bandelier Tuff, largely rhyolitic ash flows and pumice falls that were derived from the Valles Caldera in the Jemez Mountains to the west (Purtymun, 1984). The basin fill is represented by the Puye Conglomerate (fanglomerate, lake clays, basalt flows, ash and river gravels) and the Tesuque Formation (mostly poorly consolidated sand and gravel). The average elevation of the resulting finger-like mesas is approximately 7,000 ft.

The area is drained by ephemeral and intermittent streams that flow easterly to the Rio Grande, lying some 1,450 ft below the plateau. The major canyons cut across the plateau are Guaje, Rendija, Barrancas, Bayo, Pueblo, Los Alamos, Sandia, Mortandad, Pajarito, Water, and Ancho. Springs between 7,900 and 8,900 ft on the flanks of the Sierra de Los Valles supply perennial base flow to the headwaters of Guaje, Los Alamos, Pajarito, and Water Canyons (Abeele and others, 1981). Perennial flow is maintained in sections of Pueblo, Los Alamos, Sandia, and Mortandad Canyons by the release of effluents from industrial-waste treatment plants, sewage plants, and cooling water from the power plant (Purtymun, 1975).

Ground water occurs beneath the regional water table at considerable depth in units making up the so-called "main aquifer" (Tesuque Formation and lower part of the overlying and intertonguing Tschicoma Formation in the western part of the Pajarito Plateau; Tesuque Formation and overlying Puye Conglomerate in the central and eastern parts of the plateau) and in perched saturated zones atop the Bandelier Tuff within the alluvium along canyons and locally above basalt and fine grained sedimentary units within the Puye Conglomerate (Figure 2). Available data indicate ground water flows generally eastward until reaching the Rio Grande, into which it discharges (Hoffman and Lyncoln, 1992).

LANL DRINKING-WATER SYSTEM

DESCRIPTION - In 1990 (the most recent year covered by water-supply reports from LANL), potable water was provided by a system connecting three well fields tapping the main aquifer: Los Alamos, Guaje and Pajarito (Figure 3 and Table 1). Two new wells were also being constructed in an area of Los Alamos Canyon designated the Otowi well field (Purtymun and others, 1993). Water from these wells is also provided to the communities of Los Alamos and White Rock as well as Bandelier National Monument. This system is totally separate from that used for delivery of nonpotable water.

CONCERNS/RECOMMENDATIONS - To our knowledge, no attempt has ever been made to check the water balance (input vs output) of the drinking-water system at LANL. If this is true, it may be useful to compare water pumped against water delivered, in order to verify the integrity of the system. Significant differences in the two values would point to leaks in pipelines. Although additional flowmeters and valves may be required to conduct such a study, they would permit regular checks in the future.

LANL WASTEWATER SYSTEMS

DESCRIPTION - LANL discharges wastewater persuant to their National Pollutant Discharge Elimination System (NPDES) permit no (NM0028355) under the federal Clean Water Act. Three types of wastewater are treated at LANL: sanitary, non-radioactive industrial and radioactive industrial. Facilities include the Sanitary Waste System Consolidation (SWSC) plant, various non-radioactive industrial facilities, which do minor treatment on-site, (such as, the power plant, steam plants, cooling towers, high explosive test areas, the asphalt plant scrubber and the printed circuit board facility) and the industrial-waste treatment plants at TA-21 and TA-50.

The SWSC facility and the TA-53 Sanitary Lagoons Elimination Project consolidated eight of LANL's nine sanitary-waste streams into one combined flow, which is treated by a newly constructed activated sludge treatment facility. The consolidation of the sanitary-waste streams was a result of facilities' inability to meet effluent limits, age of the facilities, and elimination of outfalls. An Administrative Order from EPA, Docket # VI-92-1306 and a Federal Facility Compliance Agreement # VI-91-1328 were issued to implement this project. The waste streams consolidated by SWSC include

TA-3	Trickling Filter Plant (Outfall 01S),
TA-9	Lagoon and Sand Filter (02S),
TA-16	Trickling Filter Plant (03S),
TA-18	Lagoons (04S),
TA-46N	Lagoon and Sand Filters (07S),
TA-53	Sanitary Lagoons (09S),
TA-35	Lagoons and Sand Filters (10S) and
TA-46S	Lagoons (12S).

This new facility directly receives all of the sanitary wastewater generated at LANL, with the exception of that originating at TA-21 (outfall 05S), which is stored at a small activated sludge plant at the site and then pumped to the SWSC facility.

The SWSC facility was designed by Molzen-Corbin and Associates and constructed by Foley Company. Start-up of the new SWSC plant was initiated on August 18, 1992. The facility is now fully operational and is currently meeting all NPDES effluent limits.

The SWSC plant has a maximum treatment capacity of 0.6 million gallons per day (MGD) and an average design capacity of 0.4 MGD. The plant is currently handling between 0.3 and 0.4 MGD. The facility employs an extended aeration treatment process with two equalization basins for the control of normal diurnal and fluctuations as well as increased flows due to infiltration and inflow. The facility is also designed to denitrify wastewater and produce an effluent with a total nitrogen content under 10 mg/L as set forth in a groundwater discharge plan issued to the SWSC plant by NMED's Ground Water Protection and Remediation Bureau. The SWSC plant is also equipped with effluent chlorination/dechlorination facilities and sand-drying beds for the treatment of sludge. A schematic diagram of SWSC is given in Figure 4.

The operators of the SWSC plant are required by the NM Water Quality Control Commission (WQCC) Part IV regulations to be certified operators. Each operational shift has at least one Class IV operator on-site (Class IV is the highest level of certification).

In general, the plant was well operated during the two days of the evaluation. All process units appeared normal and a clear effluent was being discharged. Available operational and monitoring data show that the facility has consistently met NPDES permit limits since its start-up in August, 1992. The plant staff is in the process of determining optimum operating variables for the facility. Influent conditions have changed over time when new wastewater sources were added as phased construction of the SWSC project progressed. Fluctuations in Laboratory-wide operations have also impacted the wastewater treatment plant. For instance, the shutdown of activities at LANL during the Christmas holidays forced SWSC personnel to add a supplemental food source to the wastewater influent, in order to keep biological treatment processes alive and healthy. However, final completion of the SWSC project has allowed influent conditions to stabilize in recent months and plant personnel are now able to consistently control plant operational conditions.

The SWSC facility has undergone a one-year project performance period in which Molzen-Corbin performed start-up activities at the plant, including the preparation of quarterly reports documenting operational performance. Molzen-Corbin also implemented a preventive maintenance system at SWSC and prepared an Operations and Maintenance (O&M) manual for plant personnel.

The preventive maintenance system for SWSC was not complete at the time of the evaluation. Although a draft O&M manual was prepared, it has not yet been finalized and is incomplete in its coverage of the plant. However, personnel were given intensive training in proper O&M procedures for the SWSC plant during June and July of 1992 and seem very knowledgeable of the daily operation of the facility. SWSC personnel have developed their own "daily check sheets" for routine inspections and preventive maintenance on both the wastewater treatment facility and all associated lift stations. These sheets have allowed operators to implement preliminary preventive maintenance procedures and O&M activities until the SWSC

O&M manual and preventive maintenance system can be finalized.

The laboratory at the SWSC plant routinely analyzes a wide array of process-control parameters for both the facility's process units and the treated effluent. This provides plant operators with the information needed to maintain strict operational control of all treatment units. Although the process-control samples are not taken at the outfall and results are not used for compliance purposes, most analyses are performed in accordance with EPA approved methods (40 CFR 136) for the analysis of wastewater. In order to familiarize all personnel with laboratory procedures and the application of analytical results toward plant performance, all SWSC operators are required to work 8 weeks in the laboratory on a rotating basis. All wastewater analyses performed on SWSC for NPDES compliance purposes are run by the Johnson Controls Environmental laboratory (JENV).

Results of all sanitary sludge analyses are maintained by EM-8. Some of these records are also kept at the SWSC facility. Records include the date that each sludge-drying bed is poured, the number of days each bed is in use, and the number of drying days which have a daily average temperature above 32°F. These records are required under the CWA's sludge disposal regulations 40 CFR 503. Analyses performed on the sludge include heavy metals and radiological contaminants. All analyses are performed by LANL's EM-9 laboratory section. Dried sludge is removed from the SWSC plant drying beds and taken to TA-54, Area G for final disposal. A set of waste-acceptance criteria has been prepared for LANL by Benchmark Environmental Corporation and is currently in use at Area G.

In an effort to coordinate SWSC's regulatory compliance status and its facility operations, JCI and LANL hold weekly SWSC meetings to exchange information, discuss problems and assess plant performance. These meetings are attended by representatives from the SWSC Plant (JCI), Johnson Control's Environmental Division (JENV) and LANL's EM-8 Group. Additionally, JENV performs "spot" inspections on all sanitary wastewater facilities including SWSC and those facilities which were closed after consolidation into SWSC. JENV also exchanges process-control samples with the SWSC laboratory in order to check the validity of each lab's analytical results and to assess the effectiveness of their quality-assurance programs. These efforts are commendable and may prove invaluable in enhancing both the plant's performance and its regulatory compliance status.

In May 1990, LANL initiated a Waste Stream Characterization (WSC) Program to verify that all waste streams were properly identified under the Laboratory's NPDES permit and to insure that all point source discharges to the environment were properly permitted. LANL has discovered numerous discharges from unpermitted outfalls during the WSC program. LANL has taken the following actions to correct these discharges: 1) consolidate outfalls into permitted outfalls; 2) submit NPDES permit application(s); 3) plug outfalls; and/or 4) select alternate treatment processes and/or disposal practices.

The industrial-waste treatment plant at TA-50 collects and processes liquid wastes containing radioactive wastes from LANL. A flow chart of the Tech Areas that contribute to the plant is given in Figure 5. The plant discharges in batches of approximately 26,000 gal/discharge and approximately 100,000 gal/week of treated effluent into Mortandad Canyon. A schematic diagram of the plant is given in Figure 6.

Most of the collection system for the TA-50 plant is double-walled; however, some segments still consist of single-walled collection lines. A diagrammatic cross-section of the piping is included in Appendix A. Leak detectors, located in manholes throughout the collection system, which is designed to notify the operator of any leaks.

Influent liquid wastes from TA-55 (plutonium processing facility) consist of aqueous acids and bases. This liquid waste is pretreated at TA-50/Room 60 prior to final treatment at the main TA-50 treatment facility. A schematic diagram of the pretreatment facility is included in Appendix A. Sludges produced at the pretreatment facility are considered to be transuranic waste. Sludge removed from the pretreatment facility (Room 60) is solidified in 22 gal portions, mixed with Portland cement, sodium silicate and vermiculite and placed in a 55 gal drum with a 90 mil polyethylene liner. The drums are then taken to TA-54 for storage, awaiting final disposal at WIPP.

The sludge produced at the main TA-50 plant is wasted and decanted approximately every 30 days. The sludge is then dewatered in a rotary vacuum filter to approximately 30% solids. The dewatered low-level radioactive sludge is then placed in drums for storage at TA-54.

The TA-50 plant is 30 years old and has difficulty treating certain constituents that are present in the waste stream. With the proposal of the new NPDES permit, water-quality based effluent limits will be based on protecting livestock and wildlife watering set forth in the Water Quality Standards for Interstate and Intrastate Streams in New Mexico adopted by the New Mexico Water Quality Control Commission. The effluent discharged may not meet the permit limits for six or more of these constituents. LANL has started the process of requesting funding from Congress to build a new industrial wastewater treatment plant. If funding is approved, the new plant may be completed by the year 2007.

The industrial-waste treatment plant at TA-21/DP-Site is currently being operated approximately 3 times a month. A schematic diagram of the treatment processes is given in Figure 7. The plant primarily treats low-level radioactive wastewater. Approximately 14 to 20 drums of low-level radioactive sludge is produced by the plant every two years. The plant currently has a NPDES-permitted outfall (050), but does not discharge through this outfall. Outfall 050 was scheduled for deletion from LANL's NPDES permit on November 1, 1993. TA-21 discharges batches of treated wastewater through a cross-country pipeline to the TA-50 industrial-waste treatment plant. TA-21's effluent is sometimes mixed with treated wastewater from the TA-50 facility and discharged in batches from the permitted outfall (051).

CONCERNS/RECOMMENDATIONS - The collection system at TA-21 consists of single-walled piping without leak detectors. The integrity of the collection system is in question. The operator at the TA-21 industrial waste treatment facility cannot document that all waste discharged in the collection system is reaching the plant and being treated. A water balance on the collection system at TA-21 (output vs input) would correct this.

The quality of the effluent discharge from the TA-50 plant is also of concern. In view of the proposed effluent limits set forth in the EPA proposed NPDES Permit and past operations, some constituents in the discharge may be in violation of the effluent limits for outfall 051. Some measures should be taken to prevent this here and at other outfalls.

Radioactive discharges, such as tritium from outfall 051, must be identified in order to determine the source(s) of the tritium. According to 40 CFR Part 122.2, accelerator-produced isotopes are regulated under an NPDES permit and any reactor-produced isotopes are regulated by DOE (self-regulating in accordance with the Atomic Energy Act). Accelerator-produced isotopes must be identified on a site-specific basis so that proper effluent limits are applied to the outfalls.

LAND-APPLICATION SYSTEMS

DESCRIPTION - Los Alamos has one land-application site (Table 1). The site is located at TA-54/Area G and sits on the mesa top near the edge of the Tech Area. This area accepts sewage sludge from the sanitary-wastewater treatment facilities. There is no containment structure around the land-application site perimeter. Migration of sludge beyond the site fence was evident during the inspection.

CONCERNS/RECOMMENDATIONS - Runoff from the land-application site drains into Pajarito Canyon. Better containment and management practices are needed to prevent any sludge from leaving the area and entering watercourses.

LANL INJECTION WELLS

DESCRIPTION - Five injection wells are known to exist at LANL, two active and three abandoned. One of the active wells is at Fenton Hill, in the mountains west of the laboratory, where water has been injected to the subsurface to recover heat in conjunction with the Hot Dry Rock Geothermal Project. It is regulated by the New Mexico Oil Conservation Division and reportedly has a leak in the annulus of approximately 6 gpm from an unknown source (Richard Ohrbom, NMED/GWPRB, oral communication, August 24, 1993). The other active well is located at TA-22 and was constructed to dispose of rinse water from laundering lab clothing used in the printed-circuit facility. It is 4 ft in diameter and 30 ft deep. The hole was drilled through unconsolidated material until the Bandelier Tuff was encountered. Then a culvert was placed in the hole to serve as a casing and the hole was filled with cobbles to form a French drain. This well will be permitted under the Underground Injection Control program. The abandoned wells are also at TA-22 are being reviewed for proper decommissioning.

CONCERNS/RECOMMENDATIONS - During the inspection it was noted that there is a sizeable wetlands downslope from the injection well at TA-22. This presumably developed from water soaking down to the top of the less permeable tuff and then migrating laterally until it intersected the sloping ground surface and seeped out. Exposures in an adjacent gully, showing the tuff to lie at or within inches of the surface, support this interpretation. This water may eventually merge with that discharged from outfall 128 at this facility. It is suggested that studies be made of the connection between the injection well and the wetlands.

LANL MONITORING WELLS

DESCRIPTION - LANL's monitoring network, including wells, is described in their annual surveillance reports (Figure 8). A separate inspection of monitoring wells was made earlier (summer of 1992) by the NMED Hazardous and Radioactive Materials Bureau and Ground Water Protection and Remediation Bureau for familiarization and documentation.

CONCERNS/RECOMMENDATIONS - As the findings of that review were quite lengthy and are incorporated in the report by Stone and others (1993) for Action 8 (evaluation of the monitoring network at LANL), they are not repeated here. However, the main concerns discussed in that report include 1) the use of production wells with long screen intervals for monitoring purposes, 2) the location and density of monitoring wells in view of the hydrogeologic system and known potential sources of contamination and 3) the lack of a formal monitoring plan.

LANL PRODUCTION WELLS

DESCRIPTION - As of the last LANL water-supply report (Purtymun and others, 1993), there were 16 production wells in three well fields (Figure 3 and Table 1). Various LANL reports (especially those in the annual water-supply series) give details of well completion and construction.

CONCERNS/RECOMMENDATIONS - Construction (especially of older wells, such as those in the Los Alamos well field) may not be sufficient to prevent contaminant migration down the well annulus. This could lead to vertical mixing of waters and possible contamination of the potable water supply.

Also, a single source of information for all wells, not just production wells, would be most helpful in the oversight effort. Ideally this would include two data bases: one for well records and one for water quality. The well-records data base should include location, date drilled, total depth, geologic unit tapped, ground-surface elevation, water-level depth, water-level date(s), water-level elevation, well construction, any aquifer properties determined, well use, logs available and type(s) of chemical analyses run. The water-quality data base should include dates and results of chemical analyses, any pertinent QA/QC information and the various standards for quick reference.

SANDIA NATIONAL LABORATORIES, NEW MEXICO

SETTING

Sandia National Laboratories, NM is located on the Kirtland Air Force Base (KAFB) in the southeastern part of Albuquerque. KAFB is bounded roughly by the Manzanito Mountains on the east, the Isleta Pueblo Indian Reservation on the south, Interstate 25 on the west and Central Avenue on the north (Figure 9). Geologically, the facility straddles the eastern edge of the Albuquerque Basin, one of numerous closed depressions making up the Rio Grande Rift. The Albuquerque Basin is a very complex geologic feature that is just now beginning to be understood through detailed studies like that of Hawley and Haase (1992). In general terms, however, Precambrian metamorphic rocks and Paleozoic sedimentary rocks of the mountains are separated from the thick sequence of mainly unconsolidated Tertiary/Quaternary alluvium in the basin (Santa Fe Group) by the Tijeras Fault Zone. SNL sits on the dissected bajada extending westward from the mountains.

Elevations in the mountains are on the order of 10,000 ft, whereas those along the river are between 4,300 and 5,100 ft. The area is drained by ephemeral streams that flow westerly or southwesterly toward the Rio Grande. Tijeras Arroyo, Arroyo del Coyote and the so-called Travertine Hills Arroyo are the major drainage ways.

The regional water table occurs in the Santa Fe Group at depths ranging from 50 to 500 ft. Locally, saturated zones lie perched above low-permeability strata in this alluvial sequence (Figure 10). Prior to major development, ground-water flow in areas east of the Rio Grande was from mountain-front recharge areas toward the river, or westerly to southwesterly. Incomplete data suggest current ground-water flow beneath SNL is toward major pumping water-supply wells, or northwesterly (McCord and others, 1993).

SNL DRINKING-WATER SYSTEMS

DESCRIPTION - SNL does not operate its own water-supply system, but utilizes that of KAFB, the host facility (Table 3).

Two 5,000-gal water tankers ("water buffaloes") are used to provide temporary local supplies at five field sites not connected to the base water system: Buildings MO130, 9825, 9990, 6020 and 6030 (Table 2). The fill station for these trailers is located in Tech Area III, north of Building 6536. Deliveries are made weekly. A total of up to 139 persons/day may be served in this manner. The tanks at the sites are all underground and have capacities ranging from 500 to 10,000 gal. The filling pipes at the sites were capped and all but one were locked.

Chlorine is not added to either the trailers or site tanks. Samples are taken at the fill station and the first delivery site (MO130) for different parameters at different frequencies: bacteria (fecal coliform) and residual chlorine are tested monthly, volatile organic compounds (VOC's) annually and nitrates every 3 yrs. Residual chlorine has reportedly never been above 0.1 mg/L at the fill station and approximately 1.8 mg/L in water from the truck (oral communication, Vicky Cibicki, Environmental Safety and Health, SNL). The reason for the higher value in the tanker is not known.

The trailers were reportedly cleaned in September 1991 by means of a high-pressure hose; they had not been cleaned for 30 years prior to that (oral communication, Vicky Cibicki, Environmental Safety and Health, SNL). More specifically, cleaning was directed at "heavy mineral deposits impregnated with an oily residue" and was carried out by AC Corporation, Albuquerque. The procedure included,

> "...two initial water blasting passes, followed by [use of] a slag needle to remove the well bonded scale. This was followed by two alkaline wash and rinse processes. Next two pickling and rinse procedures were performed. Finally, disinfection, retention and rinse procedures were accomplished

version should suffice).

SNL WASTEWATER TREATMENT SYSTEMS

DESCRIPTION - SNL does not operate its own wastewater treatment facility (Table 3). Most of the wastewater from SNL is collected and delivered to the City of Albuquerque's sanitary-wastewater collection system, and is treated by the City's wastewater-treatment plant (WWTP). There are 13 active septic systems at SNL in remote areas that collect sanitary wastes. The WWTP discharges its treated effluent to the Rio Grande under an NPDES permit (no. NM0022250) by authority of the federal Clean Water Act and issued by the Environmental Protection Agency.

The City's WWTP is currently designed to treat 60 MGD of domestic sewage. The process is secondary treatment. The City combines the effluents from an activated-sludge plant and an older trickling-filter plant; the combined effluents are chlorinated and dechlorinated prior to discharge into the Rio Grande. The sludge produced by both the activated sludge treatment units and the trickling filter units is combined, anaerobically digested, and disposed of by land application (DP #521); a small portion is composted.

The City is required under their WWTP's NPDES permit to establish and operate a pretreatment program in accordance with federal regulations. The pretreatment program is an EPA-approved, self-monitoring program with inspections of individual industrial dischargers conducted by City staff. The pretreatment program is periodically evaluated by EPA.

SNL conducts its own wastewater monitoring (Figure 11), to demonstrate compliance with the effluent limitations specified in the wastewater Discharge Permits (2069A-2, 2069D-3, 2069F-2, 2069G-2, 2069H-2, 2069I, and 2069K) issued to SNL by the City's pretreatment section. SNL's wastewater self-monitoring consists of sample collection at permit-specified frequencies with continuous pH and flow monitoring at the seven stations. The parameters are analyzed from grab samples, twenty-four hour composite samples and four-day composite samples. Lists of the parameters analyzed and a description of the equipment used at each location is given in Appendix C.

CONCERNS/RECOMMENDATION - The wastewater-monitoring program at SNL is very impressive. The staff is commended on its efforts in operating and maintaining a reliable self-monitoring program. In addition, SNL is self-monitoring radioactive parameters in their discharges to the City. The City's Sewer-Use and Wastewater-Control Ordinance, Section 8-9-3 H., prohibits the disposal of radioactive wastes into the sewer system, except for specific (letter to Ms. Cibicki from Alex C. De Baca, AC Corporation, 5 Sept 1991)."

Also at this time, an Aquata Poxy liner was installed and disinfected in one of the tankers.

CONCERNS/RECOMMENDATIONS - We have several concerns about the transported water supplies:

1. Taken individually, only two of these remote-site systems constitute a public supply (non-transient non-community system) under the NM Drinking Water Program. However, since they are all served by the same drop pipe, they may be collectively viewed as a single non-transient non-community system, subject to all requirements of the NM Water Supply Regulations (Anonymous, 1991). For the sake of public health and safety, we recommend this latter interpretation.

2. To assure water purity, some minimum standards should apply:
   a) hatches on the trailers should be closed and locked between delivery days,
   b) the loadout should be via a metal pipe with a valve at the end rather than the current open drop pipe/hose arrangement,
   c) fittings between the loadout and trailers and trailers and tanks should be sanitary couplings,
   d) to prevent bacterial growth in the water while in the trailers, each load should be chlorinated before delivery, according to the standard American Water Works Association (AWWA) procedures and
   e) to prevent bacterial growth in the tanks at the sites, chlorine levels should be tested with a kit carried on the truck and adjusted as necessary according to a chart (based on AWWA guidelines) kept in the truck.

