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HAZARDOUS WASTE COMPLIANCE
TECHNICAL SECTION

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HAZARDOUS WASTE
MANAGEMENT BRANCH

ATKEARNEY

April 9, 1987

Mr. Tom Clark
Regional Project Officer
U.S. Environmental Protection Agency
1201 Elm Street
Dallas, TX 75270

Reference: EPA Contract No. 68-01-7038; Work Assignment No. R06-01-18; Sandia National Laboratories; Final Deliverable

Dear Mr. Clark:

Enclosed is the final deliverable for the above referenced project. The deliverable is the RCRA Facility Assessment (RFA) report which incorporates the results of the Visual Site Inspection (VSI).

Sandia National Laboratories, Albuquerque (SNLA), is a research and development organization operated for the Department of Energy by the Sandia Corporation, a wholly owned subsidiary of AT&T. SNLA is primarily engaged in the design and development of the non-nuclear portions of weapons systems. Thirty percent of SNLA's work includes fusion research, reactor safety, nuclear waste management, fuel cycle and materials research, solar energy, and energy conversion and combustion technology. Facility operations involve the storage, treatment and disposal of hazardous waste as well as low-level radioactive wastes.

Hazardous chemical wastes are typically containerized and taken to the Chemical Waste Landfill Area in Technical Area III. Radioactive wastes are normally disposed of in the Low Level Radioactive Disposal Pits and Trenches in Area III. Historically, record maintenance has not been enforced, and records of types and quantity of wastes disposed are vague.

There are a number of outdoor test sites at the facility where explosive and impact testing is conducted. Residue from these experiments typically includes schrapnel, lead, beryllium and depleted uranium; other metals and radioactive materials may also be present.

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As a consequence of the federal/state file search, and the VSI, 139 Solid Waste Management Units (SWMUs) and 23 Other Areas of Concern were identified. Six of the SWMUs are RCRA-regulated; four are scheduled for closure and two were reported to be closed prior to 1980.

A number of these SWMUs were identified in Sandia's CEARP Phase I draft report, required for all DOE facilities under the Comprehensive Environmental Assessment and Response Program (CEARP). Under Phase II of this program, a field investigation will be conducted. The investigation will include geophysics to delineate and confirm the presence of sites, soil sampling to determine if subsurface soils contain hazardous materials and ridionuclides, surface water sampling to evaluate surface water chemical quality, and installation of ground water monitoring wells if necessary. SNLA plans to conduct, at a minimum, geophysical surveys and soil sampling at most of the sites identified in the CEARP Phase I report. The table in Appendix 6 identifies the SWMUs for which Sandia has proposed sampling. Because of the comprehensive effort of CEARP Phase II, we have not suggested sampling under the RCRA program. We do, however, recommend that the scope of work for CEARP II be obtained from Sandia in order to determine if it satisfies RCRA 3004(a) requirements.

The Visual Site Inspection (VSI) of the Sandia facility was conducted over five days beginning January 19, 1987. The identification of SWMUs and Other Areas of Concern was based primarily on information obtained from the CEARP I draft report and verbal information from SNLA personnel. Additional SWMUs and Other Areas of Concern were identified during the actual tour of the facility; however, a complete inspection of every building and every area where waste generating activities are believed to have occurred was not possible due to the enormous size of the Sandia facility, inaccessibility of the remote test areas due to recent heavy snowfall and restrictions to access into classified areas. It is therefore, important to recognize that this RFA focuses on those SWMUs that could be observed during the VSI.

Please feel free to call either me or Marilyn Blume, the Work Assignment Manager (who can be reached at 415/892-0821), if you have any questions.

Sincerely,

Gordon Bennett
Technical Director

Kay H. Breeden
Program Director

Enclosures

cc: G. Kline
A. Schaffer
M. Blume, HLA-N

FINAL RCRA FACILITY ASSESSMENT REPORT OF SOLID WASTE MANAGEMENT UNITS AT SANDIA NATIONAL LABORATORIES, ALBUQUERQUE ALBUQUERQUE, NEW MEXICO

Prepared for:

U.S. Environmental Protection Agency
Region VI

Under:

Contract No. 68-01-7038
Work Assignment No. R06-01-18

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I EXECUTIVE SUMMARY

The Sandia Corporation currently manages Sandia National Laboratories, Albuquerque (SNLA) in New Mexico for the U.S. Department of Energy. The facility conducts research and development activities for the non-nuclear portions of weapons systems, and non-nuclear and nuclear ordnance. Wastes at the plant are primarily generated through these research and development activities, in laboratories, and during explosives testing. The facility generates and stores RCRA-regulated hazardous wastes in classification groups D001, D002, D003, D004, D008, F001, F002, F003, F005, P and U. In addition, low level radioactive waste and mixed waste is generated.

This report is a RCRA Facility Assessment (RFA) of Sandia National Laboratories in Albuquerque, New Mexico. The assessment utilized pertinent regulatory files of EPA Region VI and the New Mexico Environmental Improvement Division, a draft copy of the Comprehensive Environmental Assessment and Response Program Phase I (CEARP) report (References 1 through 42), and information obtained during a visual site inspection (VSI) conducted at SNLA during the week of January 19, 1987. Most of the information on Solid Waste Management Units (SWMUs), and release potentials, was obtained during the VSI (References 39 through 43). This information resulted in the identification and review of 139 SWMUs and 23 Areas of Concern. Prior to the VSI, SNLA identified 27 units in their SWMU report (9).

The purpose of this RFA is to identify all Solid Waste Management Units (SWMUs) at SNLA and to evaluate the potential for release of hazardous wastes or constituents from each SWMU. A SWMU is defined as a discrete unit (tank, landfill, etc.) or area where solid wastes have been managed or are deliberately, routinely, and systematically placed or allowed to discharge into the environment. In addition, areas that do not meet the regulatory definition of a SWMU but do pose a potential threat of environmental contamination are identified as other areas of concern in this RFA.

Descriptions of the facility environment, operations and waste management practices, and descriptions of each SWMU and Other Areas of Concern at the SNLA facility are presented in this RFA report.

A number of these SWMU's were identified by Los Alamos Laboratory personnel (under contract to SNLA) during Phase I of the Comprehensive Environmental Assessment and Response Program (CEARP). During Phase II of this program, a field investigation will be conducted to verify site locations and to establish the nature of wastes contained at each site. SNLA personnel indicated that Phase II may be initiated during the summer of 1987. SNLA personnel plan to conduct, at a minimum, geophysical surveys and soil sampling at the majority of the SWMUs identified in this RFA.

II INTRODUCTION

The RCRA Hazardous and Solid Waste Amendments of 1984 granted the U.S. Environmental Protection Agency (EPA), and authorized states, the authority to require remedial action for past and/or continuing releases of hazardous constituents from all solid waste management units (SWMUs) at RCRA-regulated facilities. A SWMU is defined as a unit (tank, surface impoundment, etc.) or area where solid wastes have been managed, are managed, or are deliberately, routinely, and systematically placed or allowed to discharge into the environment. In order to determine the need for remedial action, a RCRA Facility Assessment (RFA) is performed. The RFA consists of a preliminary data review/evaluation, a visual site inspection (VSI) and, when warranted, sampling and analysis.

This report summarizes the results of the preliminary data review, evaluation, and VSI of Sandia National Laboratories (SNLA) in Albuquerque, New Mexico. Because of the immense size of the SNLA site, and the classified nature of almost all of the on-site research activities, it is possible that not all of the existing SWMUs were identified during this RFA.

Primary sources of information utilized for this RFA include Part A and B of SNLA's RCRA permit application, material from the files of the New Mexico Environmental Improvement Division and the Comprehensive Environmental Assessment and Response Program (CEARP) Phase I draft report (see References 1 through 43). The CEARP Phase I draft report identified areas where wastes were generated, treated, stored, or disposed. These

areas have been discussed in this report either as SWMUs or Other Areas of Concern. The CEARP Phase II draft report will verify site locations and establish the nature of wastes contained at each site.

In addition, a Visual Site Inspection (VSI), following the protocols described in the RCRA Preliminary Assessment/Site Investigation Guidance Document, was conducted during the week of January 19, 1987. The information gathered was recorded in the inspection team's logbook and is included within this report.

III FACILITY AND PROCESS DESCRIPTION

Sandia National Laboratories, Albuquerque (SNLA), is located southeast of the City of Albuquerque in Bernalillo County, New Mexico. SNLA is owned by the U.S. Government and is operated by AT&T through a wholly owned subsidiary, the Sandia Corporation. The facility employs over 7000 people (39).

SNLA is one of three Department of Energy laboratories involved in nuclear weapon design. The facility's mission includes the design and development of non-nuclear portions of weapons systems, engineering research, and development of nuclear ordnance. Approximately 30 percent of SNLA's work involves such areas as controlled fusion research, weapons protection, fuel-cycle protection, nuclear waste management, electron-beam fusion and laser development, reactor safety, solar energy, and energy conversion and combustion technology.

SNLA is at the foot of the Manzano Mountains in the eastern portion of Kirtland Air Force Base (KAFB), just outside the southeastern boundary of Albuquerque (Plate 1). Sandia's operations are conducted on land owned by the Energy Research and Development Administration (ERDA), on KAFB, and on land withdrawn from the Forest Service's Cibola National Forest. Sandia occupies approximately 2,800 acres of the 52,200 acre parcel encompassed by the three landowners.

Operations are conducted in five technical areas, Areas I, II, III, IV, V, and the Coyote Test Field (Plate 2). Technical Area 1 is used for

research and design activities, and for administrative and support functions. Supporting laboratories and shops are also in Area I. Area II was initially established for the assembly of high explosive chemical devices, and is now used for various laboratory and testing operations. Tech Area III is involved with the simulation of a variety of natural and artificial environments and includes facilities such as rocket sled tracks, centrifuges, and a radiant heat testing facility. In Technical Area IV, inertial confinement fusion experiments and pulse-powered research activities are performed. Area V contains SNLA's experimental and engineering reactors and bulky power accelerators. The bulky power particle accelerators are electron beam generators usually in the x-ray mode (40).

The Coyote Test Field (CTF) contains most of the blast areas at the facility. The CTF contains explosively driven shock tubes, aerial cable sites where test configurations are pulled down for high-speed impact with the ground, test bunkers where large amounts of cased conventional explosives can be detonated, numerous small explosive sites, igloos for explosive storage, and a laser strain seismometer (39). The CTF is surrounded by buffer zones, or designated unoccupied areas, which separate the test areas from adjacent populated land. The buffer zones serve as a shield for hazardous operations conducted in the CTF. Buffer zones north and east of the CTF are on land owned by KAFB. Sandia also leases two parcels of land which serve as buffer zones from the State of New Mexico and Isleta Pueblo. The first parcel, leased from State of New Mexico, is west of the CTFs; it is one mile wide (east to west) and 4.5 miles long (north to south). The

second parcel, leased from the Ibleta Pueblo, is directly south of the CTF; it is 3.5 miles wide and 3 miles long.

Wastes

SNLA generates, treats, and stores and disposes of hazardous waste at the site; waste classifications include D001, D002, D003, D004, D008, F001, F002, F003, F005, P, and U. SNLA generates the hazardous waste listed in Appendix 6 (1). Limited information was available describing the processes which generate these wastes because most of the research at the facility is classified; known waste generation procedures are summarized below (40):

- Still Photographic Processing Lab (Building 802)-film development solutions are automatically replenished. Overflow solution discharges to the sanitary sewer. Silver dissolved in the solution is recovered by electrode precipitation.

- Steam Plant (Building 605) - operates as a gas-fired or oil burning facility. When it is gas fired, stacks emit nitrogen dioxide; when it operates by burning oil, nitrogen disulfide, sulfur dioxide and carbon monoxide are emitted.

- Ceramics Shop (Building 840) - during fabrication of parts, lead titanite and lead oxides are discharged to the air and in the waste water stream.

- Foundary (Building 840) - aluminum casting, at a rate of approximately 10,000 pounds per month, produces lead vapors.

- Plating and Coating Shop (Building 841) - conducts electroplating, anodizing, coating, and chemical etching of ferrous and non-ferrous materials. Uses nickel acetate, cadmium cyanide, sodium dichromate, sulfuric acid and sodium hydroxide. Solutions are reused. Waste fluids are stored in drums. Approximately 100 milliliters per day of the above described solutions are discharged to the sanitary sewer.

- Photofabrication Building (Building 841) - conducts photochemical lithography. Solvents used in processing are stored in drums which are taken to the chemical waste landfill area in Area III.

- Microelectronics Production Facility (Building 870) - fabricates integrated circuits and semiconductors. Uses about 10 gallons/day organic solvents and 50 gallons/day mineral acids. Wastes are taken to the chemical waste landfill area in Area III.

- Laboratories (located in Area I and other remote areas) - conduct classified research. Wastes are drummed and taken to the chemical waste landfill area in Area III.

- Radioactive Wastes (Area III) - are produced during blast experiments, ordnance testing and fabrication research. Low level radioactive wastes produced are depleted uranium, trituim and other radionuclides.

- Remote Test Sites (located throughout the facility) - conduct explosive and impact tests. Wastes produced include schrapnel, lead, beryllium, radionuclides and depleted uranium.

Based upon this facility assessment, 139 SWMU's and 23 Areas of Concern have been identified at the facility and discussed in this report. In some cases multiple units of similar design or function of which the exact number and location are unknown are addressed as a single SWMU. SNLA listed several containment categories (surface impoundment, landfills, container storage, incinerators, and aboveground/underground storage tanks) in their Part B Application (1) and their response to EPA's request for the information concerning releases from SWMUs (2), and identified 27 units in their SWMU report (9). During this investigation, 112 additional units were identified and reviewed. Units for which location information is available are depicted on Plates 3 through 13.

Waste Management

As previously indicated, waste management at SNLA includes generation, treatment, storage, and disposal of liquid and solid non-hazardous and hazardous wastes. Brief descriptions of known waste management operations within a specific technical area or waste management area for specific waste streams follow.

Liquid Sanitary Waste

Liquid sanitary wastes from all Area I and IV activities, with the exception of Building 887, are discharged at the Area I boundary into the KAFB sewer system, which connects to the Albuquerque City Sewage Plant. Sanitary sewage from all other areas discharges into septic tank systems with associated leach fields. Domestic solid waste is stored in dumpsters and delivered to a City of Albuquerque sanitary landfill (39).

Storm Water Waste

Storm water from Area I is collected in a separate sewer system which discharges into the Tijeras Arroyo. Storm water from other areas follows natural drainage paths across the mesa and may eventually discharge to the Tijeras Arroyo (39).

NA - area III
Haz waste L.F. has storm water collection basin

Waste Chemicals

Waste chemicals are generally collected in drums or other containers designated by SNLA as being suitable containers for burial at the chemical waste landfill area (CWLA), an area containing RCRA regulated units. Repacking and storage of segregated hazardous chemical wastes destined for off-site disposal is conducted in Building 895, a RCRA-regulated unit.

Some liquid waste chemicals are discharged to the sanitary sewers as follows (40):

- After specified dilution to 1 normal, inorganic acids may be dumped into sink drains. No further information pertaining to volume, frequency, number, and location of sink drains was available.
- Alcohol, acetone, and chlorinated hydrocarbons may be dumped into sink drains if each discharge does not exceed 100 milliliters.
- The photo labs in Technical Area I discharge small volumes of dichromatic salts to the sewer; the annual discharge is approximately 30 kilograms.

The chemical waste landfill area (CWLA), as defined by SNLA, located in the southeast portion of Technical Area III, consists of six unlined pits, a lined chromic acid pit, an unlined chromic acid pit, an inactive landfill, a surface-water collection pond, a container storage area and a temporary repack storage area for chemicals that are to be disposed of onsite. A fence encloses the 1.9-acre area. The CWLA is depicted on Plate 3. In addition, repackaging and storage of segregated hazardous chemical wastes designated for offsite disposal is conducted in Building 895.

Low Level Radioactive Waste

Low level radioactive waste is generally disposed of in the Area III pits and trenches, SWMUs 24 through 30. Liquid radioactive wastes are filtered through ion exchange resins which are disposed of as solid waste in these SWMUs. Prior to 1970, the Sandia Engineering Reactor (SWMU 135) was still in operation. Acids, periodically used to clean the filter resins, typically became contaminated; spent acids are then discharged to the Area V lagoons (SWMUs 18 and 19).

Gaseous radioactive wastes are filtered through high efficiency particulate air (HEPA) filters. Used filters are handled as solid radioactive wastes and disposed of in the low level radioactive disposal sites - Area III Trench Numbers 1 through 6 (SWMUs 24 through 28).