3. The trailers should be clearly labeled "POTABLE WATER" and not used for any other purpose. Similarly, trailers used for other purposes should not be substituted for the potable-water delivery.

4. The cap on all filling pipes at the remote sites should be locked. That at Building 6030 was not locked when visited (17 June 1993).

5. Copies of results of all regular testing, as specified in the NM Drinking Water Regulations, and all field testing, as described above, should be sent to the NMED Albuquerque office (NMED - Drinking Water, 4131 Montgomery NE, Albuquerque, NM 87109). Since designations of sites may not be familiar to non DOE/Oversight NMED staff, a map of the SNL area, showing some familiar reference points as well as the locations of sampling sites, should accompany such reports (a page-size

wastes from hospitals and specialized clinics. Although SNL's wastewater-monitoring stations are often located below the confluence of several waste streams, source-specific sampling is done when warranted. Recent concerns regarding some discharges from SNL containing radioactive wastes are being addressed by the City, SNL and DOE.

SNL LAND-APPLICATION SYSTEMS

No land-application sites are known at SNL (Table 3).

SNL INJECTION WELLS

No injection wells are known at SNL (Table 3).

SNL MONITORING WELLS

DESCRIPTION - There are numerous monitoring sites at SNL (Figure 12 and Table 3). Water level is monitored at 35 wells and 2 springs; water quality is monitored at 16 wells and 4 springs. SNL's monitoring network, including wells, is described in their annual monitoring reports. The Ground Water Protection and Remediation Bureau reviewed the monitoring program in fulfillment of Action 8 of the AIP (McDonald and Stone, 1993).

CONCERNS/RECOMMENDATIONS - Findings of that review were quite long, so are not repeated in detail here. However, major concerns discussed include 1) an insufficient number of properly constructed monitor wells for determining site-wide, let alone site-specific, water levels, 2) lack of accurate or reliable water-level maps for determining ground-water flow directions and 3) lack of nested wells for determining vertical ground-water gradients.

SNL PRODUCTION WELLS

As noted under "Drinking-Water Systems" above, SNL has no production wells at the time of this report (Table 3).

INHALATION TOXICOLOGY RESEARCH INSTITUTE

SETTING

Inasmuch as ITRI is also located on KAFB, its geologic and hydrologic setting is generally the same as given above for SNL (Figures 9 and 10).

ITRI DRINKING-WATER SYSTEMS

Like SNL, ITRI has no water-supply system of its own, but receives its water from KAFB (Table 4).

ITRI WASTEWATER SYSTEMS

Sewage lagoons previously used by ITRI were taken out of service in May 1992 (Bennett and others, 1992). Thus, like SNL, ITRI has no waste-water treatment facility of its own, but discharges to the City of Albuquerque system under an industrial waste discharge permit (no. 2178-A) (Table 4).

ITRI LAND-APPLICATION SYSTEMS

There are no known land-application sites at ITRI (Table 4).

ITRI INJECTION WELLS

There are no known injection wells at ITRI (Table 4).

ITRI MONITORING WELLS

DESCRIPTION - There are 23 monitoring wells at ITRI (Figure 13 and Table 4). ITRI's monitoring network, including wells, is described in their monitoring reports. The Ground Water Protection and Remediation Bureau reviewed the monitoring wells in fulfillment of Action 8 of the AIP (McDonald and Stone, 1993).

CONCERNS/RECOMMENDATIONS - Findings of that review are quite long so are not repeated in detail here. However, major concerns included 1) the insufficient number of properly constructed monitor wells to assess the nitrate plume associated with the sanitary lagoons at the site, 2) failure to follow EPA practices in sampling and 3) use of inappropriate analytical methods for detecting VOC's.

ITRI PRODUCTION WELLS

As noted under "Drinking-Water Systems" above, ITRI has no production wells (Table 4).

WASTE ISOLATION PILOT PLANT

SETTING

The Waste Isolation Pilot Plant (WIPP) is located on a karst plain approximately 26 mi east of Carlsbad, New Mexico (Figure 14). More specifically, it is in the area called "Los Medanos", on the gently sloping terrain rising eastward from the Pecos River to the Southern High Plains (Mercer, 1983). Geologically the site lies in the northern Delaware Basin, a late Paleozoic depression in which a sequence of various kinds of marine deposits accumulated. Of particular interest for the WIPP site is the Upper Permian or Ochoan Series of rocks (Figure 15). These include, in ascending order, the Castile Formation (anhydrite and halite), the Salado Formation (halite and potash), the Rustler Formation (anhydrite, dolostone, mudstone, halite) and Dewey Lake Red Beds (siltstone, claystone). Overlying the Permian rocks are nonmarine (dune, lake and stream) deposits of Quaternary age. The waste repository is being constructed in the lower halite member of the Salado Formation, at a depth of 2,150 ft below the surface (Chaturvedi and Rehfeldt, 1984).

The region lies within the drainage of the Pecos River. However, owing to the blanket of permeable dune sand and the karst setting, integrated surface drainage features are largely nonexistent. For example, Nash Draw, a southeast-trending solution/collapse depression lying just west of the WIPP site and a major topographic feature of the region, has no external drainage (Mercer, 1983).

Although the shallowest ground water in the area is that within the Dewey Lake Red Beds, they are unsaturated at the WIPP site. Thus, extensive hydrogeologic study has centered on the water-producing units of the Rustler Formation which overlies the Salado (Chaturvedi and Channell, 1985). The Rustler includes, in ascending order, an unnamed lower member (mudstone, halite, anhydrite, sandstone), the Culebra Dolomite Member (dolostone), the Tamarisk Member (anhydrite, mudstone, halite), the Magenta Dolomite Member (dolostone) and the Forty-Niner Member (anhydrite, mudstone, halite). While the anhydrite units serve as confining beds, all other materials produce water. Permeability is fracture controlled and ground-water flow direction varies from unit to unit, depending on fracture orientation. Flow along the Rustler/Salado contact and within the Magenta is westerly, whereas that within the Culebra is southerly (Mercer and Gonzalez, 1981).

WIPP DRINKING-WATER SYSTEM

DESCRIPTION - WIPP does not operate its own water-supply system (Table 5). Water for drinking and other purposes is obtained from the City of Carlsbad's Double Eagle/Loco Hills system via a 31-mi-long pipeline. Water is stored in a single tank at WIPP and chlorinated before distribution throughout the site. Although bottled water is generally provided, the piped water is also used for drinking on the site. The supply is sampled for coliform bacteria twice a week by DOE.

CONCERNS/RECOMMENDATIONS - The Carlsbad Field Office of NMED considers the supply a non-transient non-community system, as defined by Drinking Water Regulations (Anonymous, 1991):

> "... a public water supply ... that regularly serves at least 25 of the same persons for more than 6 months per year".

The Environment Department would normally inspect systems in this category every 5 yrs; the next sanitary survey at WIPP would occur in 1994. However, sanitary surveys by the State are on hold at the moment. In view of the number of people served and the possibility for contamination between the source and the supply point, Carlsbad Municipal Public Water Supply should insure that all taps between the Double Eagle well field and the WIPP site be fitted with approved backflow prevention devices. In the meantime, the close surveillance by DOE assures the safety of the supply. As part of this surveillance, DOE may wish to take special bacteriological samples just upstream of the treatment facility at WIPP, to further check the quality of incoming water.

WIPP WASTEWATER SYSTEM

DESCRIPTION - The WIPP waste-water treatment system is a lagoon type system with zero discharge (Table 5). The waste-water gravity flows to a splitter box where it can be directed to either or both of the primary settling basins. From the settling basins the flow goes to another splitter box where it can be directed to either or both of the polishing ponds. After the polishing ponds, chlorine is added by means of HTH tablets placed in contact with the flow. After chlorination the water is discharged to two evaporation basins. A schematic diagram of the wastewater treatment plant is given in Figure 16.

Waste is also collected in port-a-potties in the underground workings. These port-a-potties are leased from a commercial company which maintains and services them. The septage that is pumped from these units goes to a local wastewater treatment plant for treatment.

CONCERNS/RECOMMENDATIONS - The lagoon system was being expanded during our visit to the site. The expansion should provide enough capacity to the system for years to come. Leakage or spills from the port-a-potties could pose a health problem.

WIPP LAND-APPLICATION SYSTEM

DESCRIPTION - Two types of land application occur at WIPP: stockpiling of geologic materials and disposal of sewage-lagoon sludge (Table 5).

The geologic materials include salt mined from the underground workings and top soil excavated during various construction activities (Anonymous, 1993). Both have been placed in uncovered piles above ground near the facility and are considered Solid-Waste Management Units (SWMU's; Appendix D). More specifically, there are two salt storage piles: an older inactive one (SWMU 002a) located east of the main facility, consisting of 155,000 cubic yards (yds^3) and covering 7 acres (ac) and an active one (SWMU 002b) located north of the main facility, consisting of 402,000 yds^3 and covering 15 ac. Both top-soil storage areas are inactive and cover approximately 3 ac. One (SWMU 002c) lies east of the main facility and the other (SWMU 002d) lies east of the older salt storage pile.

The other land-application activity involves sludge from the sewage- treatment lagoons. This is to be disposed of in the new site landfill, which is treated as SWMU 003b (Appendix D).

CONCERNS/RECOMMENDATIONS - Precipitation on the uncovered piles of waste-rock (largely evaporates) could lead to the generation of saline runoff. However, since the shallowest ground water in the vicinity is already high in total dissolved solids, impact is probably negligible. Regular monitoring of the makeup of the sewage sludge should prevent introduction of dangerous quantities of undesirable materials into the landfill. Controlling runoff and water content of the sludge would minimize the possibility of formation/migration of any leachate from the landfill.

WIPP INJECTION WELLS

The only structures that technically meet the formal injection-well definition are the mine shafts. However, as they are not used to dispose of liquids, there are no injection wells at WIPP (Table 5).

WIPP MONITORING WELLS

DESCRIPTION - All wells currently used for observation were constructed for other purposes (hydraulic testing, potash-resource evaluation, etc.). Thus, official DOE policy holds that there are no monitoring wells at WIPP (Table 5).

CONCERNS/RECOMMENDATIONS - There are two conceivable sources of ground-water contamination at WIPP: Spills in the waste-handling area at the surface and leakage of containers in the repository.

Detection of spills at the surface should be facilitated by wells completed in the various Rustler units. However, it will be more difficult to monitor for contamination (liquid) in the repository since the host medium (Salado) is not water-bearing. Admittedly, even these wouldn't capture all flow. Thus, design of an adequate monitoring system deserves further attention. In view of the highly corrosive nature of fluids in the strata, selection of screen and tubing material, not to mention monitoring equipment, is critical. Care should also be taken to assure that wells are constructed so that they don't provide pathways for vertical migration of contaminants.

WIPP PRODUCTION WELLS

As noted under Drinking-Water System above, WIPP has no production wells as of the writing of this report (Table 5).

SUMMARY AND CONCLUSIONS

On the whole, the quality of systems and wells inspected at the four DOE facilities in New Mexico ranges from satisfactory to excellent. However, a number of general and specific inadequacies were noted. **The following comments are not all inclusive but merely brief summaries from the "Concerns/Recommendations" sections above, which should be consulted for details.**

LOS ALAMOS NATIONAL LABORATORY

Water systems and wells inspected at LANL are generally satisfactory. The drinking-water system is the only independent supply of the four DOE facilities covered in this report. The new SWSC plant is a significant improvement in LANL's ability to treat sanitary wastewater. Development of an operations and maintenance manual is our only concern for the SWSC plant. The TA-50 industrial-waste treatment plant is reaching its design age and the treatment of certain constituents is inadequate. Land application of waste is minimal, involving only the disposal of sludge from the SWSC plant at the TA-54 land application site. Our concern is the transport of sludge to the adjacent canyon by runoff. The main injection well (located at TA-22) is inefficient and may contribute to adjacent wetlands. Connection between the injection well and the wetlands deserves further study. As noted by Stone and others (1993), the monitoring network is inadequate and some monitoring wells are unsatisfactory. A system of carefully placed and constructed monitoring wells is still needed, as is a monitoring plan. The system of production wells at LANL is impressive. However, care should be taken to prevent ground-water contamination from surface runoff. As the production wells themselves are not suitable for use as monitoring wells (long screened intervals), the addition of properly constructed monitoring wells within the well fields is warranted to provide early warning and the source horizon of any contamination.

SANDIA NATIONAL LABORATORIES, NEW MEXICO

The systems observed at SNL appear satisfactory. Although the main drinking-water supply comes from the City of Albuquerque, the transported supplies for remote sites deserve major attention as outlined above. Wastewater is delivered to the City for treatment; the system for monitoring quantity and quality of the waste streams is very impressive. No land application systems, injection wells or production wells are known at SNL. The monitoring network was found to be inadequate by McDonald and Stone (1993). Gaps in the monitoring system need to be filled after the regional hydrogeology is more clearly conceptualized.

INHALATION AND TOXICOLOGY RESEARCH INSTITUTE

Several of the systems and wells targeted by this action do not exist at ITRI: drinking-water system, waste-water system, land-application system, injection wells and production wells. With the recent addition of several wells, the monitoring network at ITRI would have been adequate, but screens were set below the water table so the wells are inadequate for monitoring. Site-wide monitoring at SNL will enhance the conceptualization of the hydrogeologic setting at ITRI as well.

WASTE ISOLATION PILOT PLANT

Like ITRI, several items covered by this action do not exist at WIPP: injection wells, monitoring wells and production wells. However, those that do exist were generally found to be satisfactory. Although drinking water is obtained from the City of Carlsbad, the possibility of contamination from multiple connections along the extensive pipeline dictates more frequent inspections by the state. The new waste-water treatment facility seems adequate and properly managed. Land application of mine waste and lagoon sludge are not of concern.

We would be glad to clarify or discuss our position on any of the issues addressed herein at any time. Inquiries may be directed to W. J. Stone at 841-9473 for response or referral.

ACKNOWLEDGEMENTS - Cooperation of facility and DOE personnel during our investigation, through tours and interviews, is greatly appreciated. Alex Puglisi, formerly with the Surface Water Quality Bureau, drafted the section on LANL's SWSC plant. Discussions with Paul Sanchez on various WIPP items (NMED/AIP, Hazardous and Radioactive Materials Bureau, WIPP), as well as Paul Gray and Barry Birch on drinking water-issues (NMED District 1 and 2 Offices, respectively), were also most helpful.

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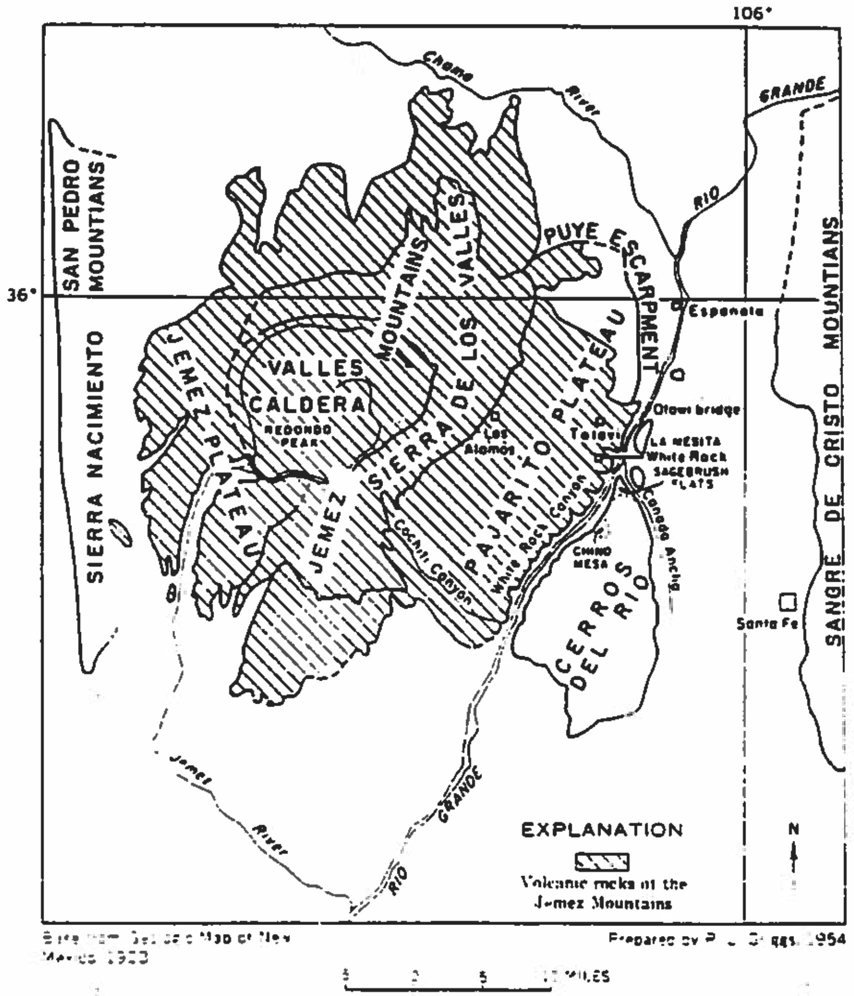


Figure 1. Location and geologic setting of LANL (from Griggs, 1964).

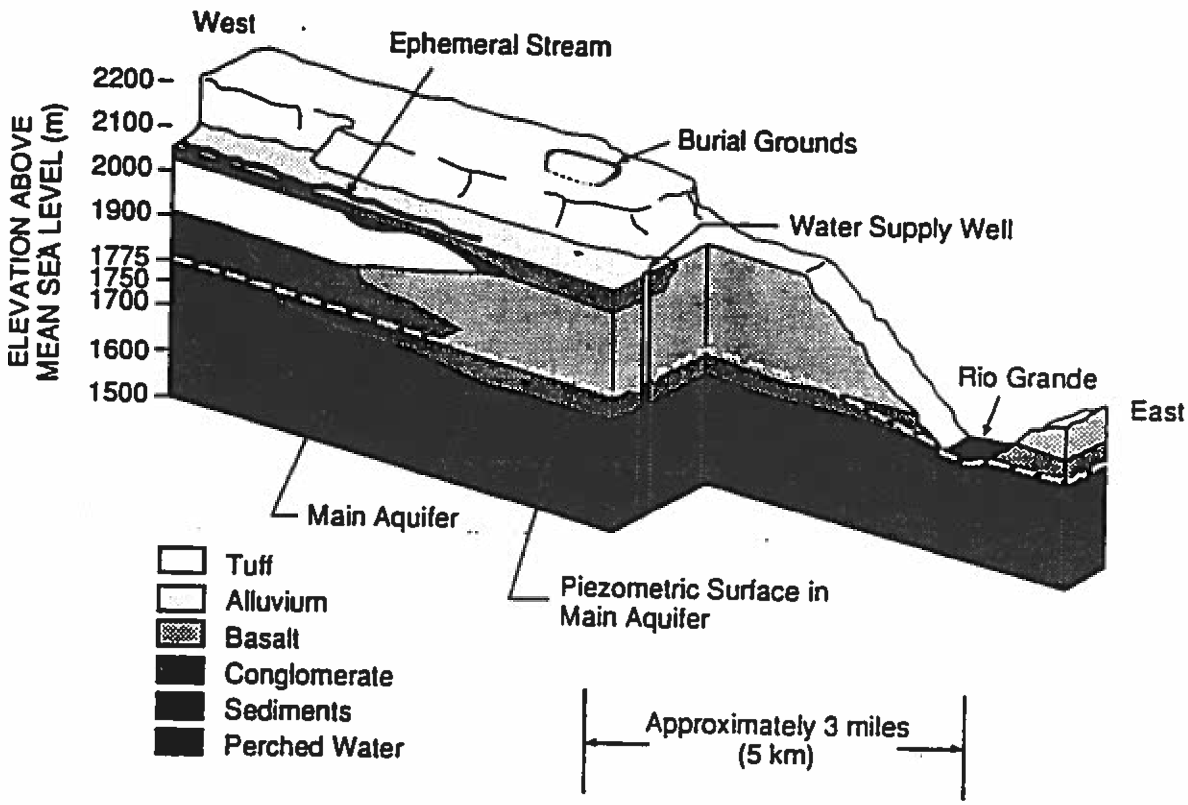


Figure 2. Generalized hydrogeologic model for LANL (from Hoffman and Lyncoln, 1992).

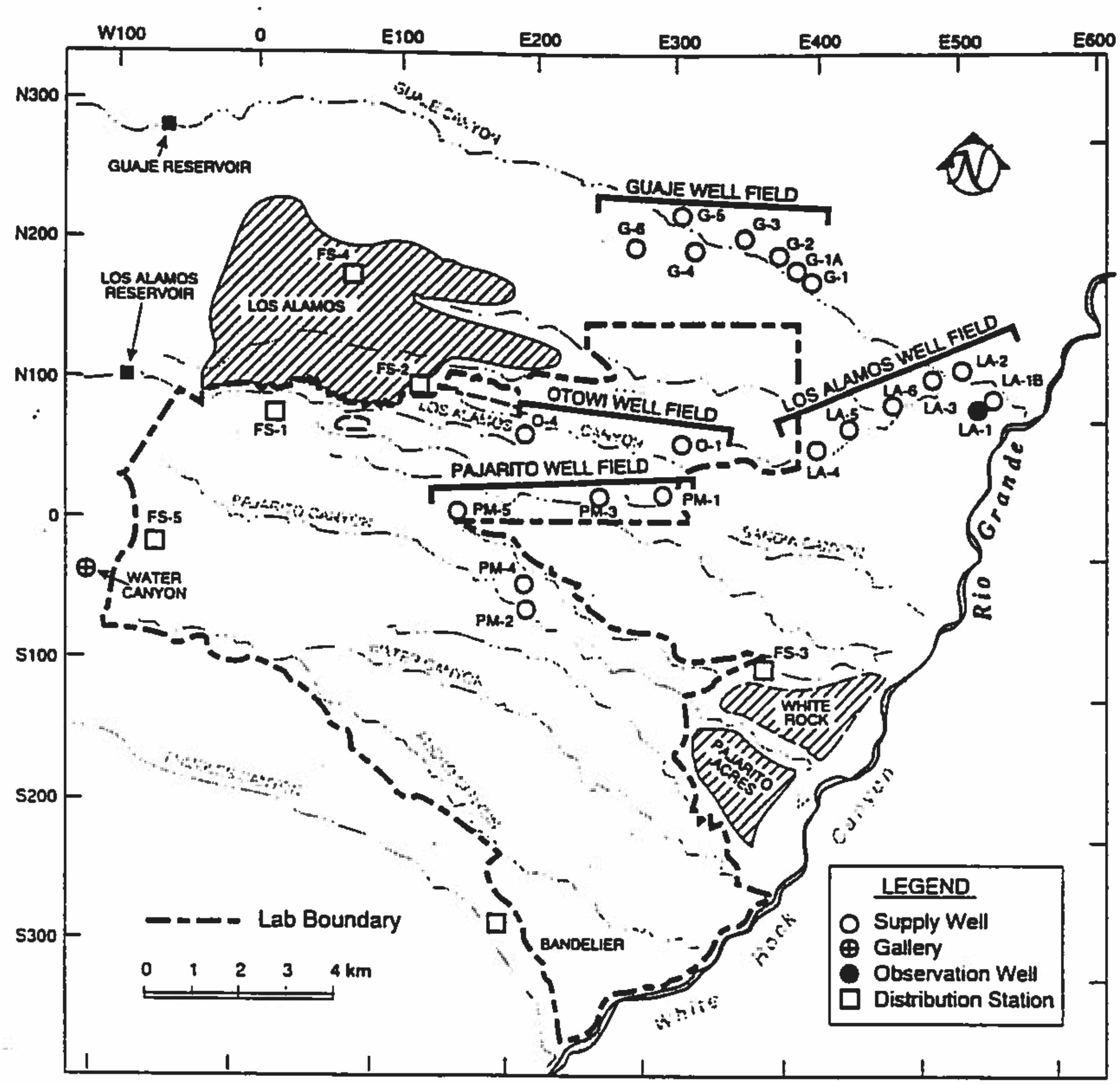


Figure 3. Location of water-supply wells at LANL (from Hoffman and Lyncoln, 1992).

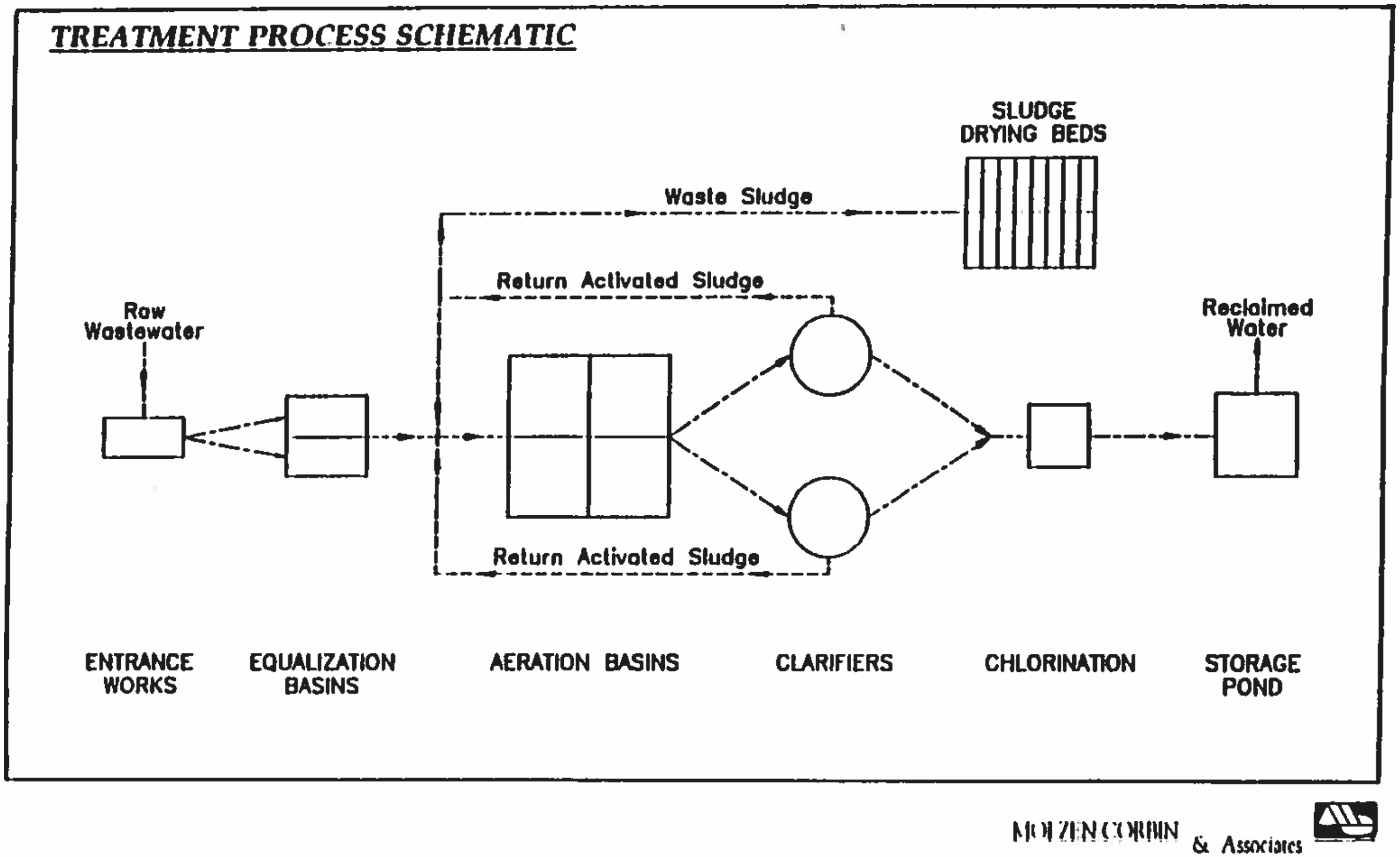


Figure 4. Sanitary and wastewater treatment at LANL, SWSC (from Molzen-Corbin & Associates, 1993).

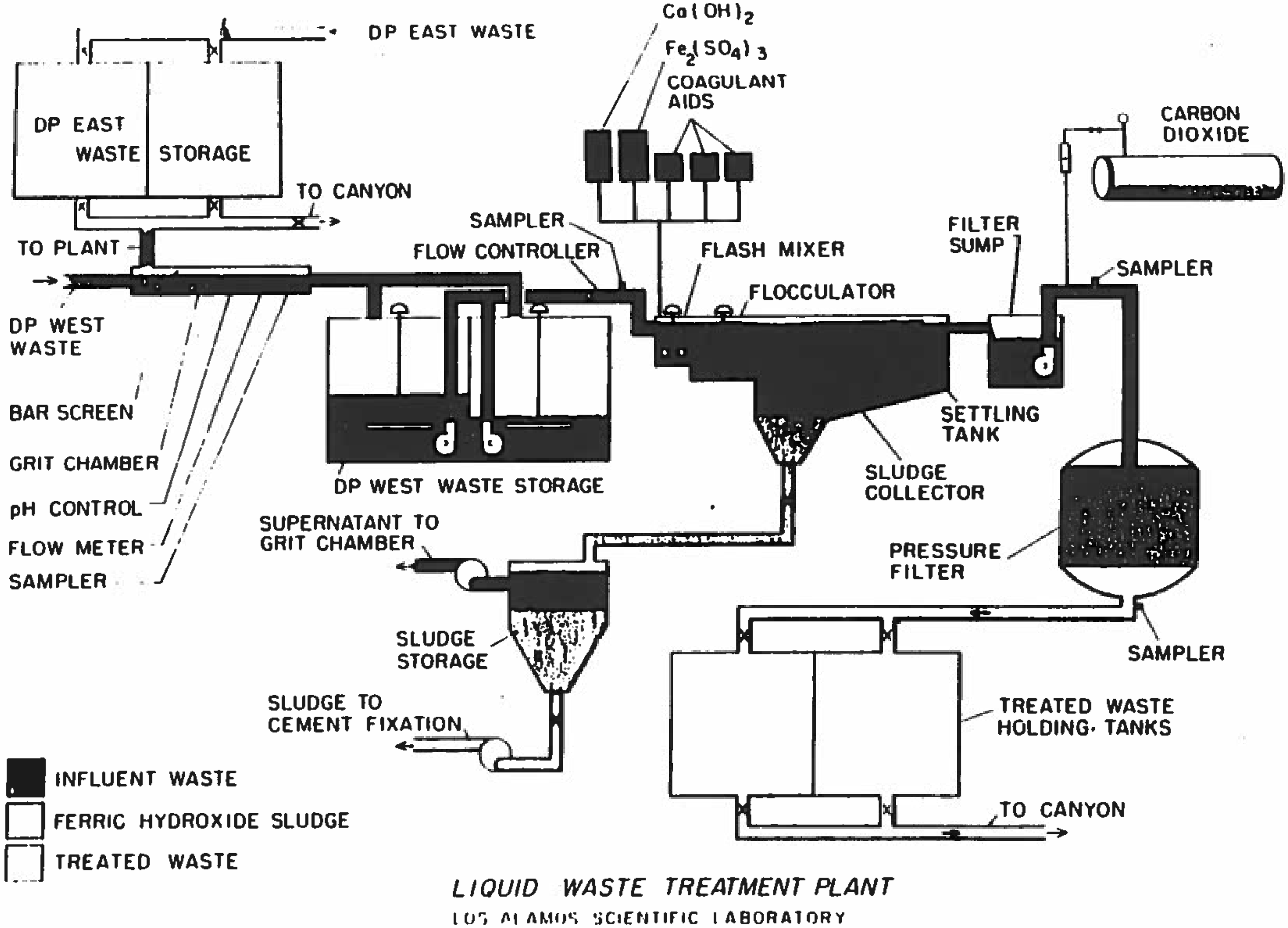


Figure 5. Radioactive wastewater treatment at LANL, TA-21 (from Emility, 1991).

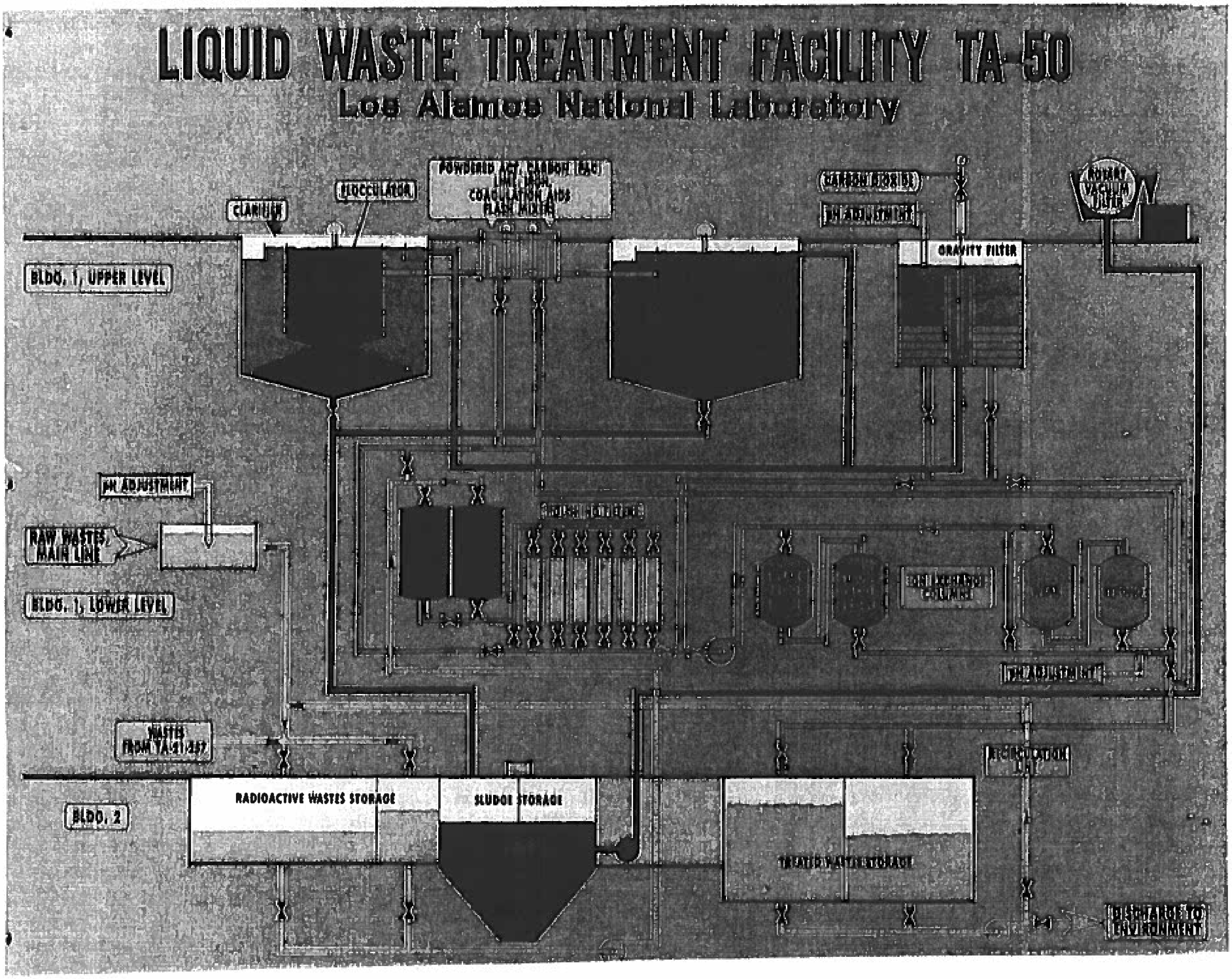


Figure 6. Radioactive wastewater treatment at LANL, TA-50 (EM-7 handout)

Radioactive waste movement.

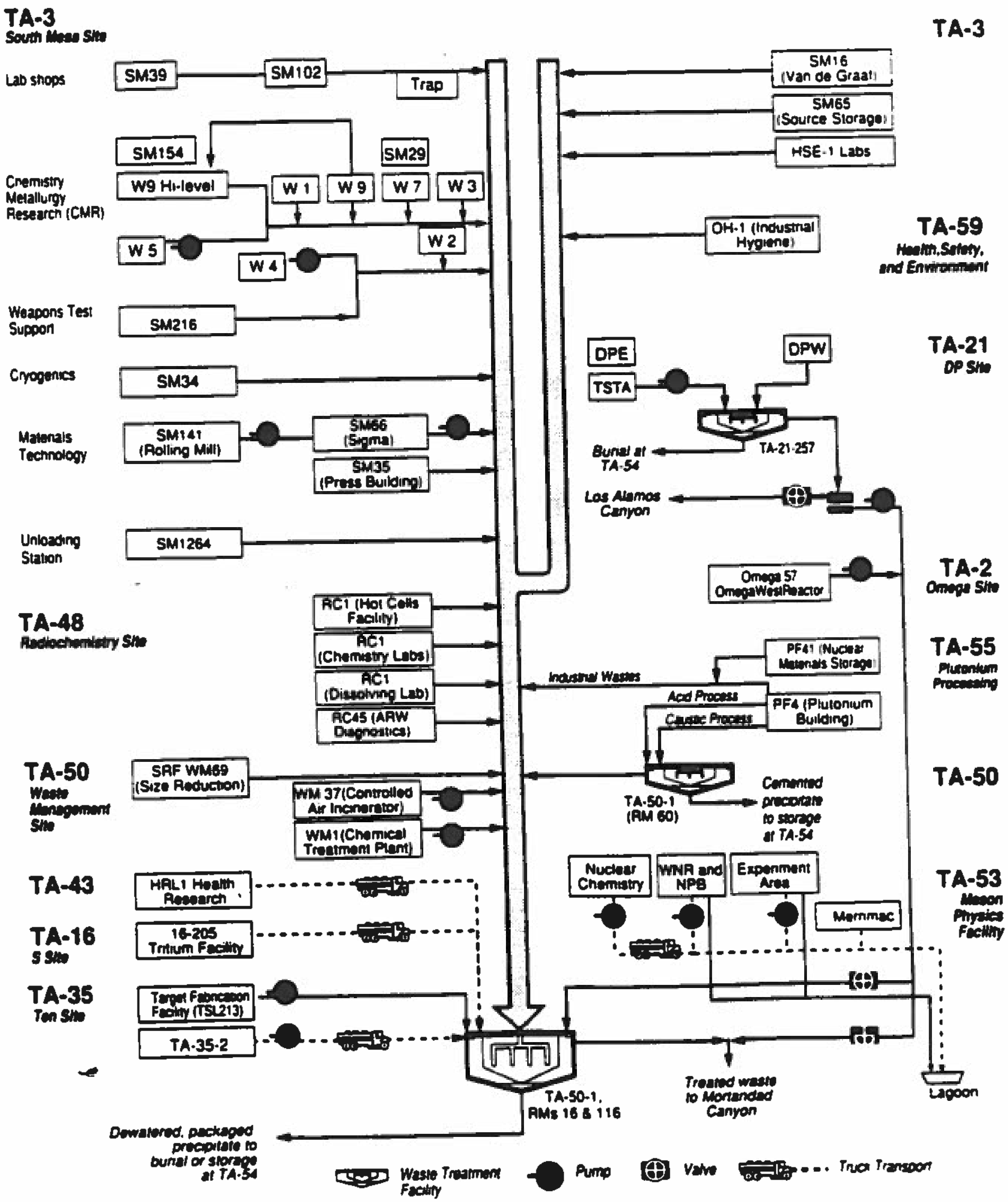


Figure 7. Flow chart for the TA-50 plant at LANL (EM-7, Hansen, 1993).

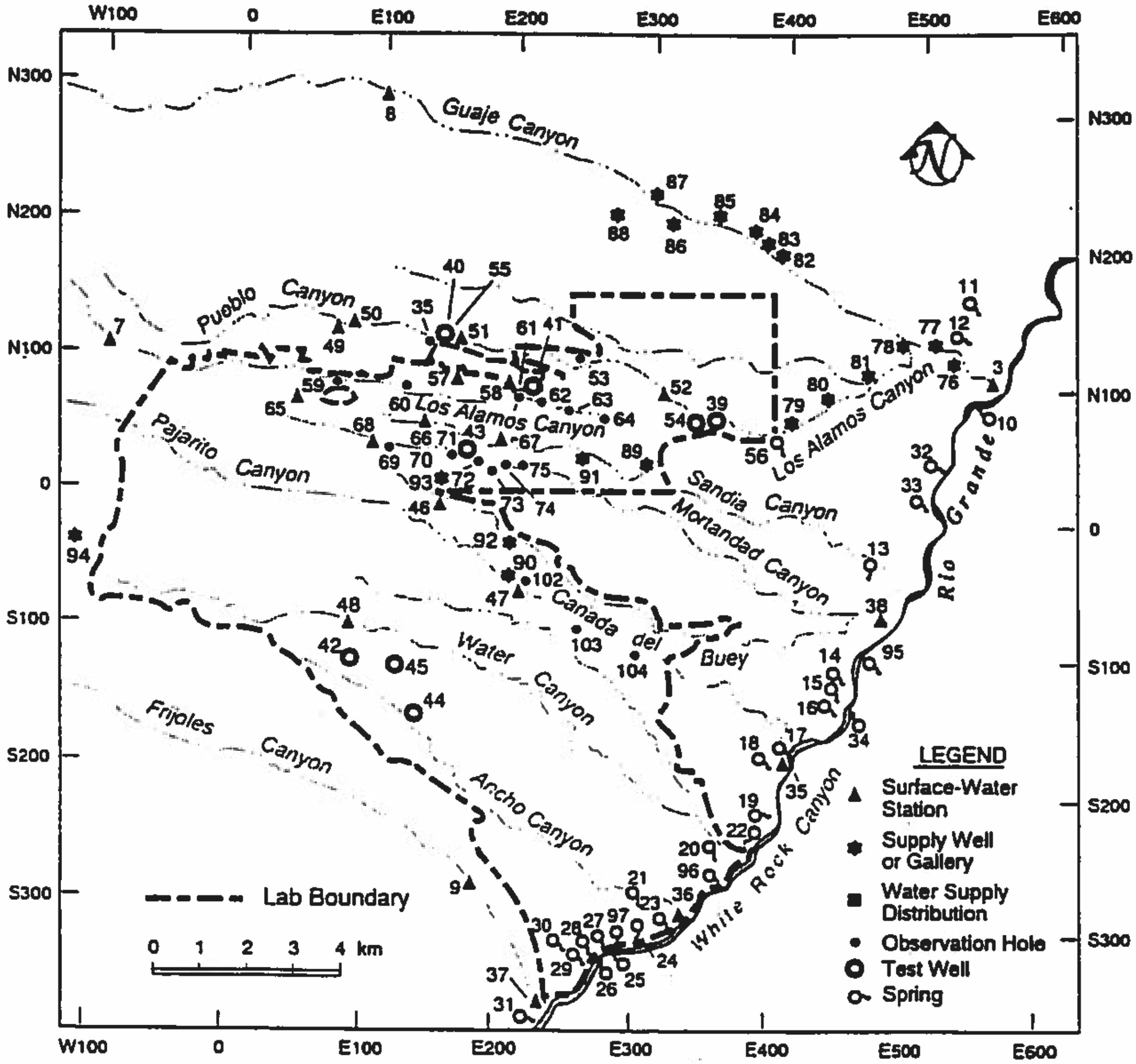


Figure 8. Location of monitoring wells at LANL (from Hoffman and Lyncoln, 1992).

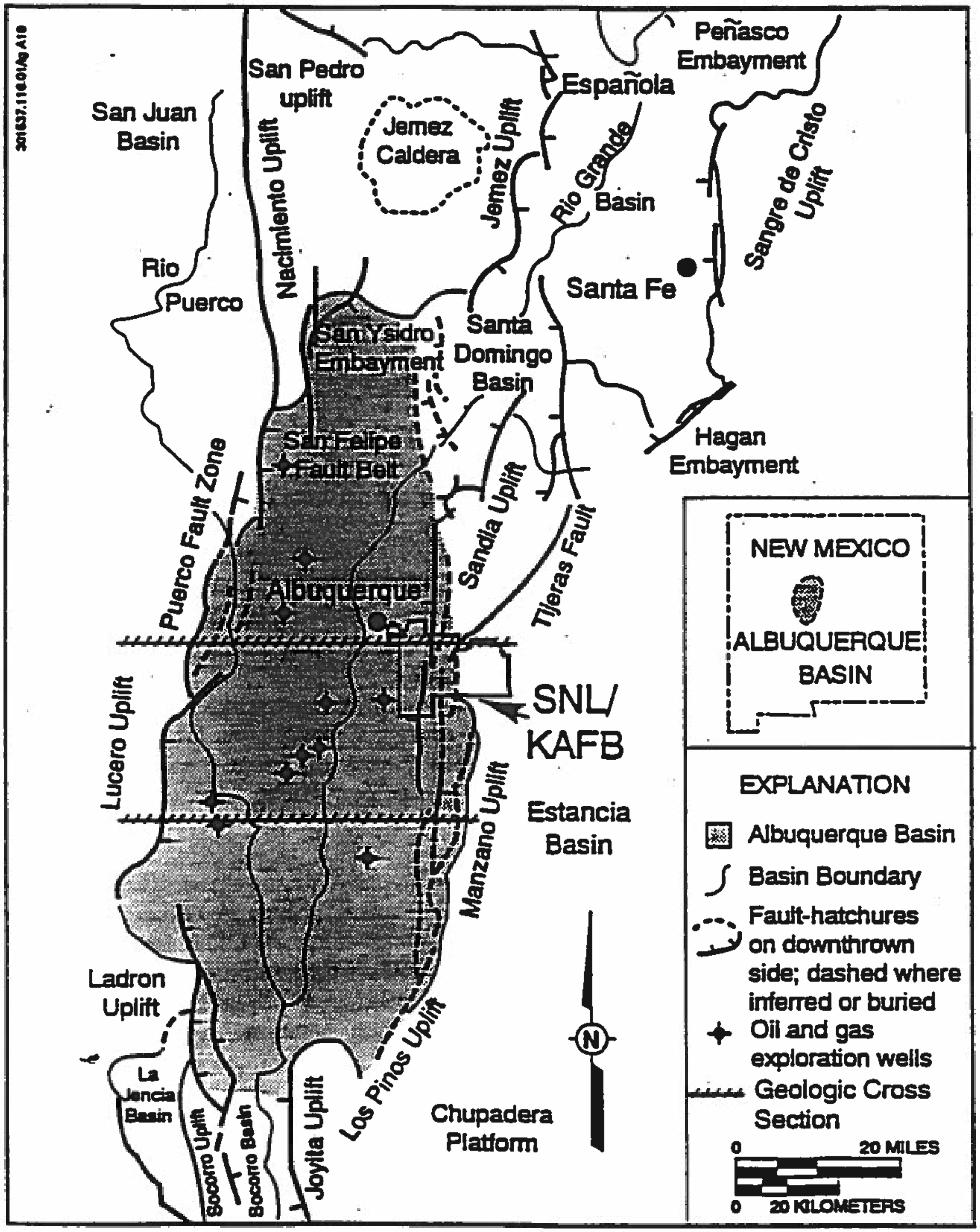


Figure 9. Location and geologic setting of SNL/ITRI (from McCord and others, 1993).