Waste Explosives

Waste explosives are generated in all the technical areas and several remote test areas. Reject and defective explosives are remanded to the military explosive ordnance demolition (IOD) team for proper handling. Waste explosives are burned in the Thermal Treatment Facility (SWMU 102).

Scrap Metal

All of the technical areas and remote test sites have salvage yards (SWMUs 52-54, 57-59, 64-66 and 73-76) for storage of scrap metal, machinery, and other items no longer in use.

Environmental Studies

Several environmental studies have been conducted at the CWLA (Area III) since it opened in 1962. During the first, in 1971, five borings were drilled, cored, and sampled for beryllium, chromium, lead, cadmium, mercury, cyanide and phenols. Four of the five borings were drilled outside of the fenced area, and the fifth boring was near the center of the CWLA although it was approximately 130 feet away from the unlined chromic acid pit (SWMU 8). The cores collected did not contain measurable levels of contaminants (2, Attachment 3). No further information on this investigation was available during this assessment.

The second investigation was conducted in 1978 by SNLA to determine the potential interaction between chromium and soil at the CWLA. During this investigation, the physical and chemical characteristics of soils representative of the site were measured and a one dimensional finite difference computer model was developed to simulate contaminant migration in the unsaturated zone below the site. Soil parameters measured included soil type and classification, particle size distribution, moisture content, hydraulic characteristics, and soil adsorbtion potential (for specific inorganic contaminants). The results of this testing and modeling was not available during this assessment.

The third investigation was conducted in 1981 at the edge of the unlined Pit 2A. During this investigation significant hexavalent chromium concentrations were found in the soil column to a depth of 45 feet; the exact concentrations were not available during this assessment (2, Attachment 3). Beryllium, lead, cadmium, mercury, cyanide and phenols were not detected. As a result of the 1981 investigation a more extensive sampling program was conducted in 1983. Four holes, each 60 feet deep, were drilled in the vicinity of unlined pit 2A (SWMU 2). Cores were collected at five foot intervals and tested for chromium and organic solvents. Solvents were not detected. Hexavalent chromium concentrations ranged from less than 10 parts per million (ppm) to approximately 1000 ppm. The highest concentrations, 1000 ppm, were detected approximately 10 feet below ground surface. Below 45 feet, hexavalent chromium concentrations were generally less than 10 ppm. The exact location of these borings was not available (2, Attachment 3).

In 1985, 12 borings were drilled and 10 trenches excavated to determine the lateral and vertical extent of chemical contamination. The approximate locations of these trenches and borings are shown on Plate 3. Trenches were excavated to a depth sufficient to characterize the general character of the debris. Trench depths varied dependent upon the depth at which debris was encountered; trench depths ranged from three feet in areas where debris was encountered to ten feet in areas where no debris was encountered. Soil samples were collected from trench walls at 25 foot intervals or shorter intervals in areas where visual observation of contamination was noted. Gamma, beta and alpha radiation surveys were conducted in each trench. Samples were analyzed for EPA metals and volatile organics. The twelve borings were drilled to depths ranging from 50 to 70 feet below ground surface. Soil samples, collected at five-foot intervals were used to characterize local subsurface conditions and were submitted for chemical analysis. Samples were tested for EPA metals and volatile organics.

The radiation survey indicated that no sources of radiation were detected in the majority of the trenches. A low level of beta-gamma radiation (6mR/hr) was detected in trench TR-2. The source of this radiation was found to be metal turnings that had once been contained in a bag or bottle. Relatively high concentrations of arsenic hexavalent chromium and lead were measured in trenches TR-3, TR-7, and TR-12. Volatile organic concentrations in the soil were generally low (less than 50 pacts per billion [ppb]). The highest concentration of any organic compound in soil samples was 150 ppb acetone in sample TR-4 at 1 foot depth. Sample

results are presented in Appendix 4. SNLA suggested that the results of the 1985 study show that contamination at the inactive landfill (SWMU 20) is limited to debris; the soil comingled with, adjacent to, and above debris; and soil to a depth of 12 feet below the surface in areas where debris has been identified (10, App. B).

Several documents suggest that SNLA was attempting to obtain a waiver from RCRA ground-water monitoring requirements. However, in a letter from DOE to the New Mexico Environmental Improvement Division (EID) dated July 22, 1986 (31) indicates that four monitoring wells were installed in 1985. The ground water in these wells was sampled in 1985 and 1986. SNLA did not release the results of these analyses during the VSI because results had not undergone internal Quality Assurance (QA). The results of these sampling rounds should be available in the next few months. This was also confirmed during the VSI.

IV ENVIRONMENTAL SETTING

Location and Surrounding Land Use

SNLA is on Kirtland Air Force Base in the foothills of the Manzano Mountains. The laboratory is adjoined by the city of Albuquerque to the north; the Cibola National Forest and the Manzano Mountains to the east; Kirtland Air Force Base (KAFB), the Albuquerque International Airport and undeveloped state land to the west; and open Isleta Pueblo land to the south (Plate 1).

Sandia operations are conducted partly on land owned by the Energy Research and Development Administration (ERDA) partly on KAFB and partly on land withdrawn from the Forest Service's Cibola National Forest. SNLA currently uses 2800 acres of the 52,200 acre parcels of land to conduct testing and to house 285 buildings scattered throughout the area. Remote areas are used for high explosives testing, explosives testing and other hazardous operations (Plate 2).

KAFB residential areas, housing over 5000 residents, lie immediately north and west of Area I; at its closest point housing is 400 feet north of the Area I fence. Base office buildings are present west and northwest of Area I. Air Force recreational facilities, including a golf course, skeet shooting range, and riding stables, lie between Areas I, II and the remote areas (Area III, Area V, and the Coyote Test Field) (39).

The Isleta Pueblo Indian Reservation is populated by approximately 1900 residents (1980 census); these people live in the vicinity of the Rio Grande

River, approximately 7 miles southwest of the site. Pueblo lands immediately south of KAFB are used solely for grazing and act as a buffer zone for Base activities. With an estimated population of 331,767 (1980 census) Albuquerque, New Mexico is the largest population center near SNLA. Estimates indicate that 450,000 people reside within a 50-mile radius of the site (40).

Topography

SNLA is situated on a high arid plateau adjacent to the foothills of the Manzano Mountains and in the foothills of the mountains. The area is dissected by Tijeras Arroyo which divides the Sandia Mountains to the north from the Manzano Mountains in the south, and the Arroyo del Coyote which joins the Tijeras Arroyo southwest of the Manzano Mountains. Elevations across the site range from 5400 feet in the western section of the site near Technical Area I to approximately 8000 feet in the peaks of the Manzano Mountains to the east. In the Technical Areas, at the base of the Manzano Mountains, elevations generally range from 5400 to 5500 feet. This flat-lying area occupies approximately one-half of Sandia's acreage. In more remote areas, south and east of Manzano Base, such as the Coyote Test Field, Madera Canyon and Cibola National Forest, elevations typically range from 5600 to 7000 feet. Regional topography generally slopes to the west, away from the Manzano Mountains (39).

Meteorology

SNLA does not collect site specific meteorologic data. However, meteorologic data is collected at Albuquerque International Airport, three miles west of the site. Generally the climate is mild and dry, but subject to large seasonal variations in temperature and precipitation.

The average daily temperature range is high but extreme temperatures are rare. Winter temperatures range between -5 degrees centigrade (°C) to 11°C; summer temperatures range between 14 and 33°C. The air is normally dry with an average annual relative humidity of about 46 percent; humidity drops to less than 20% in June, the least humid part of the year (39).

Mean annual precipitation in the area is 8.4 inches, net annual precipitation is less than one inch and mean annual snowfall is 10 inches (9). Precipitation is considerably heavier in the Manzano mountains where the remote test areas are located. At the Tijeras Ranger Station (15 miles east of Albuquerque) the average rainfall is more than 15 inches. Over one half of the annual precipitation falls from July through September during short, intense storm events. Winters are generally dry; snow rarely remains on the ground in the valley for more than 24 hours, but in the Manzano mountains snow cover is normal from the middle of December through early spring (39).

Wind movement during the year, under normal conditions, is equally probable in any direction. Wind speeds are generally less than 3.5 meters/second (m/s) and seldom exceed 10 m/s. Prevailing winds are from the east, exiting the Tijeras Pass toward SNLA (1, page 2-5)

Geology

The SNLA site is in the eastern portion of the Albuquerque-Belen Basin, one of the largest in a series of north-trending basins in the Rio Grande trough (90 miles long and 30 miles wide). The Albuquerque-Belen Basin is a graben formed by faulting and uplift along the eastern edge of the center of the Rio Grande rift (Plate 14). The basin is bounded by the Nacimiento uplift to the north, the Sandia and Manzano uplifts to the east, the Socorro channel to the south, and the Lucero uplift and Puerco plateau to the west (39). The basin is widest in the Albuquerque area and constricted to the north and south. Major faulting, deepening of the basin, and tilting of the surrounding mountains occurred in late Miocene time. Subsequent basin deposits have been laid down in a sequence of complex layers.

The Albuquerque-Belen Basin is filled with unconsolidated to consolidated valley sediments ranging from approximately 20 feet thick near the Sandia and Manzano uplifts to over 20,000 feet thick in the deepest parts of the basin (1, page 2-6). Bedding is lenticular, faulted, folded and difficult to correlate.

Valley fill below the site consists of the Quaternary and Tertiary age alluvium which comprise the the Santa Fe Formation sands. These sands are composed of unconsolidated to loosely consolidated sediments, interbedded with volcanic rocks derived from erosion of the Sandia and Manzano mountains. The uppermost unit of the Santa Fe Formation, the Cejas Member, is sandy gravel with minor lenses of mud, sand, and volcanic ash. It is estimated to be 100 to 150 feet thick. The thickness of the entire Santa Fe

Formation has not been determined at the facility; however, it could be up to 9000 feet thick (1, page 2-9) (39).

Sedimentary rocks, underlying the alluvium (Santa Fe Formation) extend 10,000 feet below sea level (15,000 feet below ground level). These sedimentary rocks rest on Precambrian rocks which underlie the entire basin and lift up to form the western plateaus and eastern mountains.

The facility is near the western edge of Manzano uplift, adjacent to pervasive faulting at the uplift margin. The most significant on-site feature is a 35-mile long fault zone, splitting the site from north to south. The fault zone is approximately 2 miles wide and is comprised of the Hubbell Springs, Manzano and Tijeras faults and the Travertine Hills (Plate 14). The Hubbell Springs fault exhibits spectacular fault scarps in the area; the most recent movement on this fault is thought to be pre-Holocene (43). The Manzano fault is a major rift-bounding normal fault at the base of the Manzano Mountains; movement along the fault probably contributed to the sharp mountain front. The Tijeras fault is truncated by the more-recent Hubbell Springs fault. The most recent movement of the fault is probably pre-Pleistocene (43). The Travertine Hills are aligned in a north-south direction approximately one-half mile east of the Hubbell Springs fault. The occurrence of these travertine deposits near the intersection of the Hubbell Springs and Tijeras faults suggests that groundwater may have historically migrated upward along the fault system (43).

Surface Water and Floodplain

The plateau on which SNLA is located has a generally west-southwesterly ground surface slope ranging from 250 feet per mile near the mountains to 20 feet per mile near the Rio Grande, about 7 miles west of SNLA (39).

Surface drainage is dominated by the Tijeras Arroyo which cuts the site from northeast to southwest between Technical Area II and Manzano Base, and the Arroyo del Coyote which crosses the site from southeast to northwest between Technical Area III, the Coyote Test Field and Manzano Base. In addition, numerous small drainages originate in the mountains and discharge to the plateau; Lurance Canyon, Madera Canyon, and Sol Se Mete Canyon are the major drainages originating in the mountains. Tijeras Arroyo and its tributaries drain the northern half of KAFB; Arroyo del Coyote and its tributaries drain the southern section of the area (Plate 14). These arroyos eventually discharge to the Rio Grande River.

During heavy rainfall, the higher interfluvial regions in the foothills drain by sheet flow into small gullies and rivulets; during periods of intense rainfall generated surface flow is carried to the Arroyo del Coyote and Tijeras Arroyo from Madera, Lurance and Sol Se Mete Canyons. Generally, discharges to the arroyos are intermittant; water flowing in the arroyos typically evaporates or infiltrates over short distances. In flat-lying areas on the plateau, overland sheet flow toward the arroyos can develop during intense rainfall. However, because of the arid environment, the typically short duration of storms and the permeable nature of surface soils, most of this flow tends to infiltrate before actually reaching the arroyos.

SNLA describes the 100-year floodplain of the Tijeras Arroyo and the Arroyo del Coyote in their Part B application (1, Figure 207) and states that all Technical Areas are outside the 100-year floodplain. However, several inactive SWMUs are located immediately adjacent to the arroyos and could be in the 100-year floodplain. In addition, several SWMUs are located in Lurance, Madera and Sol Se Mete Canyons. Because floodplain elevations are not given, actual horizontal limits could not be determined from the available information.

In order to evaluate the potential for a release to surface water it has been necessary to assume that floor plain elevation information provided by SNLA is correct. Release potentials could change significantly if floodplain elevations indicate that Technical Areas are within the limits of the 100-year floodplain.

Surface water run-on and runoff are controlled in some site areas by berms and diversion channels. Run-on and runoff control appear to be discontinuous across the site. Both ground water and surface waters are used for domestic and agricultural water supply

Regional Ground Water

The major subsurface ground-water reservoir underlying the region is the Albuquerque Ground-Water Basin. The reservoir is a national resource area defined by the state as a "declared underground water basin" and regulated by the state as a sole source of potable water. The reservoir is bounded on the west by the Lucero uplift and on the east by the Sandia-Manzano mountains.

The major aquifer is in the Santa Fe Formation Sands. The aquifer is predominantly unconfined, although confined conditions may exist locally due to the presence of discontinuous lenticular silt and clay deposits. Ground water generally occurs a few hundred feet below ground surface and the water table generally slopes toward the Rio Grande at an average gradient of 10 feet per mile. Local variations in ground-water flow may occur due to extraction from deep municipal water supply wells. Aquifer transmissivity is estimated at 200,000 gallons per day per foot (gpd/ft) with a storage coefficient of 0.2; ground-water flow velocities are estimated at 20 feet/year (39).

In recent years annual ground water extraction in the Albuquerque area has been approximately 25,000 acre-feet per year pumped from approximately 300 large municipal and irrigation wells, and a number of private low-discharge wells. Extraction is expected to increase to over 220,000 acre-feet per year by the end of the century. Well yields currently average several hundred to several thousand gallons per minute.

Under natural conditions, recharge to the ground water system occurs largely along the mountain fronts, particularly where small canyons open onto alluvial fan deposits; ground water flow is from these areas toward the Rio Grande. During periods of heavy pumpage local reversals of gradient may occur, and recharge from the Rio Grande to the aquifer may take place. Except along the mountain front and at the Rio Grande, recharge potential is low; most rainfall tends to evaporate or to be transpired by vegetation before it can reach the water table (39).

Fresh water is present in appreciable quantities in the Albuquerque Basin. Salinity seems to increase with depth; consequently, ground water at great depths may not be suitable for water supply.

Local Groundwater

Depth to ground water at the facility appears to be affected by the Hubbell Springs Fault. East of the fault, the water table is less than 100 feet deep; west of the fault, depth to water is approximately 450 feet or more below ground surface; springs in the vicinity of the fault indicate that groundwater discharges to the ground surface in this zone. The presence of the travertine deposits near the intersection of the Hubbell Springs and Tijeras faults also suggests that groundwater migrates upward, toward ground surface in this area. A 1985 ground-water investiga- tion conducted at SNLA west of the Hubbell Springs fault found the depth to ground water to be 500 feet (1, pages 2-8 and 2-11). Another study, performed at Kirtland Air Force Base in 1981, located ground water east of the fault at a depth of 54 feet (38, page 10). A local supply well drilled in Lurance Canyon in 1986 is 400 feet deep and encountered ground water at 320 feet below ground surface.

There are 14 active supply wells on KAFB, ranging in depth from 900 to 1199 feet. These wells are used for municipal and domestic supply and pump intermittently during the summer. Depth to water in these wells ranges from

480 to 580 feet below ground surface; all of the wells are west of the Hubbell Springs Fault (40).