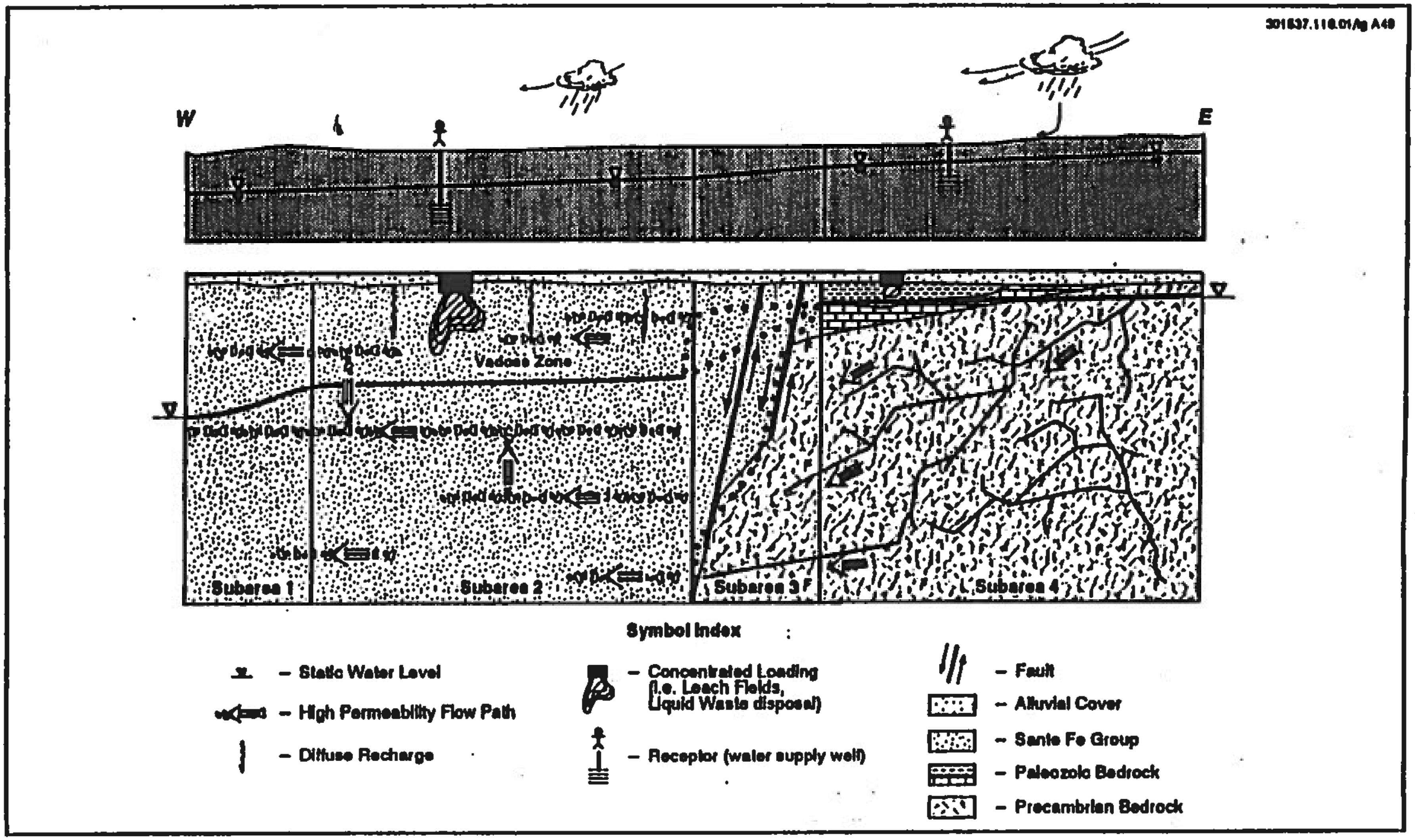


Figure 10. Generalized hydrogeologic model for SNL/ITRI (from McCord and others, 1993).

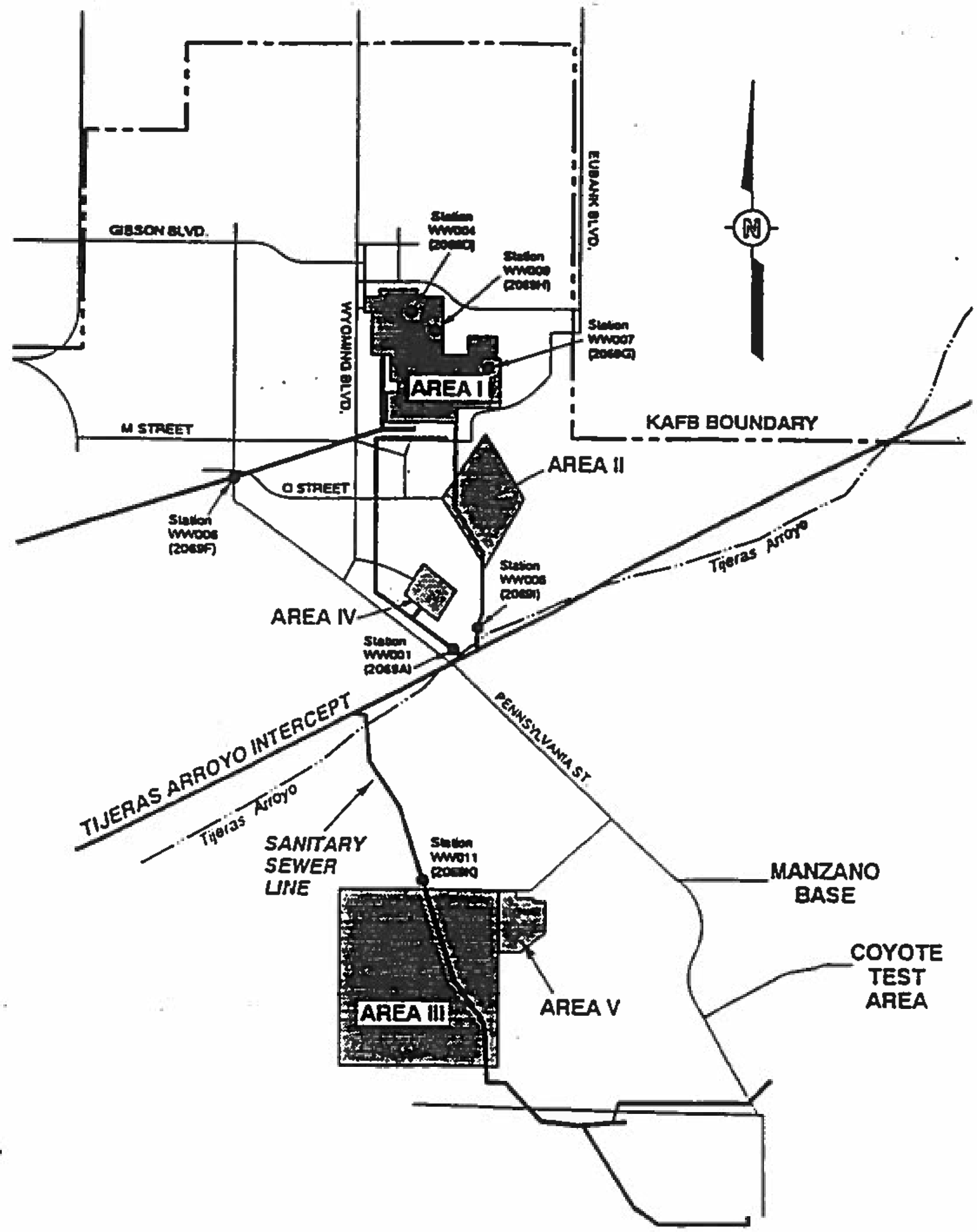


Figure 11. Location of wastewater monitoring stations at SNL (prepared by IT Corp. and provided by Adrian Jones, SNL)

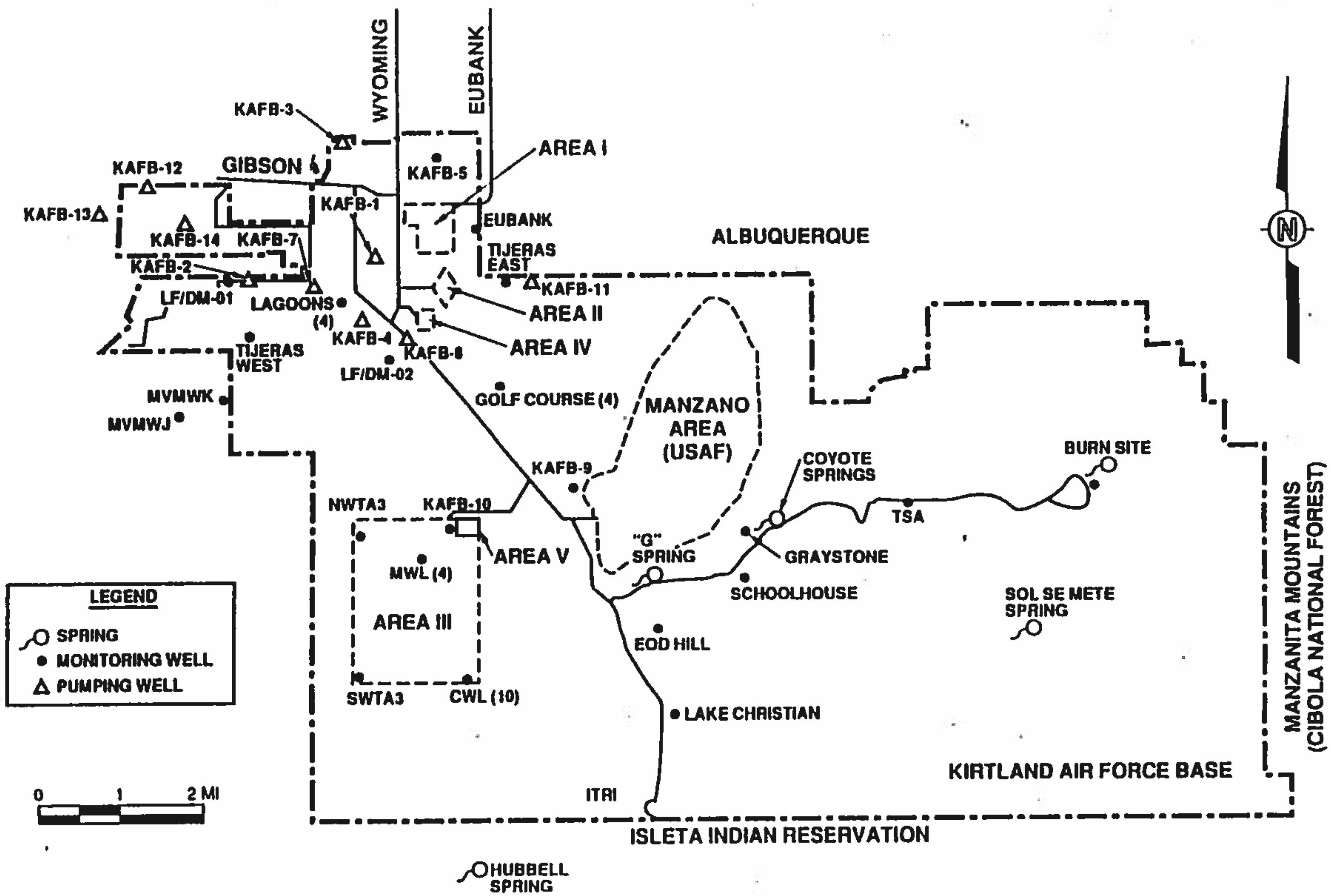


Figure 12. Location of monitoring sites at SNL (from Matz and others, 1992).

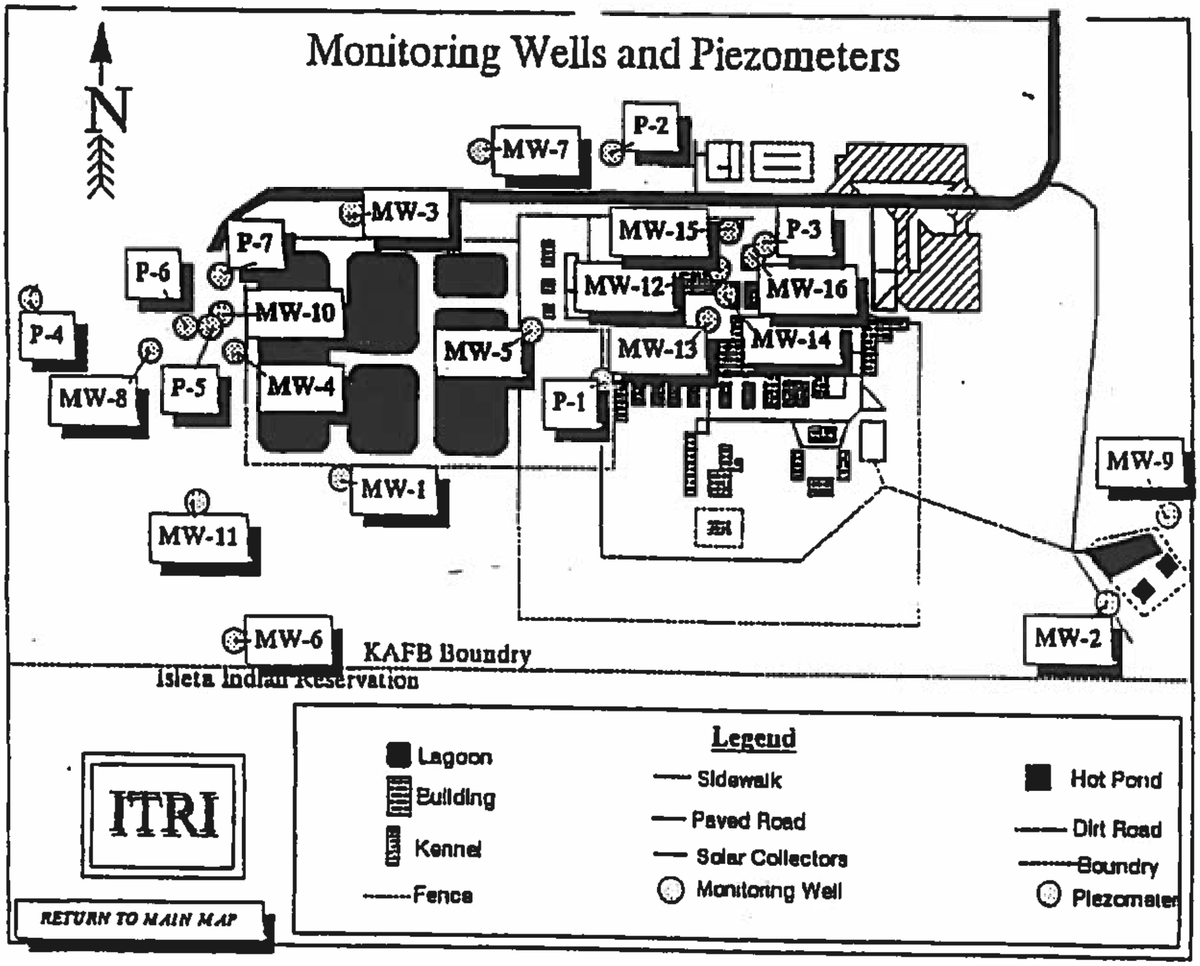


Figure 13. Location of monitoring sites at ITRI (unpublished figure provided by Gus Grace, ITRI).

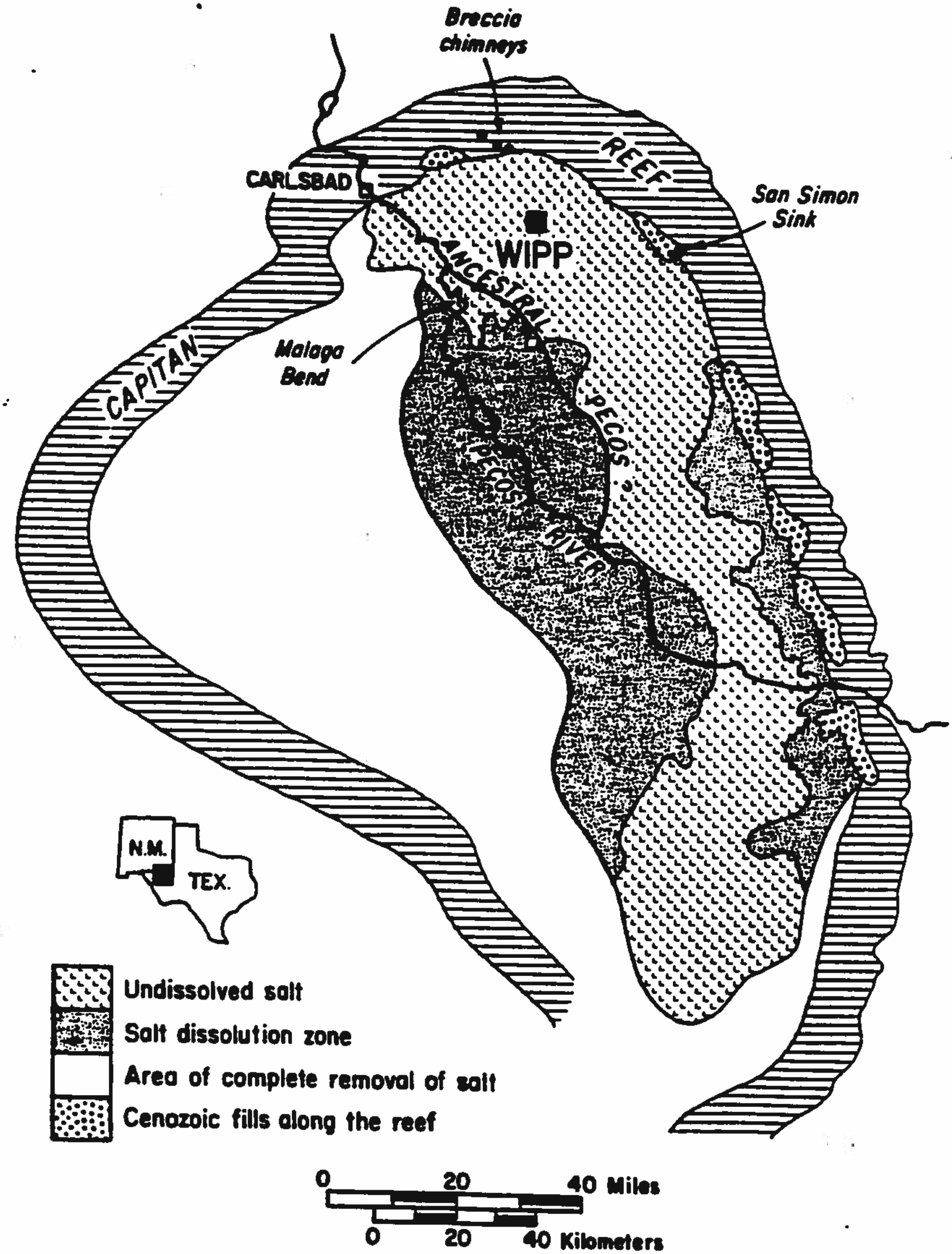


Figure 14. Location and geologic setting of the WIPP site (from Chaturvedi and Channell, 1985).

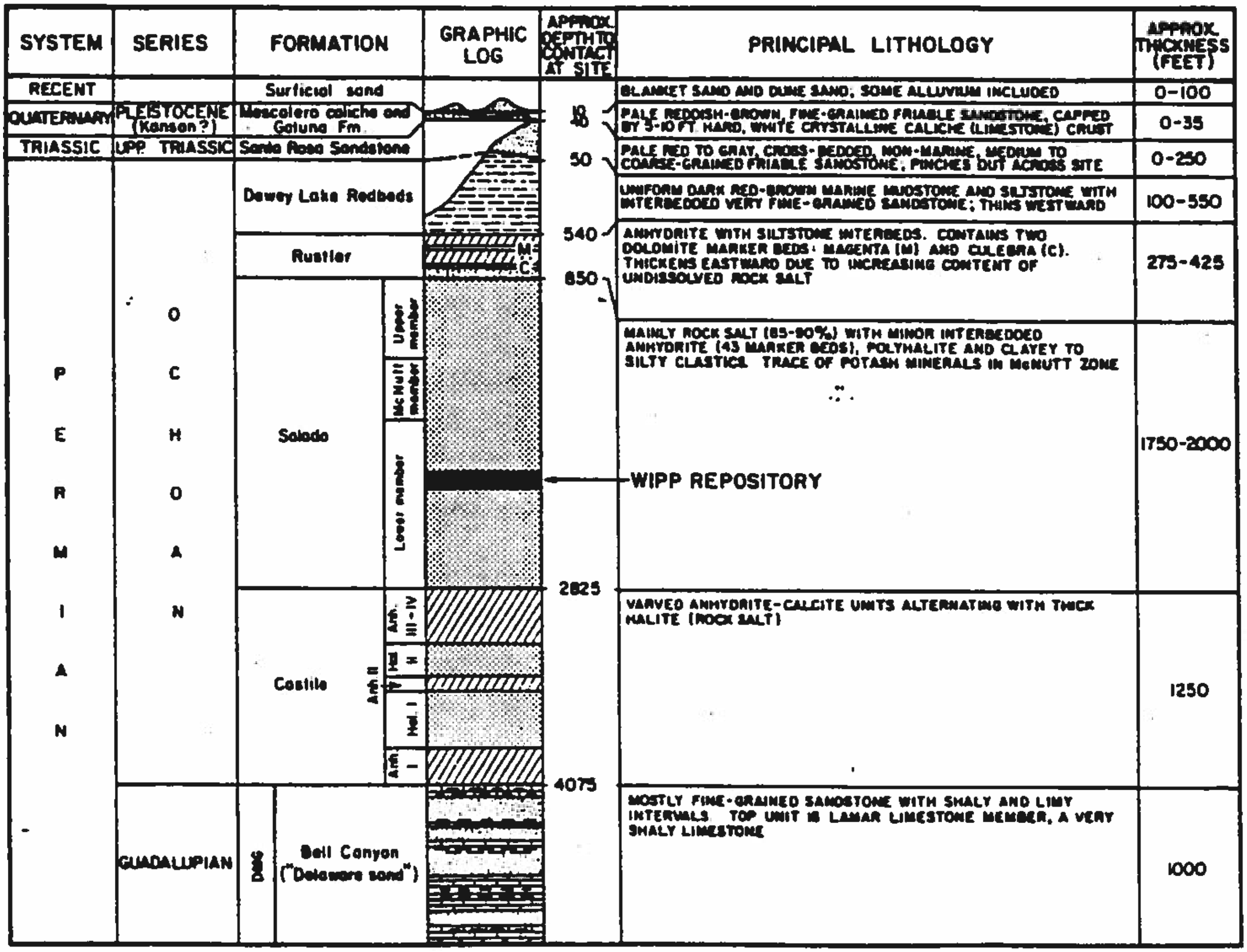


Figure 15. Generalized stratigraphic column for the WIPP site (as adapted from Powers and others, 1978, by Chaturvedi and Channell, 1985).