In 1945, ground water below KAFB flowed toward the south. Subsequent extraction caused the water levels to decline up to 120 feet and has resulted in local reversal of the gradient. Ground water west of the Hubbell Springs fault currently appears to be moving northwest, toward existing municipal water supply wells (Plate 15) (9).

Ground water on either side of the fault zone occurs in the Santa Fe Formation sands; however, the continuity of the aquifer across the fault system is not well defined. Little information was available on ground water occurrence and movement within the fault zone and in the foothills east of the fault zone. Groundwater occurrence and movement west of the fault zone is better defined (9,40). In order to evaluate the potential for a release from a SWMU, at any given location, the information provided in these references is assumed to be correct.

V RELEASE PATHWAYS

Ground Water/Soils

Ground-water surface elevations vary across the site within the Santa Fe Formation due to the presence of the fault zone. In the vicinity of the plateau containing Technical Areas I through V and the CTF, the area west of the Hubbell Springs fault, groundwater is known to be approximately 450 feet below ground surface (Plate 15). Within the fault zone, bounded by the Hubbell Springs and Manzano faults (Plate 14) groundwater is throught to be at or near ground surface. East of the fault zone, in the foothills of the Manzano Mountains depth to groundwater may be 100 feet or less. The presence of springs in Lurance and Sol Se Mete Canyons, suggests that in some areas of the foothills groundwater may discharge to the surface. Ground water west of the fault zone currently flows northwest toward a number of active irrigation and municipal supply wells. The direction of groundwater flow within and east of the fault zone is not known.

Subsurface soils are generally permeable sand and gravel with discontinuous lenticular silt and clay. Liquids could easily migrate vertically in these materials.

SNLA has historically disposed of large volumes of containerized and free liquid wastes in landfills, and free liquids in surface lagoons. A previous investigation indicated that buried 55-gallon drums and an unlined chromium waste pit have leaked, causing shallow soil contamination (10).

The potential for liquid contamination to reach ground water east of the Hubbell Springs Fault, is high due to the shallow depth to water, and the permeability of subsurface materials. West of the fault the potential for ground water contamination is lower due to the greater thickness of unsaturated materials.

Surface Water

On-site berms and diversion channels may not contain all run-on and runoff at the site. Several SWMUs are immediately adjacent to Arroyo del Coyote and Tijeras Arroyo. During periods of heavy rainfall, site runoff can enter tributaries to the arroyos and eventually may enter the arroyos. There is a high potential for releases to surface water runoff from SWMUs located in the canyons in the foothill areas and from SWMU's in the arroyos as opposed to SWMUs located in the flat areas.

Generally discharges from canyons in the foothills, and discharges through the arroyos are intermittent, resulting primarily from runoff generated during intense, short storm events. Due to the arid environment and permeable nature of surface soils water flowing in the arroyos and their tributaries typically infiltrates and/or evaporates over short distances. It is extremely unlikely that intermittant surface water flow generated at the site could reach the Grande River which is the closest perennial body of water located approximately 7 miles from the site. Therefore the potential for a release to surface water is generally low.

Air Emissions

The potential for air emissions is high because of the high vapor pressures and explosive nature of chemicals handled at the facility. Site inspections (26, 11) have indicated that incompatible liquid wastes have been combined and fires have occurred due to reactions among wastes (10, page 4-1). A hydrochloric acid spill in 1983 created a noxious cloud causing facility personnel to use self-contained breathing units until the spill was cleaned up (37, page 1). This past history indicates that air releases may occur in the future. However, most liquid waste is contained in 55-gallon drums or buried in landfills, which reduces the potential for air emissions.

Subsurface Gas

The potential for subsurface gas generation (specifically methane gas) at the facility is generally low due to the nature of the wastes. Potential for gas generation would be higher in areas where garbage or other decomposable organic matter has been disposed.

VI UNIT SUMMARIES

SWMUs 1 through 6: Unlined Pits Numbers 1, 2A, 2B, 3, 4, 5 - CWLA

UNIT DESCRIPTION: Six unlined pits are located in the southern portion of the chemical waste landfill area (CWLA). IT Corporation identified these RCRA-regulated landfill pits in their SWMU report (9, 13). The pits were constructed by excavating into the natural soil to a depth of about 9-10 feet. Pit 2 is divided into two separate areas for disposal of oxidizers (2A) and reducers (2B). Dimensions of these areas are provided below.

The natural soils beneath the landfill area consist of a sandy clay loam with a permeability of 10^{-2} to 10^{-3} cm/sec (15, page 9-4.)

DATE OF STARTUP: The chemical landfill, and subsequently the six unlined pits have been in operation since early 1962.

DATE OF CLOSURE: Closure and post-closure plans have been prepared for the unit. SNLA plans to close the landfill in accordance with 40 CFR 265, Subpart G and 40 CRF 265.310. Pits 1, 2, and 3 may have closed between July 26, 1982 and January 26, 1983. Based on the available information, Pit 4 is the only active portion of the area.

No post-closure action 7/87

WASTE MANAGED: The horizontal dimensions and the wastes placed in the pits are as follows:

Pit	Waste	Dimensions (feet)
1	Acids	26 x 13
2A	Oxidizers	46 x 16
2B	Reducers	26 x 14
3	Organics	42 x 18
4	Reactives	26 x 17
5	Metals, Salts, Neutral Compounds	50 x 16

A New Mexico Environmental Improvement Division (EID) inspection in March 1985 cited the presence of free liquids in a landfill (6). The landfill was only identified by its location in Technical Area III. As previously indicated, Pit 4 is reportedly the only active pit in this area; therefore it was probably the area referred to in the EID inspection report.

According to SNLA, wastes contained in 55-gallon drums, plastic bags, and other containers are buried in the pits. SNLA also indicates that noncontainerized free liquids were disposed of in landfill pits prior to November 19, 1981, and that containerized free liquids were disposed of prior to March 22, 1982 (10, page 2-6). An EPA inspection on May 10, 1983 noted that incompatible wastes were stored in the same area of the CWLA and that untreated reactive and ignitible wastes were placed in the CWLA (10, page 1-3). Wastes disposed of in the CWLA in 1985 include, but are not limited to, those listed in Appendix 6 (Table 2).

RELEASE CONTROLS: Surface-water run-on and run-off is locally controlled by grading. The fenced site is inspected weekly, and access is limited to authorized personnel.

HISTORY OF RELEASES: A release of chemical waste occurred when a fire started, initiated by a reaction between incompatible waste. Records on the extent, duration, and consequences of the fire are unavailable (10, page 4-1). Previous investigations conducted by Sandia (10, 41, 43) indicate that hexavalent chromium, arsenic, lead, and organic chemicals have been released to soils.

CONCLUSIONS:

Air. The potential for prior releases to air is high since fires have occurred. Incompatible and unneutralized ignitible and reactive waste have been placed in the landfill pits. Subsequent reactions may generate hazardous vapors which could penetrate pit covers and be released. Because the thickness of the soil cap over the unlined Pits 1, 2A, 2B, 3, and 5 is unknown, the potential for release to air is high. The potential for Pit 4 to release waste to the air is also high since it is reportedly active and no information was available regarding whether wastes are segregated in this pit.

Soil. Releases to soil have been documented. The potential for ongoing releases to soil is high since the pits remain unlined and contaminated soils remain in place.

Surface Water. The six landfill pits are below grade. Run-on and runoff are controlled by berms, ditches, and the surface water collection pond (SWMU 9). Therefore the potential for releases to surface waters is low.

Ground Water. Releases to ground water from this unit area RCRA-regulated and are therefore not addressed in this report.

Subsurface Gas. The potential for methane generation appears to be low, based on the kinds of wastes disposed of in the landfill pits. However, as previously described, there is a high potential for the generation of other hazardous vapors and gases.

SWMU 7: Lined Chromic Acid Pit

UNIT DESCRIPTION: The lined chromic acid pit is located in the CWLA in Technical Area III. This lined pit is RCRA-regulated. The pit measures approximately 15 feet by 15 feet (interior dimensions) and is about 5 feet deep. SNLA's Part A application indicates the pit has a maximum capacity of 10,000 gallons (12). The impoundment was constructed by excavating into natural soils.

Disposal involved placing small quantities of untreated liquid waste in the pit and allowing the volatile portion to evaporate, leaving only the residue in the lined pit. EID and EPA inspection reports indicate a minimum of 2 feet of freeboard at the time of inspection (6, page 206).

During the VSI, SNLA personnel identified an open pit in the northern portion of the CWLA as the lined chromic acid pit. Although most of the pit was filled with snow, some of the sidewalls were visible and no liner appeared to be present.

DATE OF STARTUP: Although no records have been kept, SNLA indicates that the only known use of the pit was for waste disposal between 1979 and 1982 (11, page 2-2).

DATE OF CLOSURE: The surface impoundment's closure plan calls for closure as soon as practical.

WASTE MANAGED: Liquid chromic acid and ferric chloride were disposed in the unit. Information regarding the volume of wastes disposed in this unit were unavailable during this assessment.

RELEASE CONTROLS: The pit liner system reportedly consists of a 10-inch-thick bentonite clay layer covered by two Hypalon liners, and 18 inches of sand over the Hypalon liners.

HISTORY OF RELEASES: No known releases have occurred, according to SNLA personnel.

CONCLUSIONS:

Air. Vapor releases from the pit could occur if the impoundment received volatile waste. However, the impoundment has not handled waste since 1982 and historically received only chromic acid and ferric chloride; therefore, the potential for releases to air are unlikely.

Soil. The potential for release to soil is low because the pit is reportedly double lined.

Surface Water. The pit is protected from surface water run-on by berms and ditches around the CWLA. Site investigation reports indicate that a 2-foot freeboard is maintained. Therefore the potential for a release to surface waters appears to be low.

Ground Water. Releases to ground water from this unit are RCRA-regulated and therefore not addressed in this report.

Subsurface Gas. Subsurface gas generation is unlikely due to the nature of the waste and the design of the unit.

SWMU 8: Unlined Chromic Acid Pit

UNIT DESCRIPTION: The unlined chromic acid pit is a RCRA-regulated unit located in the CWLA Technical Area III.

The pit was constructed by excavating into the natural soil and is below grade. The size and capacity of the unit are unknown. This pit could not be observed because it has been filled with soil.

DATE OF STARTUP: Unknown.

DATE OF CLOSURE: The pit may have ceased receiving wastes prior to 1978 (2, Attachment 3) or sometime in 1980 (10, page 6-1).

WASTES MANAGED: The pit received chromic acid and chromium wastes (10, page 6-1). Records of materials disposed at this site prior to 1980 were not maintained continuously during operations and an accurate estimate of the amount of chromic acid deposited within this unit is not available.

RELEASE CONTROLS: Management practices at the pit are unknown. Run-on and runoff are controlled by a network of ditches and berms around the CWLA.

HISTORY OF RELEASES: Studies conducted in 1981 and 1983 confirmed that hexavalent chromium had been released to a depth of 45 feet in soil beneath the unit. Further studies have suggested (41) that the contaminant plume will continue to migrate vertically due to rainfall infiltration. The migration rate was estimated at 30 cm/yr.

A release of hexavalent chromium to soil from the unit has been documented (2, Items 3 and 4).

During the VSI, SNLA personnel stated that yellow stains are visible inside the unlined chromic acid pit.

CONCLUSIONS:

Air. It is likely that prior releases to air have occurred based on past waste management operations. However, the pit has not received wastes since at least 1980. Therefore, the potential for ongoing releases to air is low.

Soil. Past releases to soil have been documented. The current potential for continued migration is high because the pit is not lined or covered and rainfall percolating in the area could drive the existing chromium contamination deeper.

Surface Water. The unit is below grade. Berms, ditches, and the surface water collection pond (SWMU 9) control run-on and runoff. Therefore, the potential for releases to surface water is low.

Ground Water. Releases to ground water from this unit are RCRA-regulated, and therefore not addressed in this report.

Subsurface Gas. Due to the nature of the wastes, the potential for subsurface gas generation is low.

SWMU 9: Surface Water Collection Pond

UNIT DESCRIPTION: The surface water collection pond is located adjacent to the west side of the CWLA (Plate 3). The pond is approximately 10 feet wide and 415 feet long. It is not lined.

This unit is used to collect surface water runoff from the CWLA (10, 3-1). Water is diverted from the CWLA to the pond by a network of run-on diversion ditches and run-on/runoff berms. Based on information obtained during the VSI, the collection pond has never contained water; however, the soil has been found by Sandia personnel to be moist at various times. The exact depth of the pond is not known, but appeared to be less than 10 feet during the VSI. No additional information regarding the unit was available.

The pond was filled with snow and sagebrush at the time of the VSI..

DATE OF STARTUP: Unknown; because the CWLA has been operational since early 1982, it is likely that this unit may have commenced at the same time.

DATE OF CLOSURE: Active.

WASTE MANAGED: Surface runoff may contain waste constituents released from SWMUs in the CWLA (10, 3-1).

RELEASE CONTROLS: None were observed during the VSI.

HISTORY OF RELEASES: Information obtained during the VSI suggests that the collection pond has never contained water; hence, it is unlikely that a release from this unit has occurred. No evidence of release was noted during the VSI.

CONCLUSIONS:

Air. Because the pond receives only surface runoff from the CWLA, the potential for a release of waste constituents to air is unlikely.

Soil. Although SNLA personnel stated that this unit has never been used, the potential for it to receive wastewater (runoff) is high. Therefore, the potential for a release to soils within this unlined unit is high.

Surface Water. This unit is below grade and has sufficient capacity to contain a large quantity of runoff. This unit is also located on a relatively flat lying, permeable surface in an arid environment. Precipitation events are relatively infrequent. It is likely that any runoff from this unit would be subject to evaporation and infiltration shortly after release. Therefore, the potential for release to surface water is low.

Ground Water. This unit is located on the plateau west of Hubbell Springs fault and the fault zone. Ground water in this area is known to be at least 450 feet or more below ground surface. Therefore, the potential for release to ground water is low.

Subsurface Gas. Due to the nature of wastes managed, there is no potential for the generation of subsurface gas.

SWMUs 10 and 11: Building 6924 - Runoff Pit and Basin

UNIT DESCRIPTION: These units are north of the Chemical Waste Landfill (CWLA) Area in Technical Area III (Plate 12). During the VSI, SNLA personnel explained that liquid wastes generated in Building 6924 were discharged through a culvert to the runoff pit from which they drained to the basin. Wastes in the basin were subsequently burned. No additional information regarding the management of wastes in these units was available.

The culvert is an unlined trench approximately 2 feet wide and less than 5 feet deep. It is constructed with concrete walls and extends from Building 6924 to the runoff pit--a distance of approximately 30 feet.

The runoff pit is a shallow (less than 5 feet deep) depression surrounded by corregated steel and is approximately 20 feet in diameter. The bottom of the pit is unlined.

The basin is an unlined excavation approximately 30 feet x 30 feet and 6 to 10 feet deep. Apparently, liquid wastes were discharged via an underground pipe from the pit to the basin. No further information regarding the piping was available.

DATE OF START UP: Approximately 1969.

DATE OF CLOSURE: Inactive since approximately 1971.

WASTES MANAGED: Washdown water from explosive synthesis. Small quantities of solvents.

RELEASE CONTROLS: The runoff pit and associated culvert have above-grade sidewalls to prevent run-on/runoff. No release controls for the basin were observed during the VSI.

HISTORY OF RELEASES: No information is available regarding releases from these units, according to SNLA personnel.

CONCLUSIONS:

Air. Because burning occurred in the basin in the past, prior releases of waste constituents occurred. The potential for prior releases of volatile constituents from solvents discharged to the runoff pit and basin is high because these are open-top units. Because these units no longer receive wastes, the potential for current releases to air is low.

Soil. Because the pit and basin are unlined, releases to soils within the pit (and associated culvert) and basin probably occurred in the past. Although the unit is no longer in use, contaminated soils may still be present. Therefore the potential for ongoing releases is high.

Surface Water. Run-on/runoff controls do not appear to be present at the basin; therefore, the potential for release to surface water runoff from this unit is high. However, both the runoff pit and basin are located on a relatively flat-lying, permeable surface in an arid environment. Precipitation events are relatively infrequent; therefore it is likely that any runoff from these units would quickly evaporate or infiltrate and would not migrate far.

Ground Water. These units are located on the plateau west of Hubbell Springs fault and the fault zone. Ground water in this area is known to be at least 450 feet or more below ground surface. Therefore, the potential for release to ground water is low.

Subsurface Gas. Due to the nature of the waste, the generation of subsurface gas at this unit is unlikely.