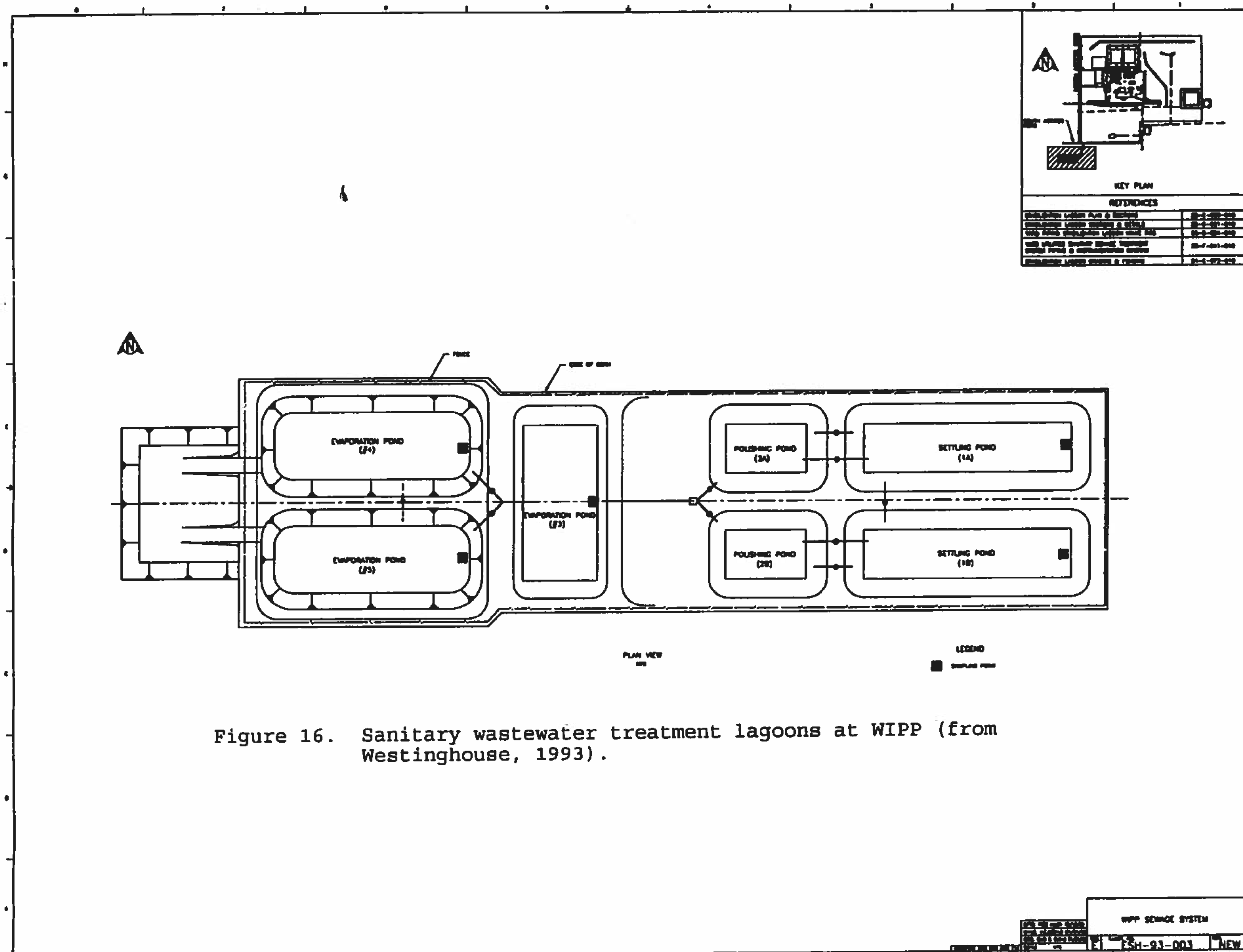


Figure 16. Sanitary wastewater treatment lagoons at WIPP (from Westinghouse, 1993).

Table 1. Summary of systems and wells at LANL.

System/Wells	No.	Name/Location	Source/Target	Comments
Drinking-Water	3 well fields	Guaje Los Alamos Pajarito	main aquifer	reference *
Waste-Water	2 sanitary	SWSC Plant TA-21/05S	8 TA's (3, 9, 16, 18, 35, 46N/S, 53)	see Figs 5, 6,7
	2 industry	TA-50, TA-21		
Land-Application	1	TA-54	SWSC lagoons	
Injection Wells	2	TA-9 Fenton Hill	laundry rinse heat recovery	 Hot Dry Rock Project
Monitoring Wells	43	site-wide	17 shallow 26 deep	see Fig 8; many are production wells
Production Wells	16	Guaje (7) Los Alamos (4) Pajarito (5)	main aquifer	see Fig 3

* Hoffman and Lyncoln (1992)

Table 2. Overview of the remote-site water supply at SNL (compiled from information provided by Vicky Cibicki, SNL).

Location	Tank Capacity	People Served	Comments
CTA	10,000 gal	15 daily to 60/week	Central Training Academy
Bldg 9825	3,000 gal	45 daily	CTA, Transportation Safeguards Training
MO-130	500 gal	17 daily	Transportation Safeguards Training Annex
Bldg 6020	2 @ 3,000 gal each	8 daily	"bunkers" area
Bldg 6030	2,000 gal	1-2 daily	"bunkers" area
Bldg 9990	2,600 gal (pump only handles 1,900 gal)	7 daily	Electromagnetic Launcher Test Facility

Table 3. Summary of systems and wells at SNL.

System/Wells	No.	Name/Location	Source/Target	Comments
Drinking-Water	--	--	KAFB	not operated by SNL
	5	remote sites	KAFB	supplied by tank truck
Waste-Water	--	--	Albuquerque municipal	not operated by SNL
Land-Application	--	--	--	none known
Injection Wells	--	--	--	none known
Monitoring Wells	35 WL 16 Qw	site-wide	regional aquifer	reference *
Production Wells	--	--	KAFB	see "Drinking Water" above

* Matz and others (1993)

Table 4. Summary of systems and wells at ITRI.

System/Wells	No.	Name/Location	Source/Target	Comments
Drinking-Water	--	--	KAFB	not operated by ITRI
Waste-Water	--	--	Albuquerque municipal	not operated by ITRI
Land-Application	--	--	--	none known
Injection Wells	--	--	--	none known
Monitoring Wells	23	site-wide	lagoons, "hot ponds"	reference *
Production Wells	--	--	--	see "Drinking Water" above

* Bennett and others (1992)

Table 5. Summary of systems and wells at WIPP.

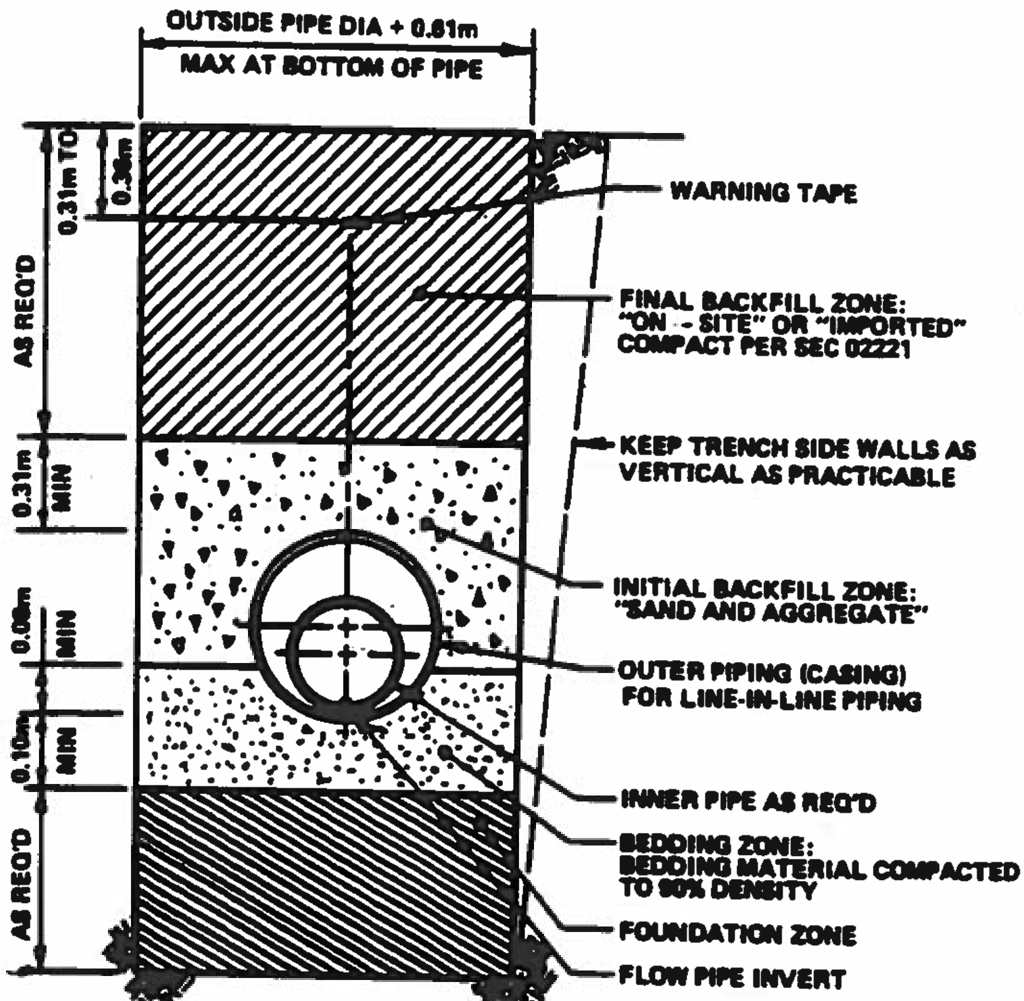
System/Wells	No.	Name/Location	Source/Target	Comments
Drinking Water	--	--	Carlsbad	not operated by WIPP
Waste-Water	1	on-site		expanded
Land Application	4 1	piles landfill	mining waste lagoon sludge	salt, soil reference *
Injection Wells	--	--	--	none known
Monitoring Wells	--	--	--	none by definition
Production Wells	--	--	--	see "Drinking Water" above

* Anonymous (1993)

Appendix A

ADDITIONAL INFORMATION ON LANL WASTEWATER TREATMENT

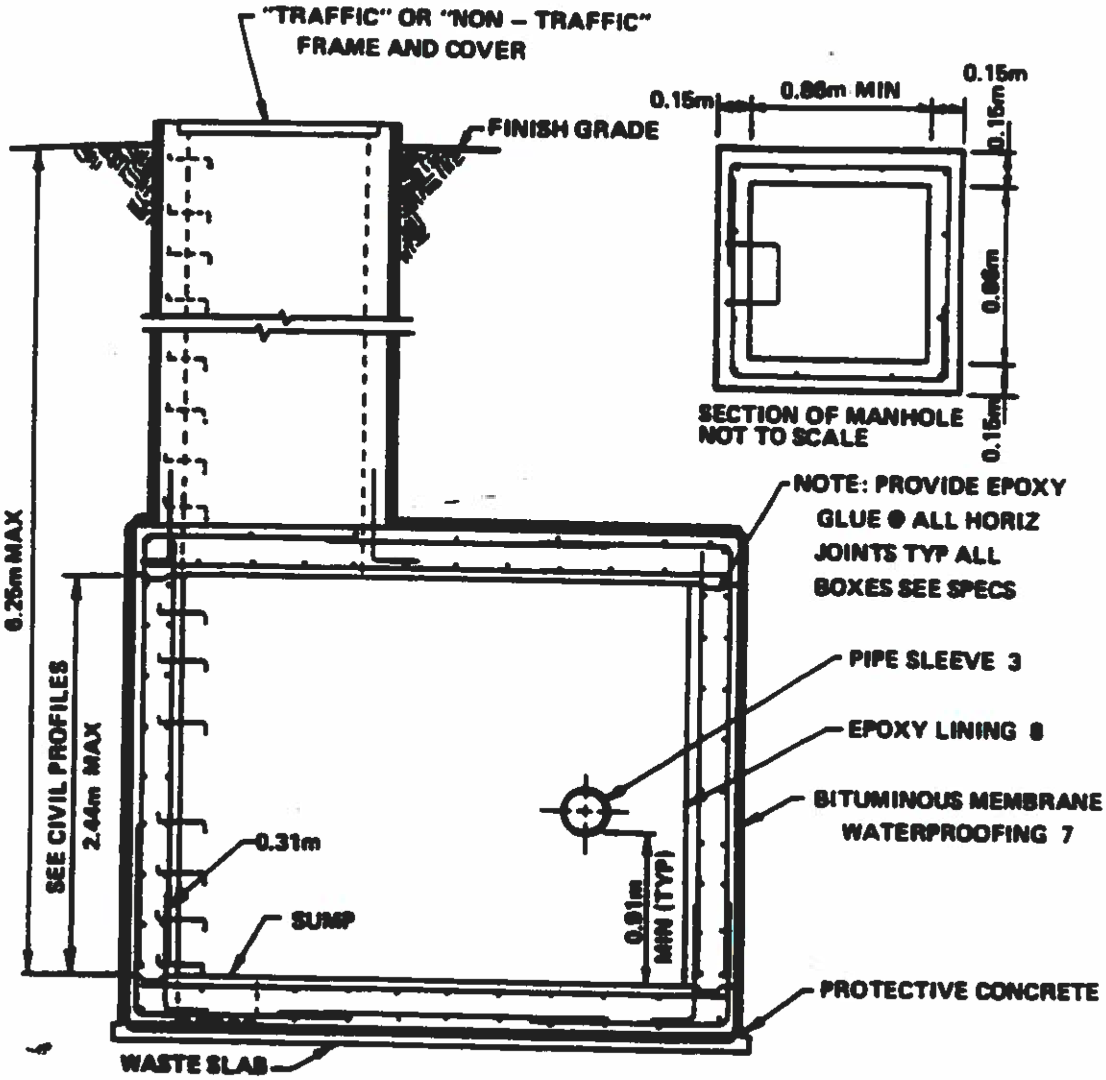
(from Emility, 1991, and LANL/EM-7)



TYPICAL TRENCH DETAIL

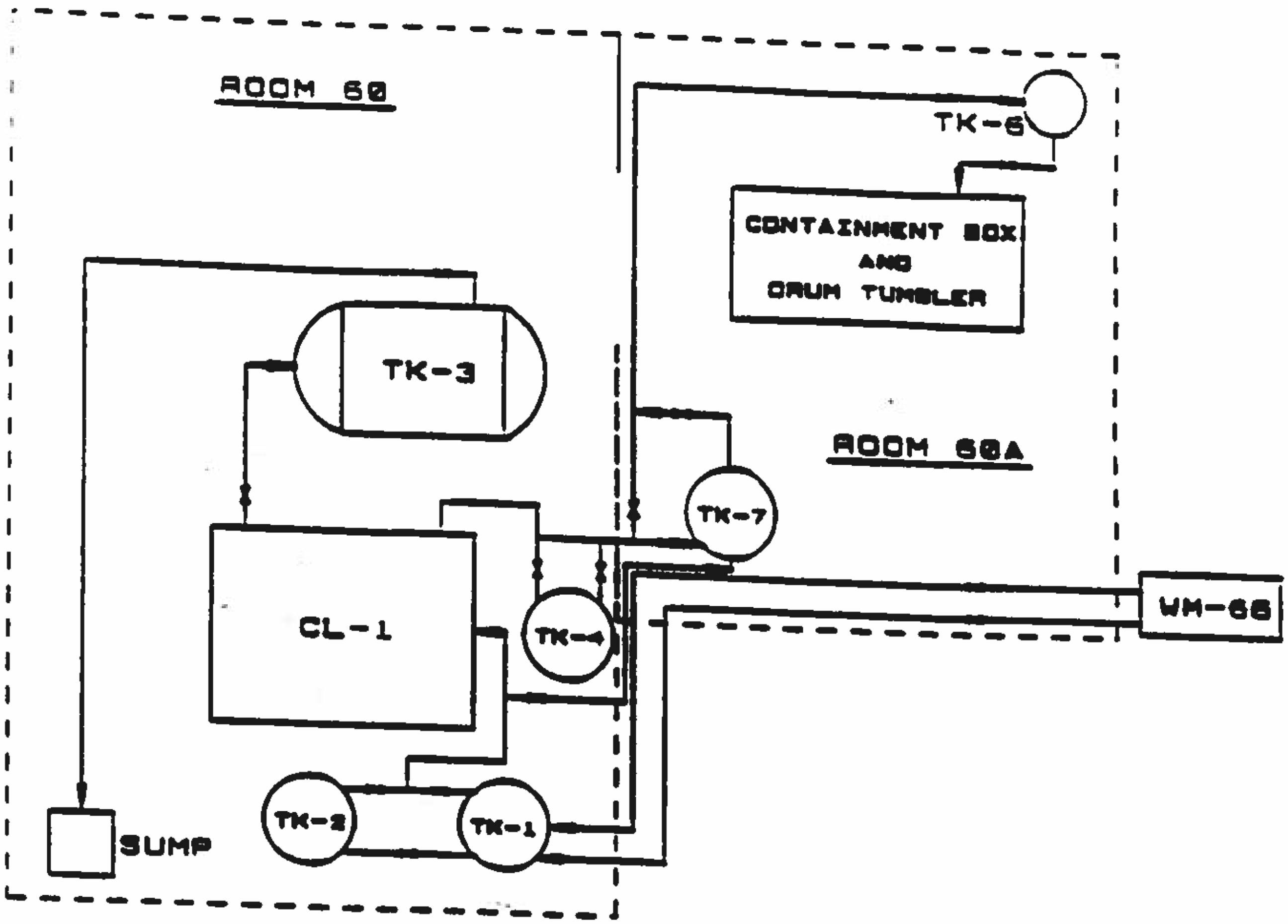
RADIOACTIVE LIQUID WASTE LINES

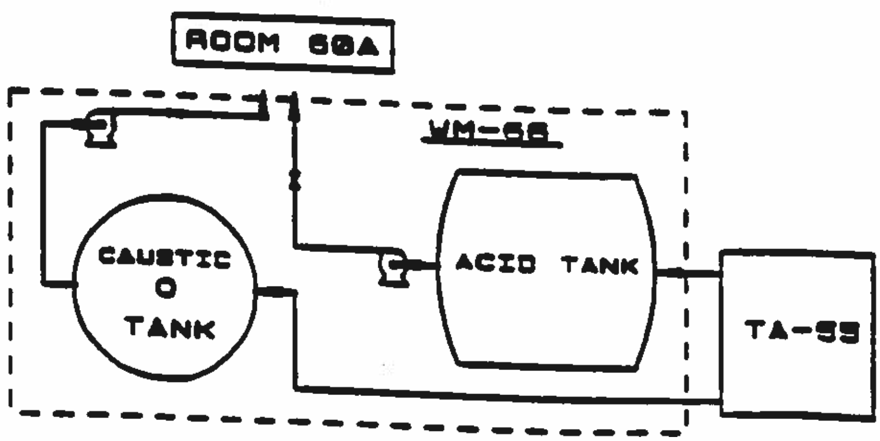
SCALE – NONE



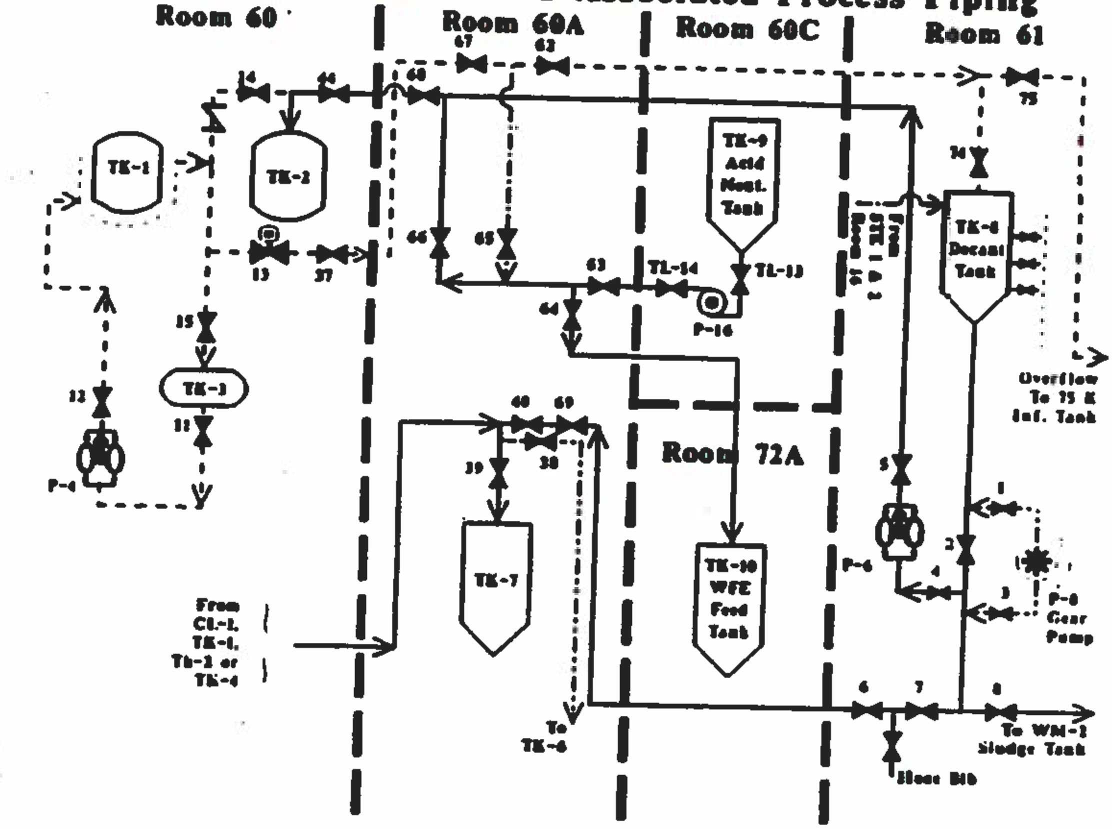
SECTION - MANHOLE BOX -(TYPICAL)