SWMU 12: Area IV Lagoon

UNIT DESCRIPTION: The Area IV lagoon is in Technical Area IV (Plate 13). SNLA states that this unit has "just recently attained inactive status" and defines inactive as not in use after November 8, 1985. However, during the VSI, the unit appeared to be active because it was filled with water.

Wastewater from accelerator facilities in Technical Area IV is discharged by gravity flow to this unit through underground piping after oil has been removed by an oil/water skimmer (SWMU 82). This unit is unlined, approximately 15 feet deep with dimensions of 75 feet x 75 feet. During the VSI, facility personnel stated that an oil sheen can be noticed on the lagoon water when the water is not frozen, and on the sides of the lagoon when the water level is low. The bottom of the lagoon could not be observed during the VSI because the lagoon was filled with snow.

No information regarding the underground piping between the oil/water skimmer and the lagoon was available during the VSI.

DATE OF STARTUP: Estimated to have been constructed in the 1970s.

DATE OF CLOSURE: The unit appears to be active.

WASTES MANAGED: Wastewater containing residual waste hydraulic oil and water from accelerator facilities.

RELEASE CONTROLS: The lagoon is unlined. The outer sidewalls are graded to prevent run-on. During the VSI there was about three feet of freeboard.

HISTORY OF RELEASES: During the VSI, there were no signs of overtopping. Oil stains were visible along the sidewalls of the lagoon.

CONCLUSIONS:

Air. Because most of the oil in the wastewater discharged to this unit is, by design, removed by SWMU 82, the potential for significant releases of volatile constituents to air is low depending on the efficiency of SWMU 82.

Soil. Because the lagoon is unlined, and oil stains are visible along the sidewalls of the lagoon, the potential for releases to soils within the lagoon is high.

Surface Water. During the VSI, three feet of freeboard was noted. In addition the sidewalls are graded to prevent run-on. Therefore the potential for release to surface water appears to be low.

Ground Water. Although the lagoon is unlined, this unit is located on the plateau west of Hubbell Springs fault and the fault zone. Ground water in this area is known to be at least 450 feet or more below ground surface. Therefore, the potential for release to ground water is low.

Subsurface Gas. The potential for subsurface gas generation is unlikely due to the nature of the waste and the design of this unit.

SWMU 13: Lurance Canyon Lagoon

UNIT DESCRIPTION: The Lurance Canyon Lagoon is in Lurance Canyon in the foothills of the Manzano Mountains (Plate 13). SNLA states that the unit was active between the years of 1970 and 1980. The unit is approximately 50 feet deep, unlined, and below grade.

The waste stream discharged to this unit was generated during classified experiments. During these experiments, test objects were placed in a containment basin filled with water and jet fuel. Jet propellent (JP-4) was ignited; the resultant waste-water was discharged through an underground corregated piping system to the lagoon. Water in the lagoon was allowed to evaporate or infiltrate into soils within the lagoon while oil from the waste-water remained on the soil surfaces. Facility personnel stated that the lagoon was used only a few times. No wastewater was present in the lagoon at the time of the VSI. No information was available during the VSI regarding the corregated piping system. The distance between the lagoon and the experimental basins appeared to be approximately 400 feet during the VSI.

DATE OF START UP: Estimated by SNLA personnel to be in the 1970s.

DATE OF CLOSURE: Reported to have been inactive (no longer received wastes) in 1980. Unit was reportedly closed in 1985. Details of the closing procedures were not available during the VSI.

WASTES MANAGED: Waste placed in this unit is described by SNLA personnel as an immiscible mixture of water and fuel oil, and burnoff residue.

RELEASE CONTROLS: The lagoon is unlined; no release controls were noted during the VSI.

HISTORY OF RELEASES: Based on the information regarding waste management operations obtained during the VSI, some releases of oil and other petroleum hydrocarbons to soil within the lagoon have occurred. Releases to soil could not be verified during the VSI because the lagoon was filled with snow.

CONCLUSIONS:

Air. Fuel oil and burnoff residue contain volatile components that would be released to the atmosphere. Therefore, historic potential for release is high. However, the current potential for release is low because the unit is inactive and no longer receives wastewater.

Soil. Releases of oil to soil have been documented. Because the unit is unlined, precipitation occurring in the area could drive the released waste more deeply into subsurface soils. Therefore, although the unit is inactive, the potential for ongoing releases is high.

Surface Water. Run-on/runoff controls do not appear to exist at this unit. However, the lagoon appears to be of sufficient capacity to have contained all wastewater generated by the burn experiments and any run-on from precipitation. Therefore, the potential for overtopping and release to surface water is low.

Ground Water. This unit is located in the foothills of the Manzano Mountains, east of the fault zone. Depth to ground water in this area is not well defined; however, the limited well information available and the presence of springs in the foothill canyons indicates that depth to ground water may vary from ground surface to 100 feet below ground surface. Therefore, since ground water appears to be shallow in this area, the potential for release is high.

Subsurface Gas. There is no potential for subsurface gas generation and release due to the nature of the wastes managed and the design of this unit.

SWMUs 14 and 15: Pick Ax Pit and Lagoon

UNIT DESCRIPTION: Pick Ax Pit is a concrete lined, below grade circular pit. The sides of the pit are lined with metal. The pit is less than 5 feet in diameter. Adjacent to the pit is a below grade, unlined lagoon, approximately 15 by 20 feet in diameter and less than 5 feet deep. The boundary of the lagoon is marked with green metal posts. Connecting the pit and lagoon is a concrete-lined culvert approximately 2 feet wide, 2 feet deep and less than 10 feet long. The sides of this culvert is lined with metal. SNLA personnel stated during the VSI that the exact function of these units is not known. It is likely that liquid wastes were first dicharged to the pit from which they eventually discharged via gravity flow to the lagoon. Both the pit and lagoon were filled with snow and sagebrush during the VSI so the bottom of each of these units could not be inspected.

DATE OF STARTUP: Unknown.

DATE OF CLOSURE: These units are inactive.

WASTES MANAGED: Liquid wastes from high explosive testing and security research material. Specific constituents are unknown.

RELEASE CONTROLS: The pit is lined with concrete and metal. The lagoon is unlined.

HISTORY OF RELEASES: Unknown.

CONCLUSIONS:

Air. The exact nature of the wastes managed at this site is unknown; therefore the potential for prior releases cannot be determined. Because the unit is no longer in use the current potential for ongoing release to air is low.

Soil. Releases to soil in the unlined lagoon have probably occurred in the past since the lagoon is unlined. However, the exact nature of the materials at this site is unknown; therefore, the potential for release to soil cannot be determined for either unit.

Surface Water. Since limited information regarding release controls is available, the potential for release to surface water cannot be determined.

Ground Water. This unit is located on the plateau west of Hubbell Springs fault and the fault zone. Ground water in this area is known to be at least 450 feet or more below ground surface. Therefore, the potential for release to ground water is low.

Subsurface Gas. The exact nature of the materials at this site is unknown, however, because it appears that wastes were discharged to surface units, the potential for release of subsurface gas is low.

SWMUs 16 and 17: Area V - Seep Pits

UNIT DESCRIPTION: Two clay pits are reported by SNLA to be located on the west side of Building 6580 (Plate 14). Waste from the Area V hot cell laboratory and reactor was discharged to the Area V holding tank (SWMU 98) to allow for decay of short-lived fission products, then discharged to the underground clay pits to seep into subsurface soils. In 1970, one of the pits collapsed, and use of the pits was discontinued. During their useful life, the pits may have received up to 12,000 gallons of fluid per day (40). The size, depth, and exact location of the pits is unknown. It is not known whether the pits were covered.

DATE OF STARTUP: Unknown.

DATE OF CLOSURE: Inactive since 1970.

WASTES MANAGED: Radioactive liquid effluents and short-lived fission products from the Area V hot cell laboratory and reactor facility.

RELEASE CONTROLS: Pits were clay-lined. The thickness of the clay lining is unknown.

HISTORY OF RELEASES: Unknown.

CONCLUSIONS:

Air. Due to the limited information regarding the design of these pits, the potential for release to air cannot be determined.

Soil. Releases to soils within the pits occurred based on the information available regarding past waste management practices. Ongoing releases to soils may be occurring if contaminated soils remain in place.

Surface Water. Due to the limited information regarding the design of the pits, the potential for release to surface water cannot be determined.

Ground Water. This unit is located on the plateau west of Hubbell Springs fault and the fault zone. Ground water in this area is known to be at least 450 feet or more below ground surface. Therefore, the potential for release to ground water is low.

Subsurface Gas. Due to the nature of the wastes managed, the potential for subsurface gas generation is unlikely.

SWMUs 18 and 19: Area V - East and West Surface Impoundments

UNIT DESCRIPTION: These units, in the north part of Area V (Plate 12), consists of two unlined impoundments. The western impoundment has dimensions of 100 x 50 feet and is 30 feet deep. The eastern impoundment has the same dimensions, but is 20 feet deep. These units collect wastewater discharged from the Area V holding Tank (SWMU 98) which receives waste from the Area V hot cell laboratory and reactor, and from floor drains and sinks in Building 6580. Activities in Building 6580 (located in Area V) are classified; as such SNLA personnel could not discuss possible waste types generated in this building. Information regarding the underground piping system between the Area V holding tank (SWMU 98) was not available during the VSI. The impoundments, were investigated by SNLA personnel 1 1/2 years ago; there was reportedly no indication of radioactivity in surface soils at that time.

During the VSI, a liquid was noted to be discharging into the eastern impoundment from the underground piping system. However, no ponded water was observed at the bottom of the eastern impoundment. The western impoundment was also empty.

DATE OF STARTUP: Estimated by SNLA personnel to be 1970.

DATE OF CLOSURE: Active.

WASTE MANAGED: Wastewater discharged from Area V holding tank (SWMU 98) reported to be low level radioactive wastes and fission products.

RELEASE CONTROLS: None observed during the VSI.

HISTORY OF RELEASES: None reported during the VSI.

CONCLUSIONS:

Air. Due to the nature of the waste types manage, the potential for particulate or volatile releases is unlikely.

Soil. Since the impoundments are unlined excavations and receive wastes, releases to soils within the impoundments have occurred. The potential for ongoing releases to soils is high since the impoundments are active and remain unlined.

Surface Water. These units are below grade and would contain a large amount of runoff. These units are located on a relatively flat lying, permeable surface in an arid environment. Precipitation events are relatively infrequent. Therefore, the potential for release to surface water is low.

Ground Water. This unit is located on the plateau west of Hubbell Springs fault and the fault zone. Ground water in this area is known to be at least 450 feet or more below ground surface. Therefore, the potential for release to ground water is low.

Subsurface Gas. Due to the design of these units and the nature of the wastes managed, the potential for subsurface gas release is unlikely.

SWMU 20: Inactive Landfill

UNIT DESCRIPTION: The inactive landfill includes nearly all the acreage within the fences at the CWLA (Plate 3). The unlined pits and trenches in the inactive portion of the landfill were constructed by excavating into the natural soil. After wastes were disposed, they were covered with a soil cap of unknown thickness. No information was available regarding the number, size, capacity, and location of disposal pits. For these reasons, the entire area is considered to be a single SWMU. The unit is RCRA-regulated.

DATE OF STARTUP: SNLA has operated the landfill since approximately 1962.

DATE OF CLOSURE: Unknown.

WASTES MANAGED: The site has received an undetermined range of chemicals disposed of in 55-gallon drums, plastic bags, and glass bottles, and as uncontainerized solid and liquid wastes. It has been estimated that 22,500 cubic yards of waste, waste residue, and contaminated soil are buried in trenches in the landfill. Inventory records for wastes disposed of in the landfill are not available.

RELEASE CONTROLS: The landfill pits and trenches are unlined. The landfill is above the 100-year flood plain. Surface-water run-on and runoff are controlled by berms and ditches in the CWLA.

HISTORY OF RELEASES: A 1985 investigation found that contamination was largely confined to areas adjacent to, beneath, and within formerly utilized disposal pits and trenches. A variety of chemicals disposed at the site could migrate through soils without significant adsorption, and therefore not be detected.

CONCLUSIONS:

Air. Since all the pits are inactive and covered with a soil cap, the potential for a release to the air is generally low. However, incompatible wastes may have been comingled, and subsequent reactions could generate hazardous vapors which could penetrate the landfill cover. Without knowledge of exact locations and kinds of wastes disposed, and thickness of the soil cap it is difficult to further evaluate the potential for hazardous vapor or gas releases.

Soil: Releases to soil have been documented. The continued potential for release to soil is high since wastes remain in place in unlined pits or trenches.

Surface Water. Run-on and runoff are controlled by a network of berms and ditches in the CWLA. The unit is below the ground surface and covered by a layer of soil. Therefore, the potential for releases to surface water is low.

Ground Water. Releases to ground water from this unit are RCRA-regulated and are therefore not addressed in this report.

Subsurface Gas. As it appears that the landfill was used primarily for the disposal of chemical waste, and not rubbish, the potential for methane generation is probably low. However, there is a high potential for the generation of other hazardous vapors and gases, as previously discussed.

SWMU 21: Tijeras Arroyo Dump

UNIT DESCRIPTION: This abandoned dump is in Arroyo Del Coyote, southwest of Manzano Base (Plate 13). Little is known about this site. Information was not available regarding site construction, disposal methods and volumes, size of unit or exact waste disposed.

The unit is probably in the 100-year flood plain of the arroyo.

Only a few isolated chunks of concrete and one small (less than 20 gallons) extremely weathered drum was observed at this site during the VSI. It is unknown whether other wastes are present, whether wastes were buried or if wastes were removed from this site.

DATE OF STARTUP: Unknown.

DATE OF CLOSURE: The site is inactive. The date when waste was last received is unknown.

WASTES MANAGED: Exact waste types are unknown but wood, metal debris, and waste oil were disposed in this dump (9, App. B). Scrap building material is also thought to have been disposed here.

RELEASE CONTROLS: None observed during the VSI.

HISTORY OF RELEASES: None reported.

CONCLUSIONS:

Air. Due to the unknown nature of material disposed at this site, the potential for releases to air cannot be determined.

Soil. If waste oil and other liquids were disposed, the potential for a release would be high because of permeable soils in the area. Because waste containment procedures and the exact nature of materials disposed at the site are not known, the potential for release to the soil cannot be determined.

Surface Water. Since this dump is located in an arroyo, the potential for release to surface water is high.

Ground Water. Although this unit is located in an arroyo where surface water could percolate through subsurface soils, This unit is located on the plateau west of Hubbell Springs fault and the fault zone. Ground water in this area is known to be at least 450 feet or more below ground surface. Therefore, the potential for release to ground water is low.

Subsurface Gas. Due to the lack of information regarding the nature of wastes managed and construction details, the potential for release cannot be determined.

SWMU 22: New Aerial Cable Dump Site

UNIT DESCRIPTION: The new aerial cable site is in Sol Se Mete Canyon in the Cibola National Forest (Plate 13). The dump site is in an arroyo filled with trees adjacent to an experimental sled track.

Information pertaining to unit construction, specific wastes, and volumes of waste disposed is not available. However, all wastes disposed at this site were reportedly buried. During the VSI, no wastes on the ground surface were observed. Liquid and solid chemicals were reported to have been containerized in drums before burial. These drums and other waste materials were placed directly on soils in the arroyo and buried under a soil cap of unknown thickness.

DATE OF STARTUP: Early 1970's.

DATE OF CLOSURE: Inactive. Date when unit last received waste is unknown.

WASTE MANAGED: Materials disposed of include metal, wood cables, rocket propellant, explosive debris, miscellaneous equipment, mannequins (9, App.B) and depleted uranium from studies conducted to simulate plutonium aerosal dispersion.

RELEASE CONTROLS: No information is available regarding release controls. None were observed during the VSI.

HISTORY OF RELEASES: According to information obtained during the VSI, there have been fires at the new aerial cable site. It is not known if the fires were generated during experiments or whether wastes were burned.

CONCLUSIONS:

Air. Liquid and solid chemicals at the site were reported to have been containerized in drums. If incompatible wastes were comingled at this site, subsequent reactions could produce hazardous gases or vapors which could penetrate the cover. Therefore the potential for a release to air appears to be moderate. The potential for prior releases from fires depends on whether wastes were burned.

Soil. It is possible that liquids disposed in this unit in drums may have leaked. In addition, all other wastes were disposed directly on soils in the floor of the arroyo. Therefore, the potential for release to soil is high.

Surface Water. The unit is in a canyon and is susceptible to effects of storm runoff and flooding. However, since all wastes were reportedly buried, the potential for release to surface water is low.