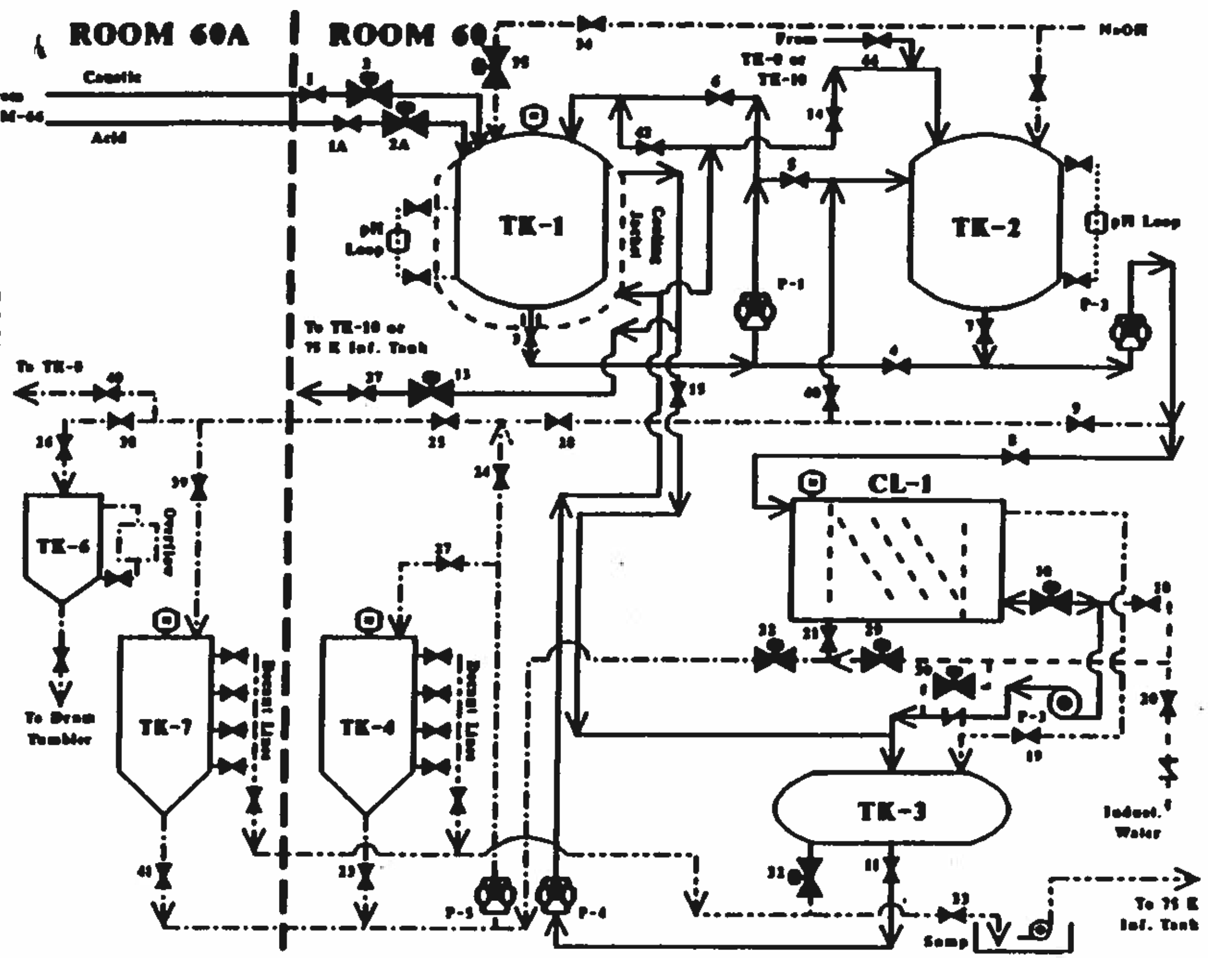
SCALE – NONE


ROOM 60
TK-6
CONTAINMENT BOX
AND
DRUM TUMBLER
TK-3
ROOM 60A
TK-7
CL-1
TK-4
WM-66
TK-2
TK-1
SUMP

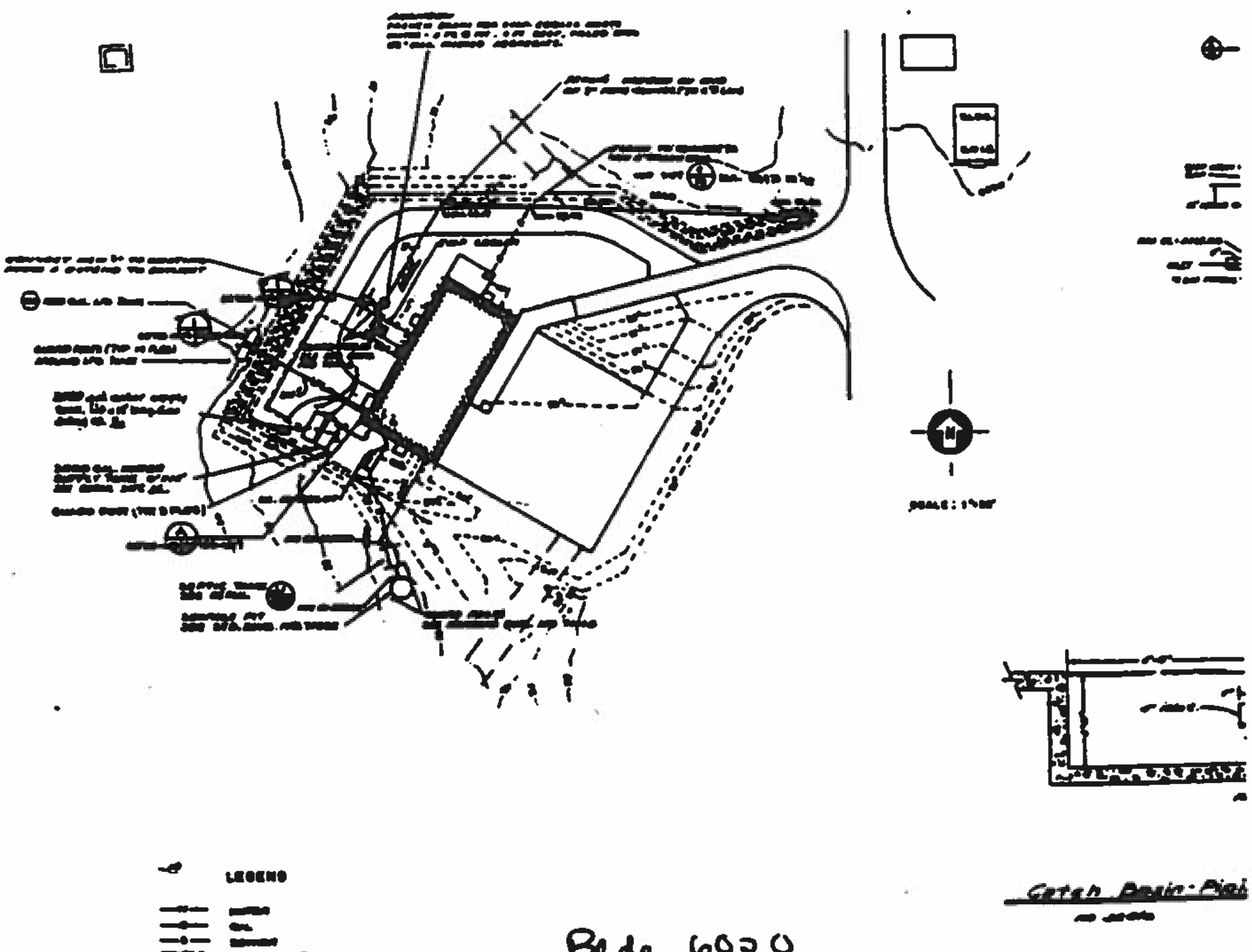

ROOM 60A
WM-66
CAUSTIC
O
TANK
ACID TANK
TA-55

TA-50-1 - Room 60 and Associated Process Piping



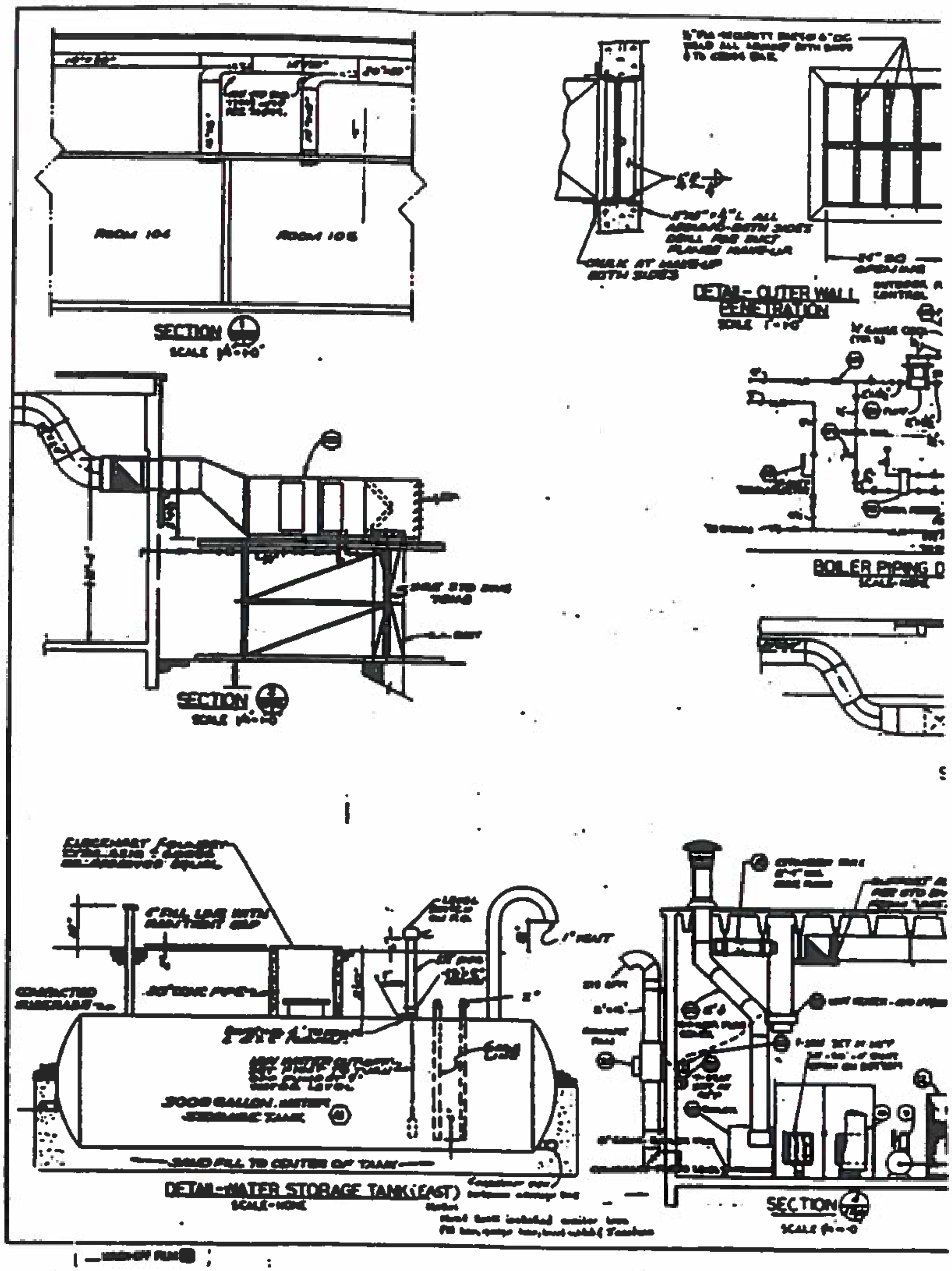


ROOM 60/60A PIPING DIAGRAM



Bldg 6020
Drawing 88733 Sheet 13

Bldg 6020
Drawing 88733 sheet 16



Appendix B

ADDITIONAL INFORMATION ON SNL REMOTE-SITE WATER SUPPLY

(provided by Vicky Cibicki, SNL)

ALPHA TRAC TANK TEST

A C CORPORATION

P.O. Box 11306 • 510 Moon, S.E. • Albuquerque, N.M. 87192
Telephone (505) 294-4344
FAX (505)299-4227

SEPT 5,1991

VICKY CIBICKI DIV 7711

S N L A

P O BOX 5800

ALBUQUERQUE,N.M. 87185

VICKY,

THIS SUMMARIZES THE FINDINGS ON THE FRUEHAUF WATER TANKER,LICENSE # E-20499. THE TANK IS A THREE COMPARTMENT(BY VIRTUE OF BAFFLES)TANKER.THE BAFFLE OPENINGS WERE ENLARGED TO PROVIDE INTER-COMPARTMENT ACCESS FOR CLEANING PROCEEDURES.IN ADDITION, TWO HINGED,LOCKABLE PANELS WERE INSTALLED OVER THE FRONT AND REAR COMPARTMENTS TO PROVIDE ACCESS AND FOR TEMPORARY INSTALLATION OF AIR MOVEMENT EQUIPMENT.THE HATCHES WILL ENABLE SNLA PERSONNEL TO PERFORM FREQUENT INSPECTION AND CLEANING WHEN DESIRED.

UPON ACCESSING THE FRONT AND REAR COMPARTMENTS,HEAVY MINERAL DEPOSITS IMPREGNATED WITH AN OILY RESIDUE WERE PRESENT.THIS CONDITION WAS NOT EVIDENT UPON THE INITIAL VISUAL INSPECTION CONDUCTED THROUGH THE SMALL HATCH OPENING ON THE CENTER OF THE TANK.THE CENTER COMPARTMENT OF THE TANK AT THAT TIME APPEARED TO BE FREE OF ANY RESIDUAL DIESEL PRODUCT AND/OR SCALE.THIS UNKNOWN SITUATION REQUIRED CONSIDERABLE ADDITIONAL TIME AND MATERIALS TO CORRECT,BUT WE STILL MET THE PROJECTED DEADLINE.

THE PROCEEDURE INCLUDED TWO INITIAL WATER BLASTING PASSES FOLLOWED BY USING A SLAG NEEDLE GUN TO REMOVE THE WELL BONDED SCALE.THIS WAS FOLLOWED BY TWO ALKALINE WASH AND RINSE PROCESSES.NEXT TWO PICKLING AND RINSE APPLICATIONS WERE PERFORMED.FINALLY, TWO DISENFECTION, RETENTION AND RINSE PROCEEDURES WERE ACCOMPLISHED.THE EFFLUENT OF THE FIRST DISINFECTION RINSE WAS COLLECTED AND ANALYSED FOR COLIFORM AND BTEX.A COPY OF SUCH ANALYSIS IS ATTACHED.

DUE TO THE DETECTION OF OILY RESIDUE IN THE TANKER, ONE SHOULD CONSIDER CLEANING THE TANKS THAT THIS TANKER HAS SERVICED IN THE PAST.SOME OF THE SCALE WAS NOT BONDED ALL THAT WELL AND THIS MAY HAVE BEEN UNKNOWINGLY DEPOSITED INTO THE HOLDING TANKS. ALL PREVIOUSLY USED HOSES WERE DISCARDED AND A NEW HOSE AND COUPLERS WAS INSTALLED. THE PUMP AND PIPING WAS CLEANED AND DISINFECTED TO AVOID ANY POSSIBILITY OF CONTACT CONTAMINATION OF FUTURE WATER SUPPLIES IN THE TANK.

DUE TO THE TANK BEING UNLINED,AND USED ONLY ONE DAY PER WEEK,DUMPING THE FIRST FEW GALLONS WITH OBVIOUS RESIDUAL RUST PRIOR TO MAKING A DEPOSIT MAY AVOID IRON BUILDUP IN THE HOLDING TANKS.ANOTHER SOLUTION MAY BE APPLICATION OF A POTABLE WATER LINING SYSTEM ON THE TANKER.

THANKS,

ALEX C DE BACA

Page No. ______ Pages ______

Proposal

A C CORPORATION

P.O. Box 11306 • 510 Moon, S.E. • Albuquerque, N.M. 87192
Telephone ~~29[illegible]~~ 294-4344
GENERAL CONTRACTOR'S LICENSE #16847

High Structure & Industrial Painting — Tank Coatings & Linings

PROPOSAL SUBMITTED TO: SANDIA NATIONAL LABS	PHONE: 844-2710/6577	DATE: AUGUST 28,1991
STREET: P O BOX 5800	JOB SCOPE: POTABLE WATER TANKER	
CITY, STATE AND ZIP CODE: ALBUQUERQUE,N.M. 87185	JOB LOCATION: OUR SHOP	
AGENT: VIVKI CIBINSKI	DATE OF INSPECTION: 8-26-91	ESTIMATOR: ALEX C DE BACA — JOB PHONE:

We hereby submit specifications and estimates for:

1 REMOVE ALL UNNECESSARY APPARATUS FROM FORMER DIESEL TANKER TO CONVERT THE TANKER INTO A POTABLE WATER HAULING TANK.
2 INSTALL TWO REMOVABLE ACCESS PANELS ON TOP OF TANK TO PROVIDE PERIODIC MAINTENANCE.
3 REMOVE ALL MINERAL AND/OR HYROCARBON RESIDUAL PRODUCT FROM SHELL AND HEADS
4 PERFORM DISINFECTION AS PER AWWA STANDARDS,C-652-86(REV D105-80),SEC 1.2, B-300,SEC 4.2,METHOD 2
5 PERFORM BACTERIOLOGICAL SAMPLING AS PER AWWA SEC. 4.4 AND HC ANALYSIS per EPA 8020,BTEX AS PER AWWA SMEWW,16th ED,1985,SEC 503 E,HC
6 DISPOSE OF APPARATUS,WASTE AND EFFLUENT AS PER REGULATORY STANDARDS.
7 INSTALL ONE EACH 3"x50' DISCHARGE HOSE WITH QUICK COUPLERS.
8 UNIT TO BE DELIVERED TO AND PICKED UP FROM OUR SHOP BY SNLA PERSONELL.
9 WORK TO BE PERFORMED FROM 7:00 AM FRIDAY UNTIL 5:00 PM WEDNESDAY. ESTIMATED TIME IS TWO WEEK PERIODS MAX.PROBABLY ONE WEEK PERIOD UNLESS THERE ARE OTHER REPAIRS REQUIRED UPON CLEANING AND INSPECTING THE VESSEL.
10 REPAIRS WILL BE AT AN ADDITIONAL CHARGE,SUBJECT TO SNLA PRIOR WRITTEN APPROVAL.

We Propose hereby to furnish material and labor — complete in accordance with above specifications, for the sum of:

THIRTY FIVE HUNDRED PLUS APPLICABLE TAXES dollars ($ 3,500.00)

Payment to be made as follows:

All material is guaranteed to be as specified. All work to be completed in a workmanlike manner according to standard practices. Any alteration or deviation from above specifications involving extra costs will be executed only upon written orders, and will become an extra charge over and above the estimate. All agreements contingent upon strikes, accidents or delays beyond our control. Owner to carry fire, tornado and other necessary insurance. Our workers are fully covered by Workmen's Compensation Insurance.

Authorized Signature ______

Note: This proposal may be withdrawn by us if not accepted within TEN (10) days.

Acceptance of Proposal — The above prices, specifications and conditions are satisfactory and are hereby accepted. You are authorized to do the work as specified. Payment will be made as outlined above.

Signature ______

Signature ______

Date of Acceptance ______

Proposal

Page No. ____ of ____ Pages

A C CORPORATION

High Structure & Industrial Painting

P.O. Box 11306 • 510 Moon, S.E. • Albuquerque, N.M. 87192
Telephone [redacted] 294-4344
GENERAL CONTRACTOR'S LICENSE #16847

Tank Coatings & Linings

PROPOSAL SUBMITTED TO: SANDIA NAT LABS	PHONE: 844-2710 /6577	DATE: SEPT 19,91
STREET: P O BOX 5800	JOB SCOPE: CLEAN/DISINFECT TANKER	
CITY, STATE AND ZIP CODE: ALBUQUERQUE,N.M. 87185	JOB LOCATION: OUR SHOP	
AGENT: VICKI CIBISKI / DATE OF INSPECTION: SEPT 16,1991	ESTIMATOR: ALEX C DE BACA	JOB PHONE:

We hereby submit specifications and estimates for:

CLEAN AND REMOVE MINERAL DEPOSITS FROM TANK INTERIOR
PERFORM DISINFECTION AND BACTERIOLOGICAL SAMPLING AS PER AWWA STANDARDS
REMOVE DEPOSITS FROM BOTH DISCHARGE GATE VALVES
TIGHTEN OR REPLACE,IF NECESSARY,3" DRAIN HOSE.

TOTAL PRICE FOR WORK DESCRIBED ABOVE IS $1,600.00

****

APPLY AQUATA POXY INTERIOR LINING SYSTEM ON RECENTLY CLEANED CARBON STEEL WATER TANKER
THE SUBSTRATE WILL ACCEPT THE COATING WITHOUT THE NEED AND COST OF ABRASIVE BLASTING
REFER TO THREE DATA SHEETS ATTACHED.

TOTAL PRICE FOR INTERIOR LINING AS NOTED ABOVE IS $1,700.00

"Will include disinfection & bacteriological analysis @ No extra charge" [illegible]

We Propose hereby to furnish material and labor — complete in accordance with above specifications, for the sum of:

AS NOTED ABOVE PLUS TAX IF APPLICABLE [illegible] dollars ($ [illegible]).

Payment to be made as follows:

IN FULL UPON COMPLETION [illegible] DISCOUNT IF PAID WITHIN [illegible] DAYS OF INVOICE DATE,NET [illegible]

[illegible]

All material is guaranteed to be as specified. [illegible] Our workers are fully covered by Workmen's Compensation Insurance.

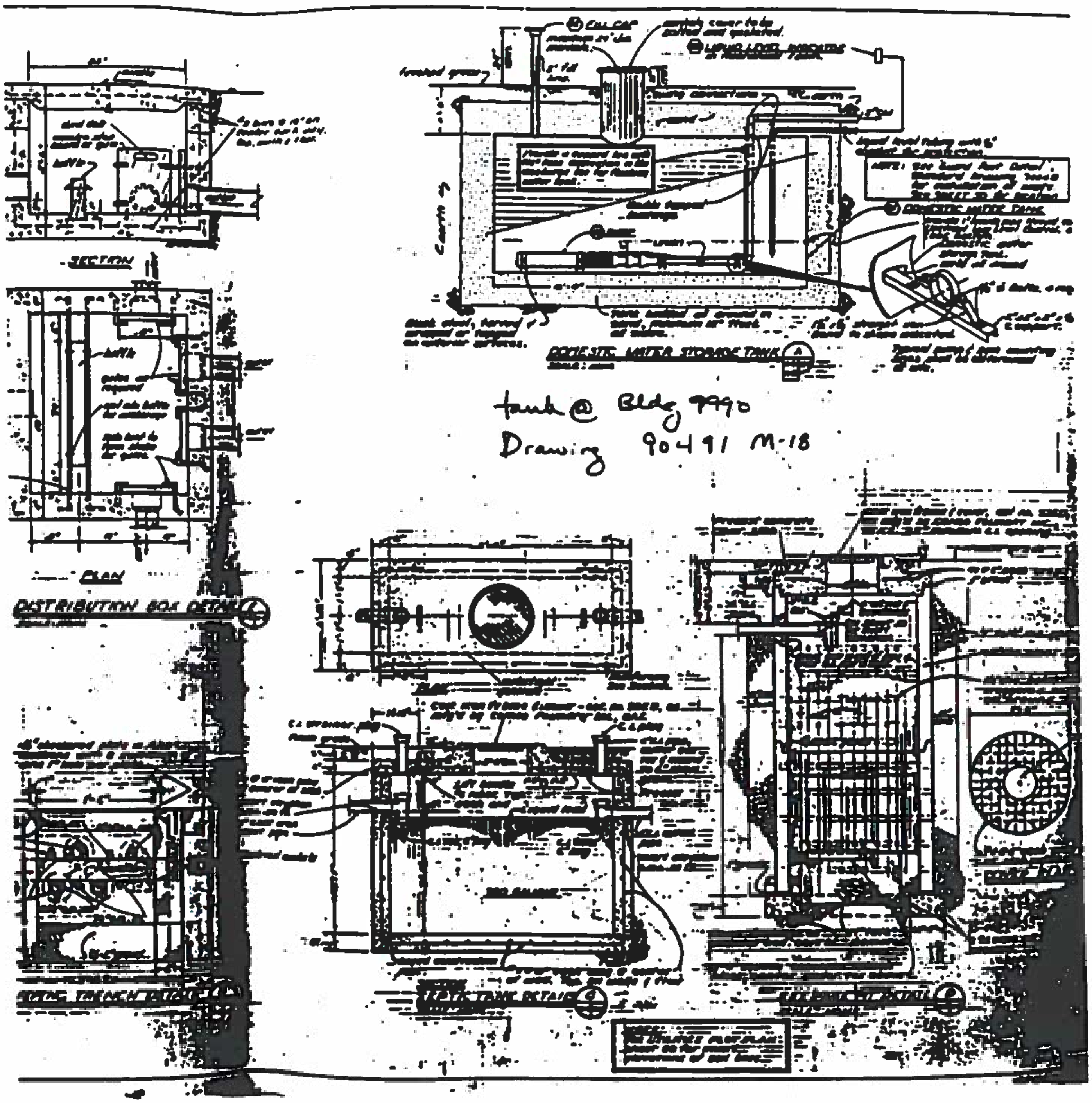
Authorized Signature [illegible]

Note: This proposal may be withdrawn by us if not accepted within TEN (10) days.