Ground Water. This unit is located in the foothills of the Manzano Mountains, east of the fault zone. Depth to ground water in this area is not well defined; however, the limited well information available and the presence of springs in the foothill canyons indicates that depth to ground water may vary from ground surface to 100 feet below ground surface. Therefore, since ground water appears to be shallow in this area, the potential for release is high.

Subsurface Gas. If incompatible wastes were commingled at this site, subsequent reactions could produce hazardous gases or vapors. Therefore, the potential for subsurface gas generation and release appears moderate.

SWMU 23: Coyote Canyon Open Dump

UNIT DESCRIPTION: This unit is an abandoned Test Site 2 (ATF-2) and surface disposal unit. The unit is in Arroyo del Coyote east of Manzano Base and west of Pendulum site. Flash floods occur in this area. During the VSI, a green potting compound (explosives), wood, wire and general debris were noted in the area. All waste was placed on the ground surface and were not covered; no excavations were apparent. Waste was deposited in an area approximately 2 acres in size. Green potting compound was also noted downgradient in the arroyo. Additional information on the unit was not available.

DATE OF STARTUP: Based on information obtained during the VSI, estimated date of operations is late 1940s.

DATE OF CLOSURE: This dump is inactive. The estimated date activity ceased at the site is early 1950s or 1960s.

WASTES MANAGED: Wastes managed included debris from old wooden crates and boxes with large to small pieces of high explosive and ceramic and silica insulators. In addition, waste from explosive area test activities were disposed in this unit. It is not known if liquids were disposed of at this unit.

RELEASE CONTROLS: Based on observations during the VSI, no release controls are present at this unit.

HISTORY OF RELEASES: SNLA states that explosives have been found "downstream" from the unit. No additional information is available regarding releases from this unit.

CONCLUSIONS:

Air. The potential of release to the atmosphere appears to be high because of the explosive nature of materials contained in the unit.

Soil. Release to soils may have occurred since high explosives have been found "downstream" from the unit, and all wastes were disposed on the ground surface. The potential for ongoing releases to soil is high since the wastes remain in this unlined dump area.

Surface Water. The presence of high explosives downstream of the unit suggest that surface water transports these wastes. This unit is in Arroyo del Coyote, increasing the likelihood of release and transport by surface waters. In addition, flash floods occur in this area. Therefore, the likelihood of a release to surface waters is high.

Ground Water. This unit is located within the fault zone bounded by the Hubbell Springs and Manzano faults. Ground water in this region appears to be at or near ground surface based on the presence of springs and the Travertine Hills in the vicinity. Because the depth to ground water may be very shallow, the potential for release to ground water from surface water infiltration is high.

Subsurface Gas. It is difficult to evaluate the potential for subsurface gas generation without information regarding the chemical composition of the waste explosives and resulting decomposition products. However, since wastes were disposed on ground surface and not buried, the potential for generation and release of subsurface gas is low.

SWMUs 24 - 30 and 115 - 116: Area III - Disposal Trenches (Nos. 1-5), Disposal Pit No. 1, Disposal Pits, Classified and Unclassified Radioactive Drum Storage Areas

UNIT DESCRIPTION: These SWMUs were referenced in a DOE letter (34) and are located in Technical Area III (Plate 9). After closure of the low level radioactive disposal site in Area II (SWMUs 32 through 40) in 1959, all radioactive materials were disposed of in these units.

All current SNLA radioactive disposal is performed in Area III in these units. The Area III disposal trenches Nos. 1-5 (SWMUs 24-28) are active sites for low level unclassified radioactive waste disposal and a separate enclosed area consisting of SWMUs 29, 30, 115, and 116 is for classified radioactive waste disposal. Both areas are fenced and together comprise approximately 1.6 acres. An estimated 720,000 ft^3 of waste has been buried on site during the 28 year operational period.

The unclassified low level radioactive disposal area has 5 trenches with dimensions approximately 40 feet wide x 130 feet long x 25 feet deep. Four of the five trenches are covered and no longer used (42). Trench No. 5 contains containers for spent fuel rods and other unclassified low level radioactive wastes.

Open drums stored above ground in the unclassified low level radioactive disposal area are used for cobalt source disposal. The cobalt sources (approximate dimensions are 1 x 3 inches) are placed in the drums, then sealed in cement. Each drum can contain several sources.

The classified disposal area consists of pits approximately 10 feet long x 10 feet wide x 25 feet deep. As pits are filled, they are capped with soil and marked with pipes. Open pits are covered with concrete slabs when not in use. Approximately 30 pits are located in this area. Another pit, Disposal Pit No. 1 (SWMU 29), inside of the classified radioactive waste disposal area is used for disposal of uranium-contaminated waste.

The classified radioactive drum storage area is approximately 25 x 25 feet in size. The material in these drums may be too "hot" to bury and waste management options for these drums have not been determined. No secondary containment is present in this storage area. Drums were sealed closed at the time of the VSI.

During the VSI, Sandia stated that environmental monitoring of the entire Area III radioactive disposal area is conducted once a week.

DATE OF STARTUP: March 1959.

DATE OF CLOSURE: Active.

WASTE MANAGED: Low level, radioactive waste including depleted uranium, tritium, cobalt-60 and cesium-13 radioactive mixed waste (contaminated equipment, clothing, glassware, and small quantities of contaminated solvents) were disposed in the classified disposal pits (SWMU 30). Unclassified radioactive wastes disposed of at this unit consist of bags, drums clothing, etc. Certain pits were designated to contain wastes from special projects. The radioactive pit, SWMU 29, located in the SE corner of the facility was used to dispose of contaminated chemicals including solvents and acids prior to 1969 (42). Some alpha-emitting material may be buried in the unclassified disposal trenches. Eleven drums of TRU waste (under 100 nci/gram) have been buried in trenches in addition to drums from the Loveland Inhalation Toxicology Research Institute.

RELEASE CONTROLS: Full pits and trenches are backfilled and covered with soil. The pits and trenches are not lined.

HISTORY OF RELEASES: In 1974, uranium shavings deposited in one of the open pits caught on fire. No other information regarding other releases from this unit is available.

CONCLUSIONS:

Air. Incompatible and unneutralized ignitible and reactive wastes may have been placed in the pits and trenches. Subsequent reactions may generate hazardous vapors which could penetrate pit/trench soil caps and be released. Because the thickness of the soil caps is unknown, the potential for release to air from SWMUs 24 through 30 is high. Wastes sealed in cement and/or drums in the drum storage areas (SWMUs 115 and 116) appear to have a low potential for release to air.

Soil. The potential for release to soils is high because the pits and trenches are unlined. The potential for release to soil from the drum storage areas (SWMUs 115 and 116) is moderate since no secondary containment systems are present.

Surface Water. The pits and trenches are below grade excavations or are covered after they are filled. Therefore, the potential for a release to surface water is low from SWMUs 24 through 30. The potential for release to surface water runoff from the drum storage areas is moderate since no secondary containment systems are present.

Ground Water. These units are located on a plateau west of Hubbell Springs fault and the fault zone. Ground water in this area is known to be at least 450 feet or more below ground surface. Therefore, the potential for release to ground water is low.

Subsurface Gas. The potential for release of subsurface gas is unlikely from the drum storage areas (SWMUs 115 and 116) because of their above grade design. However, as previously described, there is a high potential for the generation of other hazardous vapors and gases.

SWMU 31: Gas Cylinder Disposal Pit

UNIT DESCRIPTION: This SWMU unit is east of the Chemical Waste Landfill Area (Plate 10). The unit is estimated to be approximately 50 feet deep with horizontal dimensions of approximately 100 feet x 200 feet. Cylinders were placed in the pit, then blown up by setting explosive charges or by shooting. Empty gas cylinders remain in the pit. The pit is unlined.

No wastes were observed in this pit at the time of the VSI; however, the bottom of the pit was filled with snow.

DATE OF STARTUP: Approximately 1962.

DATE OF CLOSURE: Estimated date of inactivity is November 1985.

WASTES MANAGED: High pressure explosives, toxic gas and inert material were disposed of at this unit.

RELEASE CONTROLS: During the VSI, no release controls were observed.

HISTORY OF RELEASES: No information is available regarding releases from this unit.

CONCLUSIONS:

Air. Vapor and gaseous releases could have occurred during detonation of gas cylinders. Therefore, the potential for prior releases to the air is high. The potential for a continuing release is high, if wastes remain in place.

Soil. The gas cylinder disposal pit is unlined. Since waste has been detonated in the pit, the historic potential for releases to the soils from explosive residue is high. Infiltration of rainwater through the pit could increase contaminant migration; therefore the potential for ongoing releases is high.

Surface Water. Because the pit is below grade, and appears to be of sufficient capacity to retain any run-on, the potential for release to surface water is low.

Ground Water. This unit is located on the plateau west of Hubbell Springs fault and the fault zone. Ground water in this area is known to be at least 450 feet or more below ground surface. Therefore, the potential for release to ground water is low.

Subsurface Gas. Due to the nature of the wastes managed and the design of this unit, the generation and release of subsurface gases is unlikely.

SWMU 32 - 37: Area II Low Level Radioactive Disposal Pits (No. 1-3) and Trenches (No. 1-3)

UNIT DESCRIPTION: These SWMUs are in Technical Area II (Plate 9). They are no longer used. These SWMUs consist of three pits and three trenches. The pits have dimensions ranging from 12 feet to 20 feet; estimated depth is 25 feet. The dimensions of the trenches range from 5 feet to 15 feet wide with lengths ranging from 25 to 50 feet. All the pits and trenches are unlined.

Pits and trenches are reported to be covered with 3 feet of soil and concrete. Material buried in these units is not containerized. An estimated 11,110 cubic feet of low-level radioactive waste is buried in these units. Waste disposal logs were destroyed according to information obtained during the VSI. After closure of these units, all radioactive waste were reportedly disposed of in a new facility (SWMUs 24 - 30).

Explosive testing is reported to have been conducted in areas adjacent to this unit.

During the VSI, these units could only be viewed from a distance of approximately 200 to 300 feet since they are in a fenced, restricted area.

DATE OF STARTUP: 1949.

DATE OF CLOSURE: Estimated closure date is February 1959.

WASTES MANAGED: These units were used for disposal of radioactive and radionuclide-contaminated hazardous wastes including chemicals and classified items (42). Radioactive wastes disposed at these units included depleted uranium, tritium, cobalt-60, cesium-137, and plutonium. Although most of the waste disposed is low level radioactive waste, some alpha emitting material is present (42).

HISTORY OF RELEASES: No information is available regarding releases from this unit.

CONCLUSIONS:

Air. Since the wastes were covered with soil after disposal, the potential for release is low.

Soil. Since wastes were not containerized and these units are unlined, releases to soil have occurred. The potential for ongoing releases is high since wastes remain in these unlined units.

Surface Water.Run-on/runoff controls do not appear to be present at these units; therefore, the potential for release to surface water runoff is high. However, these units are located on a relatively flat-lying, permeable surface in an arid environment. Precipitation events are relatively infrequent; therefore it is likely that any runoff for these units would quickly evaporate or infiltrate.

Ground Water. These units are located on the plateau west of Hubbell Springs fault and the fault zone. Ground water in this area is known to be at least 450 feet or more below ground surface. Therefore, the potential for release to ground water is low.

Subsurface Gas. It is difficult to evaluate the potential for subsurface gas generation without information regarding the chemical composition of the classified items, and all other wastes buried in these units and resulting decompositon products.

SWMU 38: Area II Classified Waste Trench

UNIT DESCRIPTION: This SWMU, is located in Technical Area II (Plate 7). It consists of one below grade trench which is used for disposal of non-radioactive, solid, classified waste. The trench is backfilled with soil after waste is emplaced. During the VSI, the exposed portion of the trench appeared to be wedge-shape approximately 30 feet wide and 150 feet long with a depth ranging from 0 to 40 feet. The exact size of this trench is unknown. No additional information is available regarding this unit.

DATE OF STARTUP: Unknown.

DATE OF CLOSURE: Active.

WASTES MANAGED: Used for the disposal of non-radioactive classified waste. Specific waste constituents are unknown.

RELEASE CONTROLS: No release controls were observed at the unit during the VSI.

HISTORY OF RELEASES: Unknown.

CONCLUSIONS:

Air. Because waste is covered with soil after disposal in the trench, the potential for release to air is low.

Soil. Since the trench is unlined and no information is available regarding whether wastes are containerized before disposal, the potential for release to soil is high.

Surface Water. Because the unit is below grade and wastes are covered with a soil cap, the potential for release to surface water is low.

Ground Water. This unit is located on the plateau west of Hubbell Springs fault and the fault zone. Ground water in this area is known to be at least 450 feet or more below ground surface. Therefore, the potential for release to ground water is low.

Subsurface Gas. The potential for generation of subsurface gas cannot be determined without additional information about the wastes disposed.

SWMU 39: Area II Classified Waste Pits

UNIT DESCRIPTION: These pits are located in Technical Area II (Plate 7) and are no longer used. The exact number of pits is unknown; however, there are 5 rows of pits in which each row has at least 8 to 9 pits. The pits were filled with non-radioactive classified waste, then backfilled with soil and marked with posts when full. Locations of all the pits could not be determined during the VSI. No further information about the pits is available, including the size of each pit, exact wastes disposed and period of operation.

DATE OF STARTUP: Unknown.

DATE OF CLOSURE: The year when wastes were last disposed in these pits was estimated by SNLA personnel during the VSI to be during the 1940's. These pits are now inactive.

WASTES MANAGED: Classified waste. The nature of the waste (e.g., solid, liquid) is unknown. No radioactive wastes are though to be disposed in the pits.

RELEASE CONTROLS: According to information obtained during the VSI, no release controls are present at this unit. None were observed at the time of the VSI.

HISTORY OF RELEASES: No information is available regarding releases from this unit.

CONCLUSIONS: The potential for releases to the environment cannot be determined without additional information regarding the nature of the wastes managed.

SWMU 40: Area II Chemical Waste Disposal Pit

UNIT DESCRIPTION: Non-radioactive hazardous waste was reportedly disposed in this pit. No information is available regarding the unit's construction or type of waste managed.

The exact location of the pit is unknown.

DATE OF STARTUP: Unknown.

DATE OF CLOSURE: Estimated to be used prior to early 1960s.

WASTES MANAGED: Non-radioactive hazardous chemicals were reportedly disposed at this unit.

RELEASE CONTROLS: Unknown.

HISTORY OF RELEASES: None reported.

CONCLUSIONS: It is not possible to determine the potential for release without additional information on site location, construction and types/volumes of waste disposed.

SWMU 41: Lurance Canyon Landfill

UNIT DESCRIPTION: The Lurance Canyon landfill is in an arroyo and occupies an area approximately one quarter mile long and ten to twenty feet wide. This area was previously used for explosive testing and as a burn site, according to SNLA personnel during the VSI. No other information regarding historical activities at this site are available.

SNLA states that waste disposed at this site is placed directly on soils in the floor of the arroyo and most of the waste is buried under a soil cover. Some of the landfill is beneath an area currently used for various facility activities including parking (9, Appendix B). It was estimated during the VSI that this area is approximately one quarter of the total landfill area. Wastes were observed in the arroyo which were not covered with soil (e.g., scrap metal, wood).

Information on site construction, specific types of wastes disposed, and method of disposal was not available.

DATE OF STARTUP: Estimated to have started during the early 1950s.

DATE OF CLOSURE: The unit is active.

WASTES MANAGED: SNLA states that drums of trichloroethylene (TCE) and other unlabeled drums containing liquids were abandoned at the site. Information obtained during the VSI suggests that metal objects, wood, pallets, and full drums are disposed at this unit. In addition, depleted uranium, lead and beryllium may be disposed at this unit.

RELEASE CONTROLS: No information is available regarding release controls. None were observed during the VSI.

HISTORY OF RELEASES: No information is available regarding releases from this unit.

CONCLUSIONS:

Air. Liquid and solid chemicals at the site were reported to have been containerized in drums. If incompatible wastes were comingled at this site, subsequent reactions could produce hazardous gases or vapors which could penetrate the cover. Therefore the potential for a release to air appears to be moderate. The potential for prior releases from fires depends on whether wastes were burned.

Soil. It is possible that liquids disposed in this unit in drums may have leaked. In addition, all other wastes were disposed directly on soils in the floor of the arroyo. Therefore, the potential for release to soil is high.

Surface Water. Although some wastes are contained in drums and buried, other drums and wastes may not be covered with soil. Since this unit is located in a canyon and, as such, is susceptible to effects of storm runoff, the potential for releases to surface water is high.