Acceptance of Proposal — The above prices, specifications and conditions are satisfactory and are hereby accepted. You are authorized to do the work as specified. Payment will be made as outlined above.

Signature ____________________

Date of Acceptance: ____________________ Signature ____________________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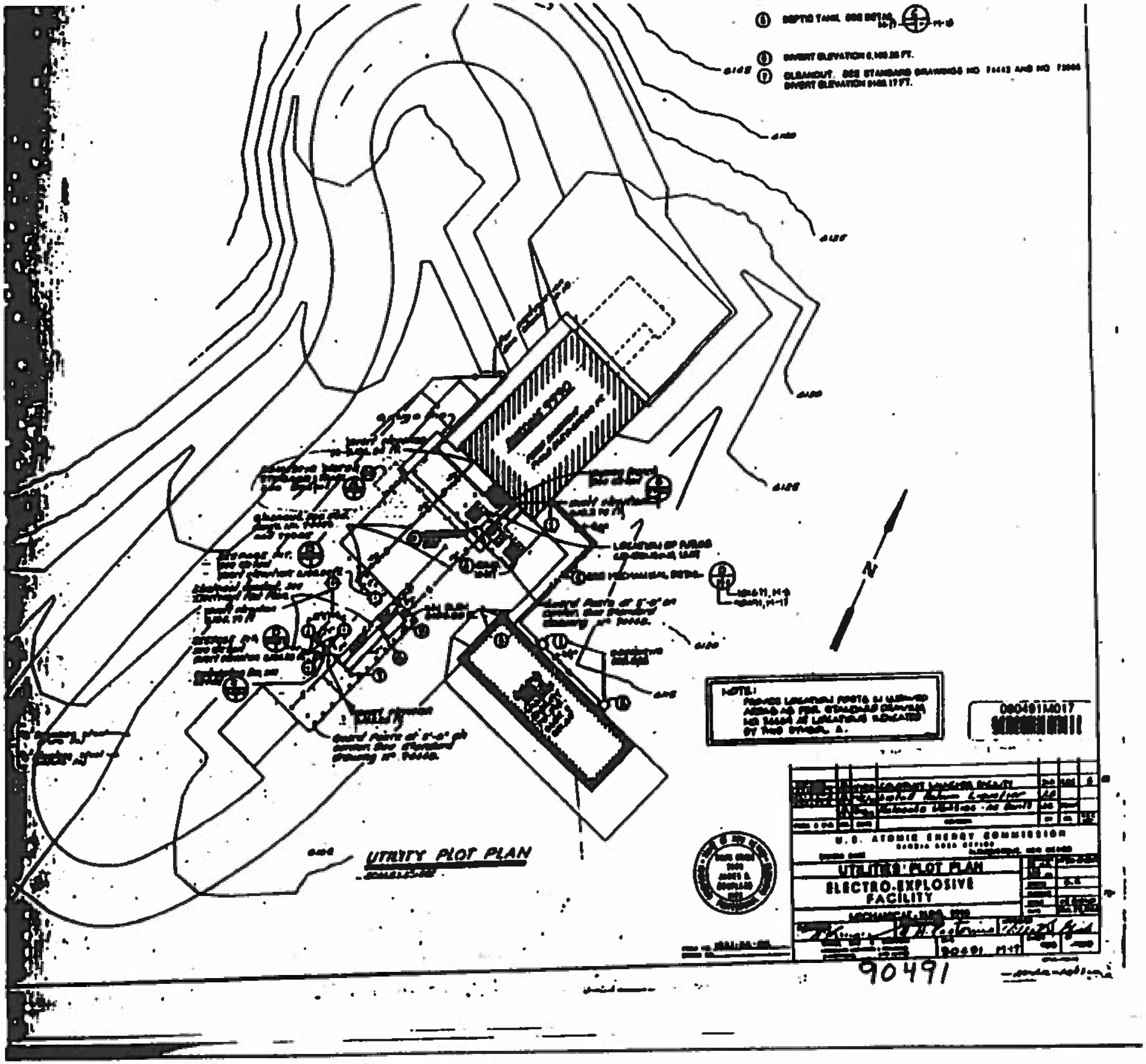
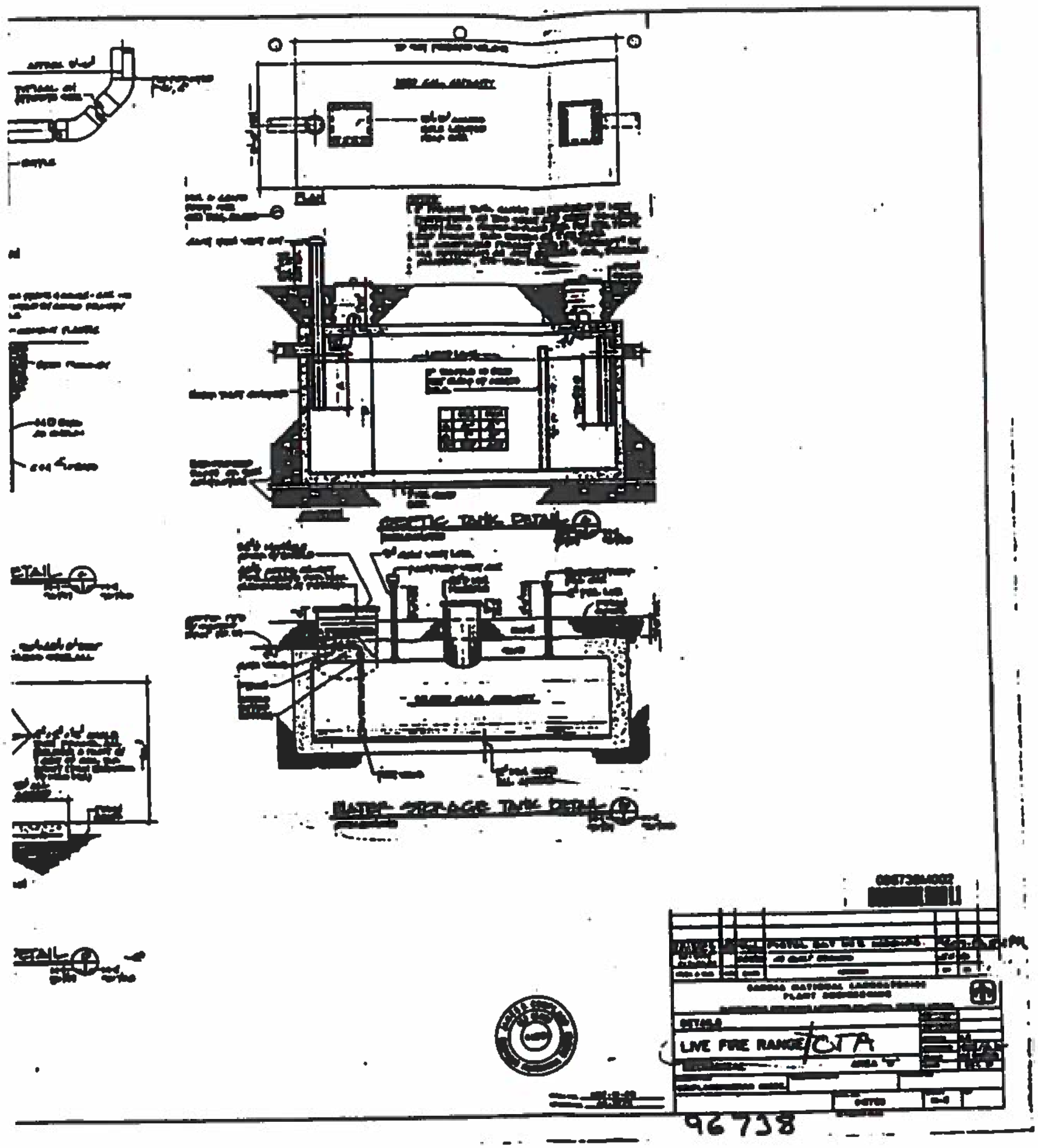
PLAN
DISTRIBUTION BOX DETAIL
baffle
DOMESTIC WATER STORAGE TANK
SEPTIC TANK DETAIL
tank @ Bldg 7790
Drawing 90491 M-18



SEPTIC TANK. SEE DETAIL
INVERT ELEVATION
CLEANOUT. SEE STANDARD DRAWINGS
NOTE:
UTILITY PLOT PLAN
U. S. ATOMIC ENERGY COMMISSION
UTILITIES PLOT PLAN
ELECTRO-EXPLOSIVE FACILITY
N
90491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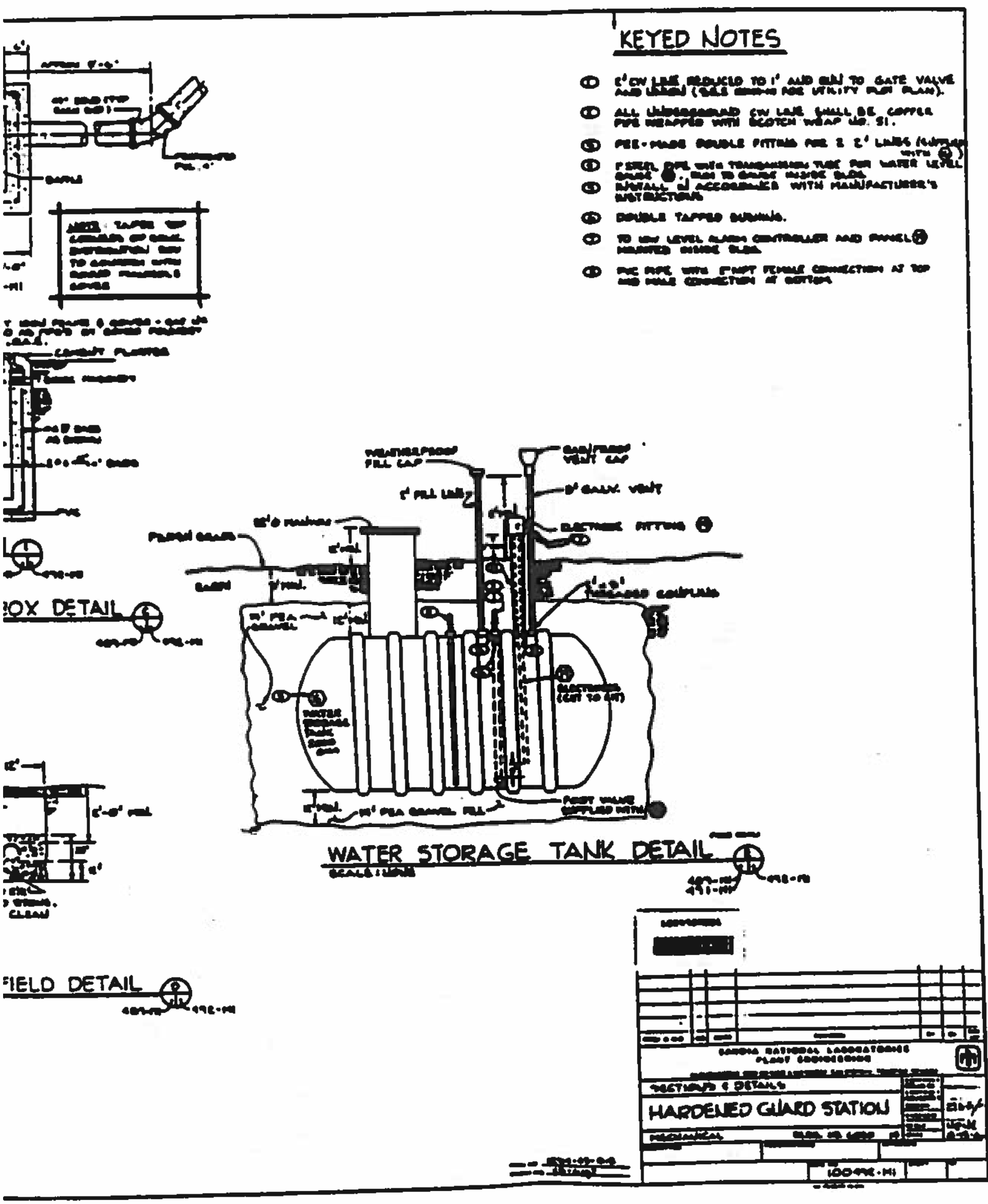
SEPTIC TANK DETAIL
WATER STORAGE TANK DETAIL
LIVE FIRE RANGE/CTA
96738


KEYED NOTES
WATER STORAGE TANK DETAIL
HARDENED GUARD STATION

ENT LIST

SANDIA NATIONAL LABORATORIES
PLANT ENGINEERING

LIVE FIRE RANGE/CTA

AREA "V"

96738

Sandia National Laboratories

Albuquerque, New Mexico 87185

date: March 14, 1993

to: Vicki. Cibicki, 7711

from: Joe Jones, 7909

Subject: SNL WATER WELLS

SNL/NM has a non-potable water well at the burnsite. This well is used to supply fire protection water for burnsite operations. There is an existing water well in Tech Area 3 which is designated as a backup potable and fire protection water source for Tech Area 5. This well is exercised regularly, but the water is not pumped into the SNL water system, and the well water has not entered our system for some time. We have one additional well at Tonopah Test Range. This well is located a couple of hundred feet east of station 3 and serves as a potable water source and fire protection for station 3.

If you have any questions or need additional information, please call me at 4-5842.

Appendix C

ADDITIONAL INFORMATION ON SNL WASTEWATER MONITORING

(from Anonymous, 1992)

Sandia National Laboratories, Albuquerque Permitted Discharge Locations
Maximum Allowable Contaminant Concentrations: One-Day Composite Samples

Parameter	Units	2069A-2 WW001	2069D-3 WW004	2069F-2 WW006	2069G-2 WW007	2069H-2 WW009	2069I WW008	2069K WW011
Phenolics	µg/L	2000.0	2000.0	2000.0	2000.0	2000.0	2000.0	2000.0
Silver	µg/L	3400.0	300.0	3400.0	1000.0	376.0	3400.0	3400.0
Arsenic	µg/L	800.0	800.0	800.0	800.0	800.0	800.0	1800.0
Barium	µg/L	7500.0	7500.0	7500.0	7500.0	7500.0	7500.0	7500.0
Cadmium	µg/L	1700.00	300.0	1700.0	1200.0	604.00	1700.0	1200.0
Cyanide, Total	µg/L	3800.0	400.0	3800.0	3800.0	1050.0	3800.0	3800.0
Cyanide-Amenable	µg/L	NA	300.0	NA	NA	753.0	NA	NA
Chromium	µg/L	8800.0	2300.0	8800.0	8800.0	2120.0	8800.0	8800.0
Copper	µg/L	10200.0	3800.0	10200.0	7000.0	[illegible]	10200.0	7000.0
Fluoride	mg/L	NA	NA	NA	80.0	80.0	NA	NA
Formaldehyde	mg/L	NA	NA	NA	100.0	100.0	NA	NA
Mercury	µg/L	40.0	40.0	40.0	40.0	40.0	40.0	40.0
Manganese	µg/L	7500.0	7500.0	7500.0	7500.0	7500.0	7500.0	7500.0
Nickel	µg/L	4700.0	1700.0	4700.0	4700.0	3480.0	4700.0	4700.0
Oil and Grease	mg/L	75.0	75.0	75.0	75.0	75.0	75.0	75.0
Lead	µg/L	1200.0	700.0	1200.0	1200.0	604.0	1200.0	NA
pH	STD	NA	NA	NA	NA	NA	NA	NA
Selenium	µg/L	800.00	800.0	800.0	800.0	800.0	800.0	800.
Temperature	°F	NA	NA	NA	NA	NA	NA	NA
Total Metals	µg/L	15400.0	15400.0	15400.0	15400.0	15400.0	15400.0	15400.0
Total Toxic Organics	µg/L	3200.0	710.0	3200.0	1297.3	1860.0	3200.0	3200.0
Zinc	µg/L	11300.0	2500.0	11300.0	11300.0	2280.0	11300.0	11300.0

NA = Not Applicable

Sandia National Laboratories, Albuquerque Permitted Discharge Locations
Maximum Allowable Contaminant Concentrations: Grab Samples

Parameter	Units	2069A-2 WW001	2069D-3 WW004	2069F-2 WW006	2069G-2 WW007	2069H-2 WW009	2069I WW008	2069K WW011
Phenolics	µg/L	4000.0	4000.0	4000.0	4000.0	4000.0	4000.0	4000.0
Silver	µg/L	8000.0	8000.0	8000.0	5000.0	5000.0	8000.0	8000.0
Arsenic	µg/L	2000.0	2000.0	2000.0	2000.0	2000.0	2000.0	2000.0
Barium	µg/L	20000.0	20000.0	20000.0	20000.0	20000.0	20000.0	20000.0
Cadmium	µg/L	4000.0	4000.0	4000.0	2800.0	2800.0	4000.0	2800.0
Cyanide, Total	µg/L	8000.0	8000.0	8000.0	8000.0	8000.0	8000.0	8000.0
Cyanide-Amenable	µg/L	NA	NA	NA	NA	NA	NA	NA
Chromium	µg/L	20000.0	20000.0	20000.0	20000.0	20000.0	20000.0	20000.0
Copper	µg/L	24000.0	24000.0	24000.0	16500.0	16500.0	24000.0	16500.0
Fluoride	mg/L	NA	NA	NA	180.0	180.0	NA	NA
Formaldehyde	mg/L	NA	NA	NA	260.0	260.0	NA	NA
Mercury	µg/L	100.0	100.0	100.0	100.0	100.0	10.0	100.0
Manganese	µg/L	20000.0	20000.0	20000.0	20000.0	20000.0	20000.0	20000.0
Nickel	µg/L	12000.0	12000.0	12000.0	12000.0	12000.0	12000.0	12000.0
Oil and Grease	mg/L	150.0	150.0	150.0	150.0	150.0	150.0	100.0
Lead	µg/L	3200.0	3200.0	3200.0	3200.0	3200.0	3200.0	NA
pH	STD	5/11	5/11	5/11	5/11	5/11	5/11	5/11
Selenium	µg/L	2000.0	2000.0	2000.0	2000.0	2000.0	2000.0	2000.0
Temperature	°F	140	140	140	140	140	140	140
Total Metals	µg/L	40000.0	40000.0	40000.0	40000.0	40000.0	40000.0	40000.0
Total Toxic Organics	µg/L	5000.0	5000.0	5000.0	5000.0	5000.0	5000.0	5000.0
Zinc	µg/L	28000.0	28000.0	28000.0	28000.0	28000.0	28000.0	28000.0

NA = Not Applicable

Sandia National Laboratories, Albuquerque
Permitted Wastewater Discharge Locations

Permit Number	Station/ Manhole	Monitoring Location	Waste Stream Process	Appropriate Regulations
2069A	WW001	Tijeras Arroyo	General	COA Ordinance
2069D	WW004	Bldg. 841	Metal Finishing	40 CFR 433.A
2069F	WW006	Lagoon	General	COA Ordinance
2069G	WW007	Bldg. 858	Electronics/ Semiconductors	40 CFR 469.A
2069H	WW009	Bldg. 878	Metal Finishing	40 CFR 433
2069I	WW008	14th Street Sewer Line	General	COA Ordinance
2069K	WW011	Technical Areas III & V	General	COA Ordinance

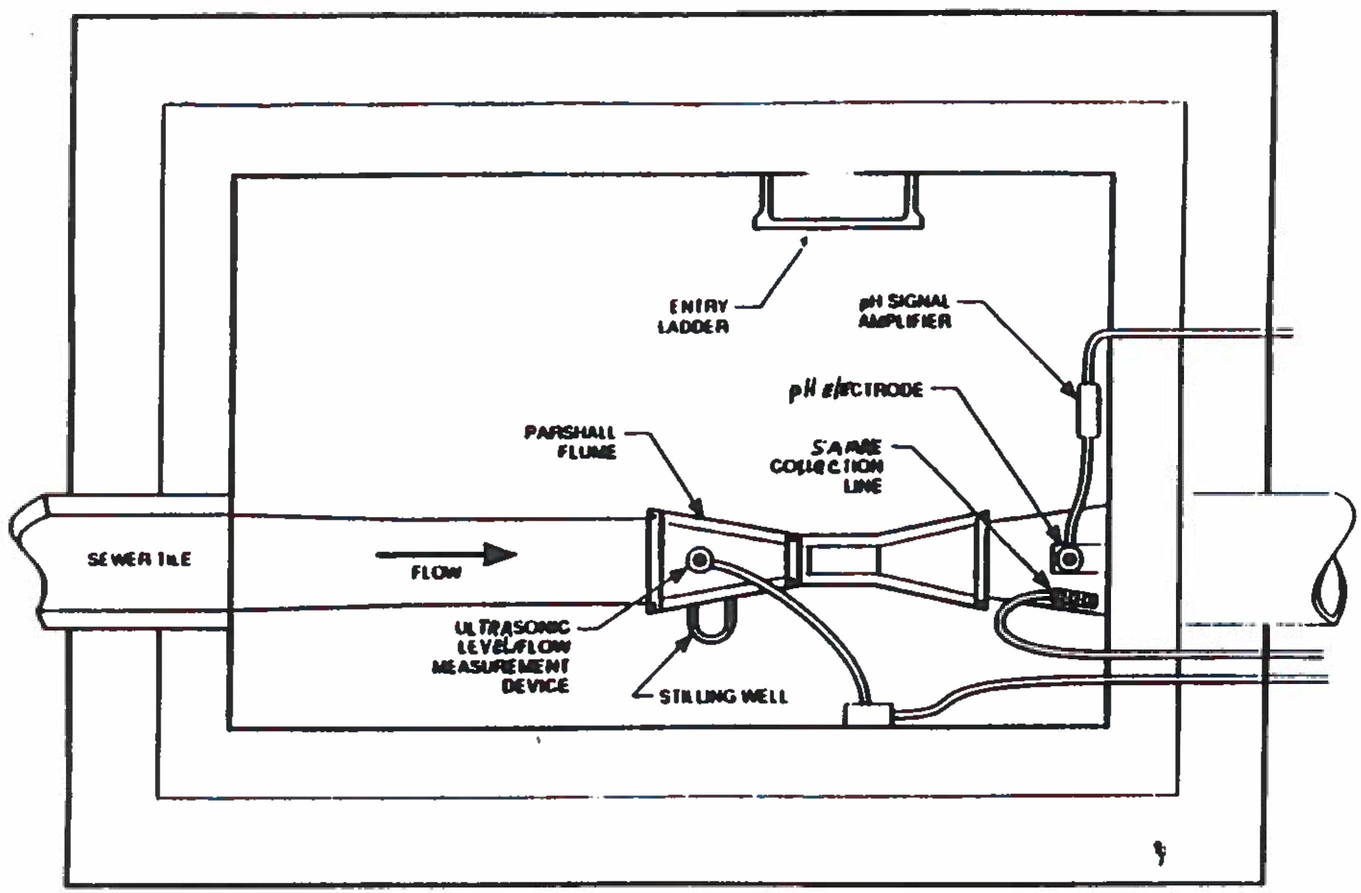
Sandia National Laboratories, Albuquerque Permitted Discharge Locations
Maximum Allowable Contaminant Concentrations: Four-Day Composite Samples