Ground Water. This unit is located in the foothills of the Manzano Mountains, east of the fault zone. Depth to ground water in this area is not well defined; however, the limited well information available and the presence of springs in the foothill canyons indicates that depth to ground water may vary from ground surface to 100 feet below ground surface. Therefore, since ground water appears to be shallow in this area, the potential for release is high.

Subsurface Gas. If incompatible wastes were commingled at this site, subsequent reactions could produce hazardous gases or vapors. Therefore, the potential for subsurface gas generation and release appears to be moderate.

SWMU 42: Animal Carcass Pit

UNIT DESCRIPTION: The animal carcass pit is located near Building 9820 in the Cibola National Forest (Plate 13); the exact location is not known. The pit was used to bury donkeys killed during research activities (9, Appendix B) conducted to study the effect of radiation on animals. The exact type of radiation the donkeys were exposed to is not known. The dimensions and design of this pit is also unknown. It is likely that the pit is unlined, according to SNLA personnel during the VSI.

DATE OF STARTUP: Estimated to have started during the 1950s.

DATE OF CLOSURE: Estimated to have ceased receiving waste sometime during the late 1950s.

WASTES MANAGED: Animal carcasses of 12 donkeys. Since no information is available regarding the type of radiation experiments conducted, it is not known whether these carcasses contain radioactive material.

RELEASE CONTROLS: Unknown.

HISTORY OF RELEASES: Unknown.

CONCLUSIONS:

Air. The potential for releases is low since the wastes managed are buried.

Soil. Since the pit is probably not lined, the carcasses could be in direct contact with soils in the pit. Therefore, the potential for release to soil is high.

Surface Water. The potential for a release from this unit is low since the waste is buried.

Ground Water. This unit is located within the fault zone bounded by the Hubbell Springs and Manzano faults. Ground water in this region appears to be at or near ground surface based on the presence of springs and the Travertine Hills in the vicinity. Because the depth to ground water may be very shallow, the potential for release to ground water from surface water infiltration is high.

Subsurface Gas. Animal carcasses have probably completely decomposed, producing methane gase. Therefore, the likelihood of subsurface gas generation is high. However, the potential for significant volumes of subsurface gas releases is low based on the amount of waste reportedly disposed at this site.

SWMU 43: School House Mesa Burial Dump

UNIT DESCRIPTION: The school house site is in an arroyo south of Coyote Springs Road, adjacent to the boundary between Cibola National Forest and Sandia Military Reservation (Plate 13). Uranium was burned at this site. In addition, the site was used as an unauthorized disposal area for garbage, shrapnel, miscellaneous equipment, and old wood chambers. During the VSI, barbed wire, schrapnel, empty drums, and wood were observed at the site.

It appears that some of the wastes at this site were burned and some were disposed at ground surface. SNLA personnel had no additional information on waste management at this site.

The site is currently inactive.

DATE OF STARTUP: Late 1940s.

DATE OF CLOSURE: Inactive since the 1950s.

WASTES MANAGED: Old explosives from firing site, garbage (exact constituents are unknown) barbed wire, bikes, schrapnel, cables, miscellaneous equipment, old wood chambers, empty drums, wood. It is not known if liquids were disposed of at this unit. It is not known whether the miscellaneous equipment contains remnant chemical wastes.

RELEASE CONTROLS: None.

HISTORY OF RELEASES: Unknown.

CONCLUSIONS:

Air. Uranium was burned here in the the 1940s and 1950s, so the potential for prior releases is high. The potential for ongoing release of hazardous constituents to the air cannot be determined without further information regarding the composition of the wastes disposed.

Soil. The potential for a release of hazardous constituents to soil is high because wastes were disposed directly onto exposed soils.

Surface Water. Run-on/runoff controls do not appear to exist at this unit. In addition, the unit is located within an existing arroyo. Therefore, the potential for release to surface water runoff is high.

Ground Water. This unit is located within the fault zone bounded by the Hubbell Springs and Manzano faults. Ground water in this region appears to be at or near ground surface based on the presence of springs and the Travertine Hills in the vicinity. Because the depth to ground water may be very shallow, the potential for release to ground water from surface water infiltration is high.

Subsurface Gas. The current potential for release of hazardous constituents from subsurface gas at the unit is low since the site has been inactive for over 30 years. However, in the past, methane gas could have been produced by decomposing garbage. Therefore, the potential for prior subsurface gas generation and release is high.

SWMU 44: Arroyo del Coyote - Gas Cylinder Disposal Pit

UNIT DESCRIPTION: The site was reported to exist during interviews conducted by SNLA. The exact location of this unit is unknown. Therefore, it was not possible to inspect this unit during the VSI. It reportedly contains 300 gas cylinders.

DATE OF STARTUP: Mid 1970s.

DATE OF CLOSURE: Late 1970s.

WASTE MANAGED: Gas cylinders, contents unknown.

RELEASE CONTROLS: Unknown.

HISTORY OF RELEASES: Unknown.

CONCLUSIONS: Because of the lack of information regarding wastes managed, unit location, and unit design, the potentials for releases cannot be determined.

SWMU 45: Building 9920 - Burial Site

UNIT DESCRIPTION: The site is in the vicinity of Building 9920 (Plate 13). Approximately 6000 to 8000 fluorescent light bulbs were buried in an 8-foot-deep unlined pit, and covered with a soil cap of unknown thickness. Other debris buried in this pit includes corium thurite, zirconium, iron oxide, and 40 kilograms of depleted uranium. The exact location and size of the pit along with the total volume of waste disposed and method of containing the waste (if containers were used) is unknown.

DATE OF STARTUP: Mid 1970s.

DATE OF CLOSURE: This site last received waste in the late 1970s.

WASTE MANAGED: Debris from explosive experiments including coruim thurite, zirconium, iron oxide and depleted uranium; used fluorescent light bulbs.

RELEASE CONTROLS: None.

HISTORY OF RELEASES: Unknown.

CONCLUSIONS:

Air. The ongoing potential for release of hazardous constituents to the air in this area is low because the waste are buried under a soil cap. However deminimis levels of neon gas may have been released during disposal.

Soil. Because it is likely that wastes were disposed directly into the unlined pit without being containerized, the potential for release to soils is high.

Surface Water. Since the waste is covered with a soil cap in a below grade unit, the potential for release to surface water is low.

Ground Water. This unit is located on the plateau west of Hubbell Springs fault and the fault zone. Ground water in this area is known to be at least 450 feet or more below ground surface. Therefore, the potential for release to ground water is low.

Subsurface Gas. The potential for release of hazardous constituents from the subsurface gas at the unit is low due to the nature of the wastes.

SWMU 46: Frustration Site Trash Pits

UNIT DESCRIPTION: The unit includes three trash pits at the southern portion of Frustration Site (Plate 13). The design, dimensions and exact location of each pit along with the type of wastes disposed is unknown.

DATE OF STARTUP: Unknown.

DATE OF CLOSURE: Inactive.

WASTE MANAGED: Unknown.

RELEASE CONTROLS: Unknown.

HISTORY OF RELEASES: Unknown.

CONCLUSIONS: The exact nature of the materials at this site is unknown; therefore the potential for release of hazardous constituents to all pathways cannot be determined.

SWMUs 47-49: Tijeras Arroyo Disposal Trenches (No. 1-3)

UNIT DESCRIPTION: Three trenches are believed to exist east of Pennsylvania Avenue; however, the exact location of the trenches is unknown. Sandia personnel reported during the VSI that they have information which indicates that a team of people in full protective gear were once working in this area, suggesting that hazardous materials may be present in the trenches.

DATE OF STARTUP: 1950s

DATE OF CLOSURE: These trenches reportedly last received waste during the 1960s.

WASTE MANAGED: Unknown

RELEASE CONTROLS: Unknown.

HISTORY OF RELEASES: Unknown.

CONCLUSIONS: The exact nature of the materials at this site is unknown; therefore, the potential for release of hazardous constituents to all pathways cannot be determined.

SWMUs 50 and 51: Sol Se Mete Canyon - Burial Site and Surface Disposal Area

UNIT DESCRIPTION: Sol Se Mete Canyon is a site where weapons-related explosive and impact tests are conducted (Plate 13). An overhead cable, sled track, and two SWMUs are located in this canyon.

The burial site (SWMU 50) consists of a waste disposal area in an arroyo on the south side of the sled track. By-products of explosive and impact tests along with used test equipment are reportedly partially buried in this arroyo. The volume of wastes disposed and the size of the burial site is unknown.

The surface disposal area (SWMU 51) is the surrounding area which routinely receives wastes from the explosive and impact tests. These wastes include small pieces of scrap metal, explosive material, and liquid wastes from gas bombs. The size of the area receiving these wastes is unknown but may be on the order of several acres according to SNLA personnel. No additional information was available during the VSI; these SWMUs could not be inspected at the time of the VSI due to heavy snow cover and inaccessibility because of rugged terrain.

DATE OF STARTUP: Unknown.

DATE OF CLOSURE: The site is active.

WASTES MANAGED: By-products of weapons-related explosive and impact tests; includes sleds, cables, scrap metal, lumber, rocket motors, depleted uranium, beryllium, and lead.

RELEASE CONTROLS: Unknown.

HISTORY OF RELEASES: None reported.

CONCLUSIONS:

Air. The potential for release is high since most of the wastes in these units are not covered and some of the wastes are very small in size (explosive debris) and could be easily wind blown.

Soil. The potential for a release to soil is high because wastes are disposed directly onto surface soils.

Surface Water. Since the units are located in a small canyon, the potential for release to surface water runoff is high.

Ground Water. These units are located in the foothills of the Manzano Mountains, east of the fault zone. Depth to ground water in this area is not well defined; however, the limited well information available and the presence of springs in the foothill canyons indicates that depth to ground water may vary from ground surface to 100 feet below ground surface. Therefore, since ground water appears to be shallow in this area, the potential for release from surface-water infiltration is high.

Subsurface Gas. The potential for generation of subsurface gas at these units is low due to the nature of the wastes and the design of the units.

SWMUs 52-54: Reapplication Yards

UNIT DESCRIPTION: Reapplication yards are located throughout the facility. The exact number of these yards could not be determined during the VSI. The units are used for salvage and scrap metal storage. The following reapplication yards were observed during the VSI:

- Two reapplication yards are in Technical Area I (Plate 5). The Area I Reapplication Yard (SWMU 52) is north of the intersection of K Street and 20th Street. A second yard, Area I Reapplication Yard (SWMU 53), south of Building 857, is an auction yard where Sandia sells scrap equipment on weekends. Both yards contain scrap metal pallets, wood, machines, desks, bolts and general equipment. These areas are enclosed by fences.

- One reapplication yard, Area III Reapplication Yard (SWMU 54), is located north of the CWLA (Plate 10). Scrap metal and used tanks, which originally stored accelerator water, are stored in this area.

DATE OF START UP: Unknown.

DATE OF CLOSURE: Active.

WASTES MANAGED: Scrap metal, wood, and used equipment. Sandia personnel stated during the VSI that no hazardous waste is stored at these yards.

RELEASE CONTROLS: Unknown. None were observed during the VSI.

HISTORY OF RELEASES: None reported.

CONCLUSIONS:

Air. The potential for releases to air from these types of SWMUs is generally low.

Soil. Since most of the wastes stored in the yards observed were placed onto surface soils, the potential for release is moderate.

Surface Water. Run-on/runoff controls do not appear to be present at these units; therefore, the potential for release to surface water runoff is high. However, these units are located on a relatively flat-lying, permeable surface in an arid environment. Precipitation events are relatively infrequent; therefore it is likely that any runoff for these units would quickly evaporate or infiltrate.

Ground Water. These units are located on the plateau west of Hubbell Springs fault and the fault zone. Ground water in this area is known to be at least 450 feet or more below ground surface. Therefore, the potential for release to ground water is low.

Subsurface Gas. The potential for generation of subsurface gas is unlikely due to the design of these units.

SWMU 55: Building Debris Dump

UNIT DESCRIPTION: The building debris dump is in Arroyo del Coyote west of Manzano Base (Plate 13). Waste disposal at the dump site was never authorized by Sandia and has not been supervised by SNLA personnel. Wastes were disposed directly onto soils in Arroyo del Coyote.

DATE OF STARTUP: Unknown.

DATE OF CLOSURE: Last dump possibly 1982 or 1983.

WASTES MANAGED: Concrete building debris, including rebar. During the VSI, Sandia personnel reported that there may be some depleted uranium in and on the concrete debris.

RELEASE CONTROLS: None observed during the VSI.

HISTORY OF RELEASES: Unknown.

CONCLUSIONS:

Air. Since the wastes are not covered, the potential for particulate releases to air is high.

Soil. Releases to soils have occurred since wastes were disposed directly onto the soils in the arroyo. The potential for ongoing releases is high since wastes remain on surface soils.

Surface Water. Run-on/runoff controls do not appear to exist at this unit. In addition, the unit is located within an existing arroyo. Therefore, the potential for release to surface water runoff is high.

Ground Water. Although this unit is located in an arroyo and there is a potential for surface water infiltration, this unit is located on the plateau west of Hubbell Springs fault and the fault zone. Ground water in this area is known to be at least 450 feet or more below ground surface. Therefore, the potential for release to ground water is low.

Subsurface Gas. The potential for generation and release of subsurface gas is minimal due to the design of this unit.

SWMU 56: Shock Tube Debris Area

UNIT DESCRIPTION: Debris produced from shock tube and impact experiments are disposed on surface soils in this area (Plate 13). The size of the area which accepts this debris is unknown. An unknown number of pits filled with sawdust behind the shock tube are used to catch debris produced during tests. The exact location of these pits is unknown. After each experiment, all debris on surface soils is reportedly pushed south of the area into large piles. During the VSI, a flat-bed trailer adjacent to a large waste pile was filled with scrap metal. Sandia confirmed that this trailer was part of waste removal operations which had recently commenced.

The exact size of the entire shock tube debris area is unknown.

DATE OF STARTUP: Unknown.

DATE OF CLOSURE: Active.

WASTES MANAGED: General debris; contains corregated metal, wood, a few old empty drums, high explosives, lead, beryllium, and depleted uranium.

RELEASE CONTROLS: None.

HISTORY OF RELEASES: Unknown.

CONCLUSIONS:

Air. The potential for ongoing particulate release of hazardous constituents to the air in this area is high because wastes are disposed on top of surface soils and are not covered.

Soil. Releases of hazardous constituents to the soil in this area have occurred since wastes are disposed directly onto surface soils. The potential for ongoing releases is high because wastes remain on surface soils.

Surface Water. The potential for release of hazardous constituents to surface water runoff in this area is high because run-on/runoff controls do not exist and this unit is in a relatively flat-lying area.

Ground Water. The potential for release of hazardous constituents to the ground water from infiltrating surface water is low because this unit is located on the plateau west of Hubbell Springs fault and the fault zone. Ground water in this area is known to be at least 450 feet or more below ground surface. Therefore, the potential for release to ground water is low.

Subsurface Gas. The potential for generation of subsurface gas at the unit is low due to the nature of the wastes.

SWMU 57: Low Level Radioactive Storage Yard

UNIT DESCRIPTION: This SWMU is located in Technical Area II (Plate 7). The dimensions of this unit are approximately 100 feet by 50 feet. A radioactive warning sign is posted at the site entrance. The presence of scrap metal and equipment was noted during the VSI. Most equipment is placed directly on surface soils.

DATE OF STARTUP: Unknown.

DATE OF CLOSURE: Active.

WASTES MANAGED: Scrap metal, small buckets, and pieces of equipment contaminated with low-level radioactive waste is disposed at this unit. It does not appear that liquid wastes are disposed here.

RELEASE CONTROLS: According to information obtained during the VSI, no release controls are present. No release controls were observed during the VSI.

HISTORY OF RELEASES: None reported.

CONCLUSIONS:

Air. Due to the type of waste managed at this unit, it appears that the potential for release of hazardous constituents to air is low.

Soil. Since wastes are disposed directly onto surface soils, the potential for release to the soil is high.

Surface Water. Run-on/runoff controls do not appear to be present at this unit; therefore, the potential for release to surface water runoff is high. However, the unit is located on a relatively flat-lying, permeable surface in an arid environment. Precipitation events are relatively infrequent; therefore it is likely that any runoff from this unit would quickly evaporate or infiltrate.

Groundwater. This unit is located on the plateau west of Hubbell Springs fault and the fault zone. Ground water in this area is known to be at least 450 feet or more below ground surface. Therefore, the potential for release to ground water is low.

Subsurface Gas. Due to the nature of wastes and design of this unit, the potential for the release of subsurface gas is unlikely.

SWMU 58: Lurance Canyon Salvage Yard

UNIT DESCRIPTION: Scrap metal, old equipment, empty drums, and empty tanks used in impact experiments are contained in a three to five acre area. The storage of liquids was not noted during the VSI. The site is located in Lurance Canyon (Plate 13).

DATE OF STARTUP: Unknown, but approximately 1975.

DATE OF CLOSURE: Active.

WASTES MANAGED: Scrap metal, machinery, old equipment, empty drums and tanks.

RELEASE CONTROLS: None.

HISTORY OF RELEASES: None reported.

CONCLUSIONS:

Air. Due to the type of waste managed at this unit, it appears that the potential for release of hazardous constituents to air is low.

Soil. Due to the type of waste stored at this unit and since the storge of waste liquids does not appear to occur, the potential for release of hazardous constituents to soil is low.

Surface Water. The potential for release of hazardous constituents to surface water is low due to the type of wastes stored.

Ground Water. It is unlikely that a release of hazardous constituents to ground water would occur from this unit due to the type of wastes stored.

Subsurface Gas. Due to the nature of wastes there is no potential for the release of subsurface gas.

SWMU 59: Mine Debris Area

UNIT DESCRIPTION: Mine debris scattered in this area, north of the New Aerial Cable site (Plate 13), includes scrap metal and old mining equipment from pre-Sandia days and rocket motors and cables deposited in recent years. Material is placed directly on the soil in an area less than one half an acre.

DATE OF STARTUP: Before World War II.

DATE OF CLOSURE: Inactive.

WASTE MANAGED: Rocket motors, cables; other debris may be present. Details on the exact nature of the waste are not known.

RELEASE CONTROLS: Unknown.

HISTORY OF RELEASES: Unknown.

CONCLUSIONS:

Air. Due to the type of waste managed at this unit, it appears that the potential for release of hazardous constituents to air is low.

Soil. Due to the type of waste managed at this unit, the potential for release to the soil is low.

Surface Water. The potential for release of hazardous constituents to surface water is low due to the types of wastes stored.

Ground Water. It is unlikely that a release of hazardous constituents to ground water would occur from this unit due the types of wastes stored.

Subsurface Gas. There appears to be no potential for the release of subsurface gas because of the wastes believed to have been disposed.

SWMU 60 - 63: Pendulum Site Mounds (No. 1-3) and Burial Area

UNIT DESCRIPTION: Waste debris associated primarily with classified weapons tests is buried in three mounds and in the surrounding area (Plate 13). Each mound is approximately 15 by 5 feet and 3 to 5 feet high. In each mound, wastes were disposed directly on ground-surface soils and covered with a soil cap of unknown thickness. The exact location and size of the burial area is unknown; however, SNLA personnel stated during the VSI that the burial area is located within approximately 100 feet of the mounds. It is not known how thick the soil cover over the burial area is.

DATE OF STARTUP: Unknown.

DATE OF CLOSURE: Inactive since the late 1970s.

WASTES MANAGED: Scrap metal, radionuclides, and explosives. May include depleted uranium, beryllium, and lead.

RELEASE CONTROLS: None observed during the VSI.

HISTORY OF RELEASES: None reported.

CONCLUSIONS:

Air. Because wastes in these units are covered with soil, the potential for release is low.

Soil. Because wastes in each mound and in the burial area were placed directly onto exposed soils, the potential for release to soils is high.

Surface Water. Although run-on/runoff controls do not appear to exist at these units, the potential for release to surface water is low because the wastes are covered with soil caps.

Ground Water. Although the site is capped with soil, the thickness of the cover is not known and precipitation may freely infiltrate the soil cap. In addition, this unit is located within the fault zone bounded by the Hubbell Springs and Manzano faults. Ground water in this region appears to be at or near ground surface based on the presence of springs and the Travertine Hills in the vicinity. Because the depth to ground water may be very shallow, the potential for release to ground water from surface water infiltration is high.

Subsurface Gas. The potential for release of hazardous constituents from the subsurface gas at the unit is low due to the nature of the wastes.

SWMU 64: Scrap Metal Yard at Pressure Vessel Test Site

UNIT DESCRIPTION: At this site, tests were conducted on dummy reactor vessels to evaluate the effects of "Three Mile Island" situations (Plate 13). Vessels were pressurized with nitrogen. Wastes produced consist of the remains of the test vessels and are disposed at the site.

DATE OF STARTUP: 1986.

DATE OF CLOSURE: Active.

WASTES MANAGED: Scrap metal.

RELEASE OF CONTROLS: None observed during the VSI.

HISTORY OF RELEASES: None reported.

CONCLUSIONS: Because it appears that this unit manages non-hazardous waste, the potential for release of hazardous constituents to the environment is low.

SWMU 65: Old Aerial Cable Radioactive Salvage Yard

UNIT DESCRIPTION: The fenced unit is northwest of the old aerial cable site (Plate 13) adjacent to an arroyo; the site stores various waste materials generated by field test activities, including a smashed truck, drums, burned transuranic* packs, crates, and empty yellow drums. The yellow drums have Oakridge Laboratory serial numbers, which according to SNLA personnel, indicate they are for the storage of special hazardous materials. The drums are reportedly from a transportation test; they may be ten years old. Radioactive warning signs are posted on the fence gate.

During the VSI, Sandia personnel stated that they did not believe the site contained radioactive materials; however, the site was not entered during the VSI.

DATE OF STARTUP: Unknown.

DATE OF CLOSURE: Unknown.

WASTES MANAGED: Burned "transuranic packs", a smashed truck, empty drums (former contents unknown) and crates.

RELEASE CONTROLS: None observed during the VSI.

HISTORY OF RELEASES: None reported.

CONCLUSIONS:

Air. Additional information needs to be obtained regarding the wastes managed, before the potential for release to air can be determined.

Soil. Additional information needs to be obtained, regarding the wastes managed, before the potential for release to soil can be determined.

Surface Water. Additional information needs to be obtained regarding the wastes managed, before the potential for release to surface water can be determined.

Ground Water. Additional information needs to be obtained regarding the wastes managed, before the potential for release to ground water can be determined.

Subsurface Gas. Due to the above-ground design of this unit, the potential for release of subsurface gas is unlikely.

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*Elements having a higher atomic number than that of uranium.

SWMU 66: Old Aerial Cable Salvage Area

UNIT DESCRIPTION: This area encompasses several acres where scrap material, empty drums, cables and miscellaneous equipment has been stored on surface soils. This area is in a small canyon.

During the VSI, SNLA personnel stated that there may have been a diesel spill at this site in the past. They also stated that waste material (exact nature is unknown) may be buried in an adjacent area.

DATE OF STARTUP: Unknown.

DATE OF CLOSURE: Unit appears to be active.

WASTES MANAGED: Parachutes, motors, rockets, scrap metal, used equipment, and abandoned empty drums. The volume and nature of contained wastes is not well defined, however, salvage material is thought to be nonhazardous.

RELEASE CONTROLS: None observed during the VSI.

HISTORY OF RELEASES: SNLA personnel stated that a spill of diesel fuel may have occurred at this site.

CONCLUSIONS: The potential for release of hazardous constituents to the environment cannot be determined without further information regarding the wastes managed at this unit.

SWMU 67: Old Aerial Cable Burial Area

UNIT DESCRIPTION: This area is located south of the old aerial cable salvage area (SWMU 66). Waste material is thought to be buried here. The exact location of this unit is unknown.

DATE OF STARTUP: Unknown.

DATE OF CLOSURE: Unknown.

WASTES MANAGED: Unknown.

RELEASE CONTROLS: Unknown.

HISTORY OF RELEASES: Unknown

CONCLUSIONS: The potential for releases cannot be evaluated without additional information regarding wastes managed.

SWMUs 68-70: CTF Burial Mounds (No. 1-3)

UNIT DESCRIPTION: These mounds are in the Coyote Test Field, approximately 2 miles south of Manzano Base (Plate 13). Two small mounds (less than 800 square feet in size and less than 5 feet high) are surrounded by a wire fire. A larger mound (probably less than 1500 square feet in size and less than 10 feet high) is adjacent to the two smaller mounds.

Radioactive/explosive signs are posted at the site. Conflicting reports from SNLA personnel indicate that either high explosives or radionuclides were buried at the site. Old explosive ordnance from the gunnery range may also be buried at one of these mounds. It appears that wastes were placed directly on surface soils and covered with a soil cap of unknown thickness.

DATE OF STARTUP: Early 1940s.

DATE OF CLOSURE: Inactive since the 1950s.

WASTES MANAGED: Possibly high explosives or radionuclides.

RELEASE CONTROLS: None.

HISTORY OF RELEASES: None reported.

CONCLUSIONS: Due to the lack of information regarding the wastes managed, the potential for release cannot be determined.

SWMU 71: Building Debris Disposal Site

UNIT DESCRIPTION: General building debris is present at a location south of Technical Area I and west of Manzano Base (Plate 13). The exact location and size of the unit is unknown. History of disposal at the site is not known. The site may be active; however, dumping is not performed under the permission of Sandia.

DATE OF STARTUP: Unknown.

DATE OF CLOSURE: Unknown.

WASTES MANAGED: Building debris, concrete, rebar. It is unclear whether the debris is contaminated by any radioactive wastes.

RELEASE CONTROLS: Unknown.

HISTORY OF RELEASES: Unknown.

CONCLUSIONS: The potential for release of hazardous constituents to the environment cannot be determined without further information regarding the wastes managed at this unit.

SWMU 72: Building 9966 - Gas Cylinder Surface Pile

UNIT DESCRIPTION: Used gas cylinders were piled outside, adjacent to Building 9966 in the Coyote Test Field (Plate 15). The cylinders have since been removed. The contents of the cylinders are unknown, but were thought to be toxic. The number of cylinders and the size of the area in which they were placed is unknown.

DATE OF STARTUP: Mid 1970s.

DATE OF CLOSURE: The cylinders were reportedly removed sometime in the late 1970s.

WASTES MANAGED: Used gas cylinders, contents unknown.

RELEASE CONTROLS: None.

HISTORY OF RELEASES: None reported.

CONCLUSIONS: Due to the lack of information regarding the wastes managed, the potential for release cannot be determined.

SWMU 73: Coyote Springs - Burial Area

UNIT DESCRIPTION: The site is adjacent to a parking area north of Coyote Springs picinic area (Plate 13). A few partially buried 55-gallon drums and pieces of metal were observed near Coyote Springs during the VSI. Their origin, contents, and condition are unknown.

The size of the burial area is unknown.

DATE OF STARTUP: Unknown

DATE OF CLOSURE: Unknown

WASTE MANAGED: Unknown

RELEASE CONTROLS: Unknown

HISTORY OF RELEASES: None reported.

CONCLUSIONS: Due to the lack of information about the nature and containment of the wastes, release potentials cannot be determined.

SWMUs 74-76: Thunder Range Salvage Yards (East, South, and West)

UNIT DESCRIPTIONS: According to file information on these units, they were "closed" prior to 1980. However, during the VSI, the east salvage yard appeared acitve. Waste material was stored directly on surface soils at this SWMU. The yard appeared to encompass at least 1.5 acres at the time of the VSI.

SNLA personnel stated during the VSI that wastes have been removed from the south and west salvage yards; consequently, these yards were not observed at the time of the VSI. At each of these SWMUs, wastes were placed directly onto surface soils. No wastes was buried at these SWMUs. The size of these yards is unknown but could potentially encompass several acres. The exact locations of these yards is unknown.

DATE OF STARTUP: Unknown.

DATE OF CLOSURE: The east salvage yard appeared active at the time of the VSI. Wastes have reportedly been removed from the south and west salvage yards.

WASTES MANAGED: Waste material contained in these units includes, but is not limited to, junked vehicles, fluorescent light tubes, discarded equipment, liquid-filled drums, paint cans, and beryllium-contaminated materials (9, App. B).

The East Salvage Yard contains cables, rockets, scrap metals, wood, and liquid-filled drums (minimum drum storage activity).

The North Salvage Yard contains cement, tires, and approximately 6000 fluorescent light bulbs. The bulbs were removed during 1986.

The West salvage yard was used to store excavated tanks, asbestos material, garbage in 1985 and old scrap metal which was brought to the yard in 1950. These materials have reportedly all been removed.

RELEASE CONTROLS: None observed at the east salvage yard at the time of the VSI.

HISTORY OF RELEASES: None reported.

CONCLUSIONS: The potential for releases to the south and west salvage yards cannot be determined without further information regarding location and "closure" procedures. The following release potentials refer to the east salvage yard only:

Air. The potential for air releases appears to be high since wastes are not covered and it is unknown whether drums had lids.

Soil. The potential for releases to soil is high, since wastes are placed directly onto surface soils.

Surface Water. Run-on/runoff controls do not appear to be present at this unit; therefore, the potential for release to surface water runoff is high. However, the unit is located on a relatively flat-lying, permeable surface in an arid environment. Precipitation events are relatively infrequent; therefore, it is likely that any runoff from this unit would quickly evaporate or infiltrate.

Ground Water. This unit is located on the plateau west of Hubbell Springs fault and the fault zone. Ground water in this area is known to be at least 450 feet or more below ground surface. Therefore, the potential for release to ground water is low.

Subsurface Gas. Due to the nature of wastes and the above ground design of this unit, there is minimal potential for release of subsurface gas.

SWMU 77: Blue Oil Tank

UNIT DESCRIPTION: This 500 gallon above-ground storage tank, used for the storage of waste oil, is adjacent to Building 898 in Area I (Plate 5). The tank is constructed of steel; its base is set in concrete which is surrounded by a 4" curb. There is an open funnel at the top of the tank. The waste oil, recycled for base personnel, is pumped out once a month by a SNLA sub-contractor. Additional information regarding tank design and construction was not available.

DATE OF STARTUP: The exact age of the tank is unknown.

DATE OF CLOSURE: The unit is active.

WASTES MANAGED: The tank is used to hold waste oil for recycling. However, information obtained in the VSI indicates that there is no supervision of waste deposited in the tank.

RELEASE CONTROLS: The tank is set in a 4" high concrete bermed area.

HISTORY OF RELEASES: During the VSI, evidence of spills on the sides of the tank were noted. Small spills were also observed in the containment area. It was not clear if releases occured outside the berm.

CONCLUSIONS:

Air. Because there is an open funnel on top of the tank and supervision of waste deposited in the tank is not conducted, the potential for a release to air is high.

Soil. Waste oil could be released to surface soils if the tank is overfilled, filled sloppily, or during tank pump-outs. The potential for a release is moderate.

Surface Water. The potential of a release to surface water is low because run-on/runoff is controlled by the concrete base and curb.

Ground Water. Because the tank is above ground and has a concrete base with curbing, the potential for a release to ground water is low. In addition, this unit is located on the plateau west of Hubbell Springs fault and the fault zone. Ground water in this area is known to be at least 450 feet or more below ground surface. Therefore, the potential for release to ground water is low.

Subsurface Gas. The tank is above ground; there is no potential for subsurface gas generation.

SWMU 78: Waste Cutting Oil Tank

UNIT DESCRIPTION: This 500 gallon underground waste oil tank is located south of Building 840 in Area I (Plate 6). The steel tank contains no piping. Waste oil is poured into the top of the tank through a "port". Additional information was not available.

DATE OF STARTUP: Approximately 1950.

DATE OF CLOSURE: The tank is active.

WASTES MANAGED: Waste cutting oil from the machine shop. There is a sign next to the tank that states "No oil - coolant only".

RELEASE CONTROLS: No information is available regarding release controls for this unit.

HISTORY OF RELEASES: None reported.

CONCLUSIONS:

Air. Because the tank is underground, the potential for a release to air is low.

Soil. Because the integrity of this tank could not be verified during the VSI, the potential for release to soil cannot be determined.

Surface Water. The potential for a release to surface water is low because the tank is underground.

Ground Water. This unit is located on the plateau west of Hubbell Springs fault and the fault zone. Ground water in this area is known to be at least 450 feet or more below ground surface. Therefore, the potential for release to ground water is low.

Subsurface Gas. The potential for generation of subsurface gases is low.