Parameter	Units	2069A-2 WW001	2069D-3 WW004	2069F-2 WW006	2069G-2 WW007	2069H-2 WW009	2069I WW008	2069K WW011
Phenolics	µg/L	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0
Silver	µg/L	2000.0	150.0	2000.0	700.0	210.0	2000.0	2000.0
Arsenic	µg/L	500.0	500.0	500.0	500.0	500.0	500.0	4500.0
Barium	µg/L	5000.0	5000.0	5000.0	5000.0	5000.0	5000.0	5000.0
Cadmium	µg/L	1000.00	120.0	1000.0	700.0	230.0	1000.0	4700.0
Cyanide, Total	µg/L	2000.0	200.0	2000.0	2000.0	570.0	2000.0	2000.0
Cyanide-Amenable	µg/L	NA	100.0	NA	NA	280.0	NA	NA
Chromium	µg/L	5000.0	1400.0	5000.0	5000.0	1500.0	5000.0	5000.0
Copper	µg/L	6000.0	2300.0	6000.0	4100.0	1810.0	6000.0	4100.0
Fluoride	mg/L	NA	NA	NA	50.0	50.0	NA	NA
Formaldehyde	mg/L	NA	NA	NA	65.0	65.0	NA	NA
Mercury	µg/L	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Manganese	µg/L	5000.0	5000.0	5000.0	5000.0	5000.0	5000.0	5000.0
Nickel	µg/L	3000.0	1000.0	3000.0	3000.0	2080.0	3000.0	3000.0
Oil and Grease	mg/L	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Lead	µg/L	800.0	400.0	800.0	800.0	380.0	800.0	NA
pH	STD	NA	NA	NA	NA	NA	NA	NA
Selenium	µg/L	500.00	500.0	500.0	500.0	500.0	500.0	500.0
Temperature	°F	NA	NA	NA	NA	NA	NA	NA
Total Metals	µg/L	10000.0	10000.0	10000.0	10000.0	10000.0	10000.0	10000.0
Total Toxic Organics	µg/L	2100.0	2100.0	2100.0	1297.3	1860.0	2100.0	2100.0
Zinc	µg/L	7000.0	1400.0	7000.0	7000.0	1300.0	7000.0	7000.0

NA = Not Applicable

Sampling, pH, and Flow Monitoring Equipment Installed at Sandia National Laboratories, Albuquerque Permitted Monitoring Locations

Monitoring Station	Automatic Sampler	pH Analyzer	pH Recorder	Flow Meter Recorder	Measurement Device	Flume Size (in.)
WW001	ISCO 2700R	Leeds & Northrup 7089	Leeds & Northrup 1 Pen	ISCO 3210	Parshall	3"
WW004	ISCO 2700R	Leeds & Northrup 7082	Leeds & Northrup 1 Pen	ISCO 3210	Parshall	2"
WW006	ISCO 2700R	Leeds & Northrup 7082	Leeds & Northrup 2 Pen	ISCO 3210	Parshall	6"
WW007	ISCO 2700R	Leeds & Northrup 7082	Leeds & Northrup 2 Pen	ISCO 3210	45° V notch weir	NA
WW008	ISCO 2700R	Leeds & Northrup 7082	Leeds & Northrup 2 Pen	ISCO 3210	Parshall	6"
WW009	ISCO 3700R	Leeds & Northrup 7082	Leeds & Northrup 1 Pen	ISCO 3210	Parshall	1"
WW011	ISCO 2700R	Leeds & Northrup 7082	Leeds & Northrup 1 Pen	ISCO 3210	Parshall	6"


SEWER TILE
FLOW
PARSHALL FLUME
ULTRASONIC LEVEL/FLOW MEASUREMENT DEVICE
STILLING WELL
ENTRY LADDER
pH SIGNAL AMPLIFIER
pH ELECTRODE
SAMPLE COLLECTION LINE

Analytical Methods Used for Determination of Organic Constituents in Wastewater

Parameters	EPA Method	Method Type
Volatile Compounds	624[a]	GC/MS
Base/Neutral and Acid Extractables	625[a]	GC/MS
Organochlorine Pesticides	608[a]	GC
PCBs	608[a]	GC
Oil and Grease	413.1/413.2[b]	Gravimetric/
Phenolics	420.1[b]	Colorimetric

[a]40 CFR Part 136, July 1, 1986, "Guidelines Establishing Test Procedures for the Analysis of Pollutants," Appendix A.
[b]U.S. Environmental Protection Agency (EPA), March 1983, "Methods for Chemical Analysis of Water and Wastes," EPA-600/4-79-020.

Analytical Methods and Detection Limits for Inorganic and General Analyses of Wastewater Samples

Parameter	Analytical Methods	Detection Limits
Arsenic	EPA 206.2/206.3[a]	5 µg/L
Barium	EPA 208.1/200.7[a]	<10/5 µg/L
Cadmium	EPA 213.1/200.7[a]	5/5 µg/L
Chromium	EPA 218.1/200.7[a]	50/10 µg/L
Copper	EPA 220.1/200.7[a]	<10/10 µg/L
Cyanide, Amenable	EPA 335.1[a]	20 µg/L
Cyanide, Total	EPA 335.2[a]	20 µg/L
Fluoride	EPA 340.2[a]	100 µg/L
Lead	EPA 239.1/200.7[a]	5/50 µg/L
Manganese	EPA 243.1[a]	<10/5 µg/L
Mercury, Total	EPA 245.1[a]	0.2 µg/L
Nickel	EPA 249.1/200.7	10/30 µg/L
Oil and Grease	EPA 413.1/413.2	5000/200 µg/L
Phenolic Compounds	EPA 420.1/420.2	5 µg/L
Selenium	EPA 270.2/270.3	5 µg/L
Silver	EPA 272.1/200.7	<10/10 µg/L
Zinc	EPA 289.1/200.7	<10/10 µg/L
Gross Alpha	EPA 900.0[c]/SM 703[d]	3 pCi/L[b]
Gross Beta	EPA 900.0[c]/SM 703[d]	4 pCi/L[b]
Tritium	EPA 906[c]/SM[d] 708.0[d]	1000 pCi/L[b]
Gamma Emitting Isotopes	EPA 901.1[c]	10 to 20 pCi/L[b]

[a]U.S. Environmental Protection Agency (EPA), March 1983, "Methods for Chemical Analysis of Water and Wastes," EPA-600/4-79-020.
[b]U.S. Environmental Protection Agency (EPA), July 1990, 40 CFR 141.25, "Analytical Methods for Radioactivity."
[c]U.S. Environmental Protection Agency (EPA), August 1980, "Prescribed Procedure for Measurement of Radioactivity in Drinking Water," EPA-600/4-80-032.
[d]*Standard Methods for Examination of Water and Wastewater*, 1980, 15th ed., American Public Health Association, New York, New York.

Appendix D

ADDITIONAL INFORMATION ON WIPP LAND APPLICATION

(from Anonymous, 1993 and Paul Sanchez, NMED/AIP, WIPP)

Table 4.3: WIPP SWMU Characterization Sheet - 002
Salt and Top Soil Storage Areas

002	SALT AND TOP SOIL STORAGE AREAS
Unit Type:	Storage Areas
Unit Use:	Storage
Operational Status:	Active
Use Period:	1981-present
Materials Managed:	Solid Waste
Hazardous Release:	None
Radioactive Release:	None
Information source(s):	Process knowledge Annual aerial photos Westinghouse, 1984

<u>Unit Description</u>

Refer to Figure for location. Two areas have been used for salt storage at the WIPP facility. The older area (002-a), located due east of Zone I, was active during the early excavation phases of the underground, starting in 1981. This area holds about 155,000 cubic yards of salt and covers about 7 acres. It was used until the main salt storage area (002-b) became active in April, 1984. This salt storage area, located north of Zone I, is still active, contains about 402,000 cubic yards of salt, and covers about 15 acres. Berms and a holding pond are used to control run-off from the main salt storage area, but just a berm is used for the older area.

Two other areas have been used to store top soil from the WIPP facility. The first area (002-c), first used in 1981, was located 470 feet due east of the Salt Handling Shaft and covered approximately three acres. Most of this stockpile has been covered by the expansion of Zone I; the east end of it is still visible at the eastern boundary of Zone I. A second area (002-d), located on the east side of SWMU No. 002-a, has been used since 1981 to store the top soil removed to clear the salt pile location. It covers about 3.1 acres.

<u>Waste Description</u>

Based on process knowledge, material stored at the salt storage sites is primarily salt with trace amounts of hydraulic oil, motor oil, diesel, and scrap steel. The impurities in the salt are from the heavy equipment used for excavation of the repository and transport of the salt to the salt pile. Material stored at the top soil storage areas is only top soil.

<u>Release Information</u>

Releases of RCRA hazardous waste or hazardous constituents have not occurred at these sites. There is an area of vegetation kill along the outer edge of the berm near the older salt storage area that appears to have been caused by the salt. The maximum extent of the vegetation kill was an area of approximately 50 feet by 100 feet. The vegetation kill area is decreasing in size as it recovers.

(after WIPP RCRA Part B Permit DOE/WIPP 91-005)

Table 4.4 WIPP SWMU Characterization Sheet - 003
Landfills

003 LANDFILLS

Unit type:	Landfill
Unit use:	Disposal
Operational status:	Active
Use period:	1978-present
Materials managed:	Solid Waste
Hazardous release:	None
Radioactive release:	None
Information source(s):	Annual aerial photos DOE, 1989 Flynn, 1989 Westinghouse, 1991a

Unit Description

Refer to Figure J-1 for location. Two areas have been used as landfills at the WIPP facility. The older location, called the Brinderson Landfill (003-a), is located 1 mile due south of Zone I. Prior to use as a landfill, the area was used as a quarry for road bed materials. It was an active landfill from 1978 to January 1988 and covers about 4 acres. The closure of the Brinderson Landfill was approved by the U.S. Department of Interior, Bureau of Land Management (BLM). Since it was closed, the Brinderson Landfill has been covered over and reseeded. The new landfill (003-b) is located 1/2 mile south of Zone I. The new construction landfill is actually two landfills. One, to the south of the current one, was excavated on BLM land and operated under a BLM permit until 1988. It was closed at the request of the BLM and a new landfill was opened on land designated by the BLM as part of the DOE Exclusive Use Area in Public Land Order 6403. Ground was first broken for the new landfill area in November, 1982; it is still active and covers about 15 acres. All necessary permits were obtained from the BLM for both landfills.

Waste Description

Both of the landfills have been used to bury construction debris consisting of foundation excavation soils, waste concrete, scrap wood, and metal. In addition, it has been reported that small amounts of non-construction debris (most likely office wastes) were dumped in the Brinderson Landfill. No asbestos materials are known to have been disposed of in the landfills. Administrative controls in WP 02-5, Nonradioactive Hazardous Materials Environmental Compliance Manual, prohibit the disposal of RCRA hazardous waste or hazardous constituents in the construction landfill (Westinghouse, 1991a).

Release Information

Releases of RCRA hazardous waste or hazardous constituents have not occurred at these sites.

(after WIPP RCRA Part B Permit DOE/WIPP 91-005)

4.2 SWMU Group 002 - Salt and Top Soil Storage Areas

The SWMU Data Characterization Sheet compiled for the WIPP RCRA B application is presented in Table 4.3. As described in the data sheet, there are four (4) excavated fill storage areas:

- SWMU-002a: SPVD Salt Storage Pile (1981-1985)
- SWMU-002b: Salt Storage Pile (1984-Present)
- SWMU-002c: Top Soil Storage Area (1981-1985?)
- SWMU-002d: SPVD Top Soil Storage Area (1981-1982)

Based on process knowledge, both salt storage and top soil storage SWMUs are described as relatively innocuous units, containing either predominately salt or clean "top soil" fill. Process knowledge is also used to declare that no hazardous waste or hazardous constituents exist or have been released at any of the storage sites. Trace amounts of miscellaneous petroleum products; however, are acknowledged at salt storage areas. Appendix 4.2 includes a 1991 air photo of the four rock and soil storage units.

Verification for this RFA study relies on a review of documents and procedures, 1982-1991 air photos, and site inspections. The only guidance document found concerning past, present and future management of the salt and top soil storage piles is the WIPP Final Environmental Impact Statement (1980; DOE/EIS - 0026). That document describes using one salt pile as backfill for the disposal rooms (SMWU-002a), and implies using the active salt-storage pile to the north of the facility (SWMU-002b) to fill portions of the shafts during decommissioning of the facility. It is uncertain whether the two "top-soil storage areas" will be reseeded to return the sites to their natural condition. In any case, background review finds no WIPP procedures or guidelines to support process knowledge, such as the screening procedure used to exclude hazardous materials from landfills (see section 4.3).

4.2.1 <u>SWMU-002a ("SPVD" Salt Storage Pile)</u>

Preliminary Review. The following information is surmised from a review of old air photos and plans described in DOE/EIS-0026 (1980). SWMU 002a appears to have received mined rock from the excavation of the waste handling, salt, and exhaust shafts, as well as excavated salt from the main drifts and experimental area in the repository horizon. The pile contains up to 340,000 tons of "claystone, anhydrite and salt" (DOE/EIS-0026, 1980). In a correction to the RCRA B application (table 4.3), air photo review suggests that SWMU-002a (SPVD Salt Pile) became inactive between June and December, 1985, coincident with the completion of the exhaust shaft.

Visual Site Inspection. A visual site survey on 2-26-93 identified abundant polyethylene plastic liners protruding from the salt pile (appendix 4.2.1). No stained rock or soil occurs on the surface or within the berms surrounding the site. An inspection of open cavities eroded into the pile revealed only construction debris (ie. waste concrete, concrete slabs, decomposing steel and rebar etc.)
Sampling Visit. No sampling was conducted at the site.

Release and Exposure Assessment. Release and migration potential are as follows:

- Soils - Release potential is high. Soluble salts and constituents leached from the rock and construction debris probably occur in native soil underlying the unit. Isopach maps of the site indicate that perhaps up to 6.0 meters (20 feet) of Gatuna formation and 30 meters (100 feet) of Triassic sandstone underlie storage pile SWMU-002a. The thickness of caliche at this location is probably about 1.0 meter (3.0 feet).

- Groundwater - Migration potential is low. The Dewey Lake Formation is less likely to contain water this far north on the WIPP site. Migration to the Culebra Dolomite aquifer, located about 236 meters (775 feet) below the surface, is not credible.

- Surface water - None

- Air - None

Exposure potential is low. Without photographic or procedural documentation during the active period of this unit (1981-1985), there exists the possibility that "trace amounts" of potentially hazardous constituents were placed in SWMU-002a along with construction debris. Nevertheless, exposure likelihood is low through the groundwater pathway, although exposure may occur in the event the site is ever overexcavated.

4.2.2 SWMU-002b (Salt Storage Pile)

Preliminary Review. The active salt pile to the north of the facility (SWMU 002b) is to contain primarily salt excavated during mining of the repository horizon (DOE/EIS-0026, 1980). A review of air photos and excavation history suggests that the southwest quadrant of SWMU-002b was the first section to receive salt fill in 1984. Between 1984 and December 1986, the western 2/3 of the unit received excavated salt from the repository horizon. Air photos suggest that the eastern 1/3 of the unit began to receive fill by July, 1988. The occurrence of Rustler and Dewey Lake rocks in this section support the presumption that fill excavated from the AIS exists in SWMU 002b. A slurry and rock mixture also appears on this eastern section in the 1988 air photo, which is consistent with a rock slurry reportedly produced during boring of the Air Intake Shaft (AIS).

Visual Site Inspection. The following objects were documented during the visual site survey on 2-26-93: wood, batteries for miners lights, gloves, fabric liner, plastic 5 gallon cans and other solid waste from the excavation and maintenance of shafts (ie. decomposing roof bolts, steel rebar, fence). As with SWMU-002a, it is not possible to estimate the amount of solid waste by visual observation. Based on surface evidence, the percentage is small. No stained rock or fill was observed on the surface or within the berms surrounding the site (appendix 4.2.2).

Sampling Visit. No sampling was conducted at the site.

Release and Exposure Assessment. Release and migration potential are as follows:

- Soils - Release potential is high. Soluble salts and other constituents have probably leached to underlying soils. The caliche cap in this area is about 1.8 meters (6.0 feet) thick. The WIPP-21 well, located immediately adjacent to SWMU-002b, suggests that about 24 meters (81 feet) of Triassic sandstone exist below the storage pile.

- Groundwater - Migration potential is low. The Dewey Lake Formation is less likely to contain water this far north on the WIPP site. Migration to the Culebra Dolomite aquifer, located about 230 meters (740 feet) below the surface, is not credible.

- Surface water - None

- Air - None

Exposure potential is low: Because there has been no procedure to screen potentially hazardous substances from SWMU 002b, trace amounts of such constituents are not precluded. Nevertheless, it is believed that only a small amount of potentially hazardous constituents may contaminate the salt and solid waste. In any case, the groundwater exposure potential is low due to the lack of groundwater in the Dewey Lake Formation.

4.2.3 SWMU-002c (Top Soil Storage Area)

Preliminary Review. No information is found to verify information on SWMU-002c adjacent to the Zone 1 Facility Boundary (appendix 4.2). Air photo review suggests the site has been undisturbed since June 1985.

Visual Site Inspection. A visual site survey on 2-26-93 revealed a notable occurrence of polyethylene plastic liners protruding from the top soil storage area (appendix 4.2.3). Other solid waste was also present in this older soil storage area: waste concrete, concrete slabs and decomposing rebar. No stained soil or fill was evident.

Sampling Visit. No sampling was conducted at the site.

Release and Exposure Assessment. Release and migration potential are as follows:

- Soils - Release potential is high, as soluble constituents could leach to underlying soils. Isopach maps of the site indicate that about 1.0 meter (3.0 feet) of caliche, 4.5 meters (15 feet) of Gatuna Formation and 30 meters (100 feet) of Triassic sandstone underlie top soil storage SWMU-002c.

- Groundwater - Migration potential is low. The Dewey Lake Formation does not contain groundwater this far north on the WIPP site. Migration to the Culebra Dolomite aquifer, located about 220 meters (730 feet) below the surface, is not credible.

- Surface water - None

- Air - None

Exposure potential is low: SWMU-002c contains a fair amount of solid waste, not just top soil, as indicated in the RCRA Part B Application. As the solid waste observed during the RFA was not allowed in this unit, it is reasonable to suggest that trace amounts of undocumented and potentially hazardous constituents were also introduced along with the construction debris. Nevertheless, exposure potential by way of groundwater is low. Exposure potential by direct contact is a possibility only if the site is excavated.

4.2.4 SWMU-002d (Top Soil Storage Area - "SPVD" Soil)

Preliminary Review. No information on this unit was found, other than that provided in the RCRA Part B Application. Air photos as early as November, 1982 show no significant alteration or addition to SWMU-002d.

Visual Site Inspection. No construction debris was evident during the survey conducted on 3-26-93. The site appears as a clean, natural dune complex (appendix 4.2.4).

Sampling Visit. No sampling was conducted at the site.

Release and Exposure Assessment. Release and migration potential are as follows:

- Soils - Release potential is low.

- Groundwater - Migration potential is low.

- Surface water - None

- Air - None

Exposure potential is low: There is no evidence of any construction debris. The lack of any visible construction debris suggests that potentially hazardous constituents were not introduced into this unit. Even if a RCRA release is assumed, exposure potential would be low, as there is no shallow groundwater in this area of the site.

- Groundwater - Migration potential is moderate. Triassic sandstone occurs shallow, underlain by the Dewey Lake Red Beds about 12 meters (40 feet) below the surface (Griswold, 1977). Because there is no information precluding the existence of groundwater at this location on the WIPP site, it is conceivable that perched water may exist and is connected with perched Dewey Lake groundwater found on the southern perimeter of the WIPP site. Migration to the Culebra Dolomite aquifer, located about 200 meters (670 feet) below the surface, is not credible.

- Surface water - None

- Air - None

Exposure potential is low to moderate: The considerable distance to the WIPP perimeter (1.4 km/.90 miles) suggests that the likelihood of exposure by the groundwater pathway is probably low. Nevertheless, hydrologic characteristics of the Dewey Lake Formation at this location are uncertain. The underlying caliche has also been extensively disturbed, and undocumented materials have been introduced into both excavations. Staff believe these factors indicate a moderate exposure potential for SWMU-003a.

4.3.2 SWMU-003b New Landfill (Active and Inactive Units)

Preliminary Review. As stated in the RCRA Part B application, the SWMU-003b landfill is composed of two landfills. The currently active landfill is north of the inactive unit and within the DOE Exclusive Use Area (see appendix 4.2). The inactive southern area of the site, operated under BLM Permit outside the DOE exclusive-use area, shows the earliest evidence of landfill activity in June, 1985 aerial photographs. Although grading modified the northern part of the landfill site beginning in 1982, the north side of the complex did not develop into an identifiable pit until much later. The L-shaped excavation is first apparent in late 1990 air photos.

By June 1986, the inactive unit is characterized by a large rectangular pit, measuring approximately 150 meters (500 feet) long and 60 meters (200 feet) wide (6-10-86 air photos). The excavated pit is filled with what appears to be a grey slurry/mud mixture, perhaps drilling mud overexcavated for construction of the Waste Handling Building. A second excavation measuring 60 x 30 meters (200 x 100 feet) appears in the inactive landfill in 1989. Because the Salt Handling bold pond (SWMU-006a) was excavated in 1989, drilling mud from that unit may have been disposed of in this second excavation. The inactive landfill site appears fully closed in 1990 (appendix 4.3). Current 1993 DOE/WIPP plans are to reclaim the southern half of the landfill using land treatment and revegetation techniques.

Visual Site Inspection. Photographs were taken of the active and inactive landfill areas on 3-1-93 and 5-19-93. The inactive landfill is graded level up to 1 meter (3.0 feet) above grade of the surrounding area (appendix 4.3.2). A 2:1 fill slope bounds portions of the southwest-facing side of the inactive unit. Many fragments of fibrous polyethylene liner protrude through the land surface. The graded surface is without vegetation and erosion of the fill slope is evident in a 1991 air photo (appendix 4.2).

Construction debris observed at the active landfill includes excavated soil, file cabinets, concrete slabs, wood and steel rebar and empty 55-gallon drums. No stained soil or other evidence of materials potentially deleterious to the environment are evident in the open pit (appendix 4.3.2).

Sampling Visit. No sampling was conducted at the site.

Release and Exposure Assessment. Release and migration potential are as follows:

- Soils - Release potential is high for the inactive landfill, and low for the active landfill. Procedures to screen hazardous materials were not in place at WIPP until 1988, several years after operations commenced at the