SWMU 79: Septic Tanks and Leach Fields (Areas II, III, V)

UNIT DESCRIPTION: This SWMU is a multiple unit consisting of an unknown number of septic tanks and associated leach fields. They are located in Technical Areas II, III, V and all remote areas in the active portions of the Manzano foothills. All of these areas contain septic tanks and individual leach fields. Sanida personnel stated that they do not believe sanitary wastes are separated from industrial wastes; therefore, hazardous wastes may be discharged to septic tanks and leach fields.

A typical description of a septic tank system is as follows:

Building 9920 (Plate 13) contains two septic tanks and associated drain fields. One tank receives drainage from the explosives room. This tank may contain high explosive residuals. The second tank is used for sanitary wastes and effluents from the laboratory hood drain. Examples of waste types from this drain include toluene, methanol, and TCE. No additional information was available regarding this unit.

Exact locations of other septic tank systems and leach fields is not known.

DATE OF START UP: Unknown.

DATE OF CLOSURE: Active; however, it is possible that some septic tanks systems may be inactive.

WASTES MANAGED: Sanitary wastes and industrial wastes including TCE, toluene and methanol.

RELEASE CONTROLS: Septic tank contents are discharged to leach fields. Release controls do not appear to be present.

HISTORY OF RELEASES: None reported.

CONCLUSIONS:

Air. Wastes are discharged to underground septic tanks and then to leach fields. Therefore, the potential for a release to air is low.

Soil. Because wastes are released to leach fields, the potential for a release to soil is high.

Surface Water. The potential for a release to surface water cannot be determined as locations of the septic tanks and leach fields are not known. Leach fields within or adjacent to arroyos could have a high potential for release.

Ground Water. Due to the lack of information regarding the locations of the septic tank systems, the potential for release cannot be determined.

Subsurface Gas. Because sanitary wastes are disposed in tanks and leached through surface soils, there is a potential for subsurface gas generation.

SWMU 80: Septic Tank Piping for Publicly Owned Treatment Works (POTW)

UNIT DESCRIPTION: Septic tanks for Technical Areas I and IV are connected to the POTW via underground pipes. The tank piping system is located throughout Technical Areas I and IV. The piping extends from KAFB to the POTW. No additional information was available regarding this piping. Exact locations, number, lengths and conditions of piping are not known. Sandia personnel stated that they do not believe that sanitary wastes are separated from industrial wastes.

DATE OF START UP: Unknown.

DATE OF CLOSURE: Active.

WASTES MANAGED: Sanitary and industrial wastes. Specific waste constituents are unknown.

RELEASE CONTROLS: Unknown.

HISTORY OF RELEASES: None reported.

CONCLUSIONS:

Air. Wastes are contained below grade in pipes. Therefore, the potential for a release to air is low.

Soil. Since the integrity of the piping could not be verified during the VSI, the potential for release to soil cannot be determined.

Surface Water. Wastes are contained below grade in pipes. Therefore, the potential for a release is low.

Ground Water. Wastes are contained below grade in pipes. Although the potential for leaking pipes exists, this unit is located on the plateau west of Hubbell Springs fault and the fault zone. Ground water in this area is known to be at least 450 feet or more below ground surface. Therefore, the potential for release to ground water is low.

Subsurface Gas. Wastes, including sanitary waste, are contained below-grade in pipes. Therefore, the potential for generation and release of subsurface gas is high.

SWMUs 81 and 82: Area IV Concrete Sump and Oil Water Skimmer

UNIT DESCRIPTION: The concrete sump is located in the southern portion of Area IV. The sump is adjacent to the oil/water skimmer. The skimmer has a concrete secondary containment system below it. Any leaks from the skimmer are routed back to the concrete sump. The approximate dimensions of the concrete sump are 150 feet x 20 feet x 10 feet.

All bermed areas surrounding the above-ground product oil storage tanks in Area IV are designed to discharge to the concrete sump. Contained fluid (a mixture of water and oil) is then pumped up to a second area which contains the oil/water skimmer. The skimmer pumps wastewater from the bottom of the concrete sump until oil is reached. The oil is discharged to the adjacent underground tank 6 (SWMU 83). The water is pumped to the Area IV Lagoon (SWMU 12).

The concrete sump was empty except for snow and water during the VSI. No further information on the oil/water skimmer was available.

DATE OF START UP: Unknown.

DATE OF CLOSURE: Active.

WASTES MANAGED: Oil leaked from two above-ground oil tanks, and associated water.

RELEASE CONTROLS: The skimmer has a concrete secondary containment system. Release controls in the concrete sump are unknown.

HISTORY OF RELEASES: None reported.

CONCLUSIONS:

Air. The potential for release of volatile waste constituents is high since the concrete sump is open to the atmosphere.

Soil. The potential for release from the oil/water skimmer is low since it has a secondary containment system. Because the concrete sump is built directly in subgrade soils and the integrity of the concrete could not be verified during the VSI, the potential for release from the concrete sump cannot be determined.

Surface Water. The potential for release from the oil/water skimmer is low since it has a secondary containment system. Since it is not known whether the concrete sump is designed with release controls, the potential for release from the concrete sump cannot be determined.

Ground Water. This unit is located on the plateau west of Hubbell Springs fault and the fault zone. Ground water in this area is known to be at least 450 feet or more below ground surface. Therefore, the potential for release to ground water is low.

Subsurface Gas. There is no potential for a release of subsurface gas from these units due to their design.

SWMU 83: Area IV Underground Waste Oil Tank

UNIT DESCRIPTION: This unit is in Technical Area IV adjacent to SWMUs 81 and 82 (Concrete Sump and Oil/Water Skimmer). The tank is used to store waste oil (with some associated water) discharged from the oil/water skimmer.

The tank capacity is estimated to be approximately 2,000 gallons. Sandia personnel believe the tank is less than 8 years old. No information was available regarding the depth of the tank or its integrity.

DATE OF START UP: Estimated to be in use since the late 1970s.

DATE OF CLOSURE: The unit is active.

WASTE MANAGED: Oil water mixture (mostly oil) from the concrete sump (SWMU 81) is stored in the unit.

RELEASE CONTROLS: Unknown.

HISTORY OF RELEASES: None reported.

CONCLUSIONS:

Air. The potential for release to air from this unit is low because the tank is underground.

Soil. Since the integrity of this tank could not be verified during the VSI, the potential for release to soil cannot be determined.

Surface Water. The potential for a release to surface waters is low because the tank is underground.

Ground Water. Although the integrity of this unit could not be verified during the VSI, the unit is located west of Hubbell Springs fault and the fault zone. Groundwater in this area is known to be at least 450 feet or more below ground surface. Therefore, the potential for release to groundwater is low.

Subsurface Gas. Because of the type of waste stored, the potential for generation of subsurface gases is low.

SWMUs 84-85: Area III - Drain and Drainfield Area

UNIT DESCRIPTION: These units are adjacent to Building 6620 in Technical Area III. Building 6620 is used for storage, development, synthesis, and processing of high explosives. According to information obtained during the VSI, an associated drain system consisting of a drain and drainfield may contain high explosives and solvents. No additional information on this unit was available.

DATE OF START UP: Unknown.

DATE OF CLOSURE: Active.

WASTES MANAGED: Waste explosives, residue, and possibly small quantitities of solvents.

RELEASE CONTROLS: No information is available regarding release controls.

HISTORY OF RELEASES: None reported.

CONCLUSIONS: Due to the lack of information regarding location and construction designs for this unit, release potentials cannot be determined.

SWMU 86: Building 6587 - Underground Waste Motor Oil Tank

UNIT DESCRIPTION: This SWMU is located along the west edge of Building 6587. According to SNLA, the tank is used to store nonhazardous waste oil. The tank has a capacity of 1000 gallons and is constructed of steel, including the piping system. No internal or external protection (e.g., inner liners, outer coatings) are known to exist.

According to information obtained during the VSI, the tank is to be removed in 1987 and replaced by an above ground tank.

DATE OF START UP: Approximately mid-1960s.

DATE OF CLOSURE: The unit is active.

WASTES MANAGED: Waste motor oil is stored in this unit.

RELEASE CONTROLS: No information is available regarding release controls for this unit.

HISTORY OF RELEASES: None reported.

CONCLUSIONS:

Air. Because the tank is underground, the potential for a release to air is low.

Soil. Since the integrity of this tank could not be verified during the VSI, the potential for release to soil cannot be determined.

Surface Water. The potential for a release to surface waters is low because the tank is underground.

Ground Water. Although the integrity of this unit could not be verified during the VSI, the unit is located west of Hubbell Springs fault and the fault zone. Groundwater in this area is known to be at least 450 feet or more below ground surface. Therefore, the potential for release to groundwater is low.

Subsurface Gas. Because of the nature of the waste managed, the potential for subsurface gas generation is low.

SWMU 87: Building 876 - Underground Waste Motor Oil Tank

UNIT DESCRIPTION: This SWMU is located in the motor pool area in Technical Area I. The capacity of the tank is estimated to be 350 gallons. The 38 year old tank is constructed of steel, including the piping. The internal and external protection of the tank is unknown.

DATE OF START UP: Estimate early 1950's.

DATE OF CLOSURE: The unit is active.

WASTES MANAGED: According to SNLA, the tank is used to store waste oil which is recycled by a contractor.

RELEASE CONTROLS: Unknown.

HISTORY OF RELEASES: None reported.

CONCLUSIONS:

Air. Because the tank is underground, the potential for a release to air is low.

Soil. Since the integrity of this tank could not be verified during the VSI, the potential for release to soil cannot be determined.

Surface Water. The potential for a release to surface waters is low because the tank is underground.

Ground Water. Although the integrity of this unit could not be verified during the VSI, the unit is located west of Hubbell Springs fault and the fault zone. Groundwater in this area is known to be at least 450 feet or more below ground surface. Therefore, the potential for release to groundwater is low.

Subsurface Gas. The potential for generation of subsurface gas is low due to the nature of the waste managed.

SWMU 88-90: Building 831 - Three Emergency Hospital Tanks

UNIT DESCRIPTION: These three underground tanks adjacent to Building 831, (Plate 6) were installed approximately 20 years ago. The tanks were designed to contain wash water generated during cleaning of hospital personnel who had been contaminated with radioactive materials; Sandia personnel believe the tanks have never been used.

The tanks are reportedly constructed of fiberglass reinforced plastic with PVC piping. Each tank has a capacity of 1000 gallons.

DATE OF STARTUP: Installed approximately 1967.

DATE OF CLOSURE: Unknown.

WASTES MANAGED: Radionuclide contaminated wastewater.

RELEASE CONTROLS: Unknown.

HISTORY OF RELEASES: None reported

CONCLUSIONS: Due to the lack of information regarding use of these tanks, release potentials cannot be determined.

SWMUs 91-92: Building 6580 - Two Underground Wastewater Tanks

UNIT DESCRIPTION: These two underground holding tanks adjacent to Building 6580 contain wastewater from the hot cell laboratory, reactor facility, and lab drains in Area V. Wastewater discharged to these tanks is temporarily stored to allow short-lived fission products to decay. Fluid is then released to the Area V surface impoundments (SWMUs 18 and 19). Information obtained from the CEARP Phase I report (40) indicates that during periods of heavy use, the volume of waste passing through the 9000 gallon tanks approaches 12,500 gallons per day.

The exact location of the tanks is unknown. The design, materials of construction, and capacity of the tanks are also unknown.

DATE OF STARTUP: Unknown.

DATE OF CLOSURE: Active.

WASTES MANAGED: Radionuclide contaminated wastewater.

RELEASE CONTROLS: Unknown.

HISTORY OF RELEASES: None reported.

CONCLUSIONS:

Air. Because the tanks are underground, the potential for release to the air is low.

Soil. Due to the lack of information regarding the location and design of these units, release potentials cannot be determined.

Surface Water. Due to the lack of information regarding the location and design of these units, release potentials cannot be determined.

Ground Water. Although the integrity of this unit could not be verified during the VSI, the unit is located west of Hubbell Springs fault and the fault zone. Groundwater in this area is known to be at least 450 feet or more below ground surface. Therefore, the potential for release to groundwater is low.

Subsurface Gas. Due to the nature of the wastes managed, the potential for release of subsurface gas appears to be low.

SWMU 93: Building 9939 - Underground Spent Acids Tank

UNIT DESCRIPTION: This underground steel tank located near Building 9939 is used to store spent acids; waste generation processes are unknown. The 7000-gallon tank has an outer asphaltic coating. Sandia personnel estimate that the tank currently contains 500 gallons of fluid. The exact location of the tank is not known.

DATE OF STARTUP: 1960s.

DATE OF CLOSURE: Active.

WASTES MANAGED: Waste acids including sulfuric and nitric acids.

RELEASE CONTROLS: Unknown.

HISTORY OF RELEASES: None reported.

CONCLUSIONS:

Air. The potential for release to air is low because the tank is below ground.

Soil. Since the integrity of this tank could not be verified during the VSI, the potential for release to soil cannot be determined.

Surface Water. The potential for release to surface water is low because wastes are contained in an underground tank.

Ground Water. Although the integrity of this tank could not be verified during the VSI, the unit is located west of Hubbell Springs fault and the fault zone. Ground water in this area is known to be at least 450 feet or more below ground surface. Therefore, the potential for release to ground water is low.

Surface Gas. The potential for subsurface gas generation is low due to the nature of the wastes managed.

SWMU 94: Building 970a - Underground Emergency Spill Containment Tank

UNIT DESCRIPTION: This 500 gallon underground tank is constructed of fiberglass reinforced plastic, associated piping is steel. The tank is designed to be used for emergency spill control; however, it has never been used. The nature of the waste that could be released to the tank is unknown. The tank is adjacent to Building 970a.

DATE OF STARTUP: Unknown.

DATE OF CLOSURE: Unknown.

WASTES MANAGED: Unknown.

RELEASE CONTROLS: Unknown.

HISTORY OF RELEASES: None reported.

CONCLUSIONS: Because the tank has never been used, there is no potential for a release to the environment.

SWMU 95: Building 844 - Underground Spill Containment Tank

UNIT DESCRIPTION: This SWMU is located at the northwest corner of Building 844. The estimated capacity and age of the tank is 150 gallons and 20 years, respectively. According to file information (9), the tank is used to store non-hazardous waste oil which is recycled by a contractor. However, during the VSI, Sandia personnel stated that the tank may never have been used and that its function was to store radionuclide-contaminated water. SNLA also stated that there is no longer access to the tank. Additional information was not available.

DATE OF START UP: Unknown.

DATE OF CLOSURE: Unknown. The tank may never have been used.

WASTE MANAGED: The exact waste type is unknown since file information states that the tank is used to store nonhazardous waste oil, and Sandia personnel suggest that it is designed to store radionuclide-contaminated water.

RELEASE CONTROLS: No information is available regarding release controls.

HISTORY OF RELEASES: No releases are believed to have occurred.

CONCLUSIONS: Release potentials cannot be determined until further information is available regarding wastes managed.

SWMU 96: Building 867 - Underground Rinsewater Tank

UNIT DESCRIPTION: This 4000 gallon underground tank located near Building 867 (Plate 6) has not been used to date; Sandia personnel anticipate it will be used in 1987. If used, the tank would hold rinsewater from explosive manufacturing processes.

The tank is constructed of fiberglass-reinforced plastic and is reported to have an interior lining.

DATE OF STARTUP: Constructed in the 1970s.

DATE OF CLOSURE: Tank has never been used.

WASTES MANAGED: Acidic and caustic rinsewater.

RELEASE CONTROLS: Tank has interior lining.

HISTORY OF RELEASES: None reported.

CONCLUSIONS: Because this tank has never been used, there is no potential for release of hazardous constituents to the environment.

SWMU 97: Building 6712 - Underground Tank

UNIT DESCRIPTION: Information obtained during the VSI suggests that this tank is approximately 27 years old and was constructed of steel. The capacity and former contents of this unit are unknown. Apparently, the unit has been removed. No other information on this unit was available.

DATE OF START UP: Estimate mid-1960's.

DATE OF CLOSURE: The unit has been removed.

WASTES MANAGED: Unknown; may have stored waste fuel oil.

RELEASE CONTROLS: No information is available regarding release controls.

HISTORY OF RELEASES: Unknown.

CONCLUSIONS: Due to the lack of information about the tank's contents, the potential for releases cannot be determined.

SWMU 98: Area V Holding Tank

UNIT DESCRIPTION: This tank is in Area V (Plate 12); the exact location is unknown. The unit is a holding tank for radioactive wastewater. Waste discharged from Area V hot cell lab and lab drains is temporarily stored in this tank; the retention time depends on the rate of radioactive decay of the wastewater. Effluent is analyzed for radionuclides prior to discharge to the Area V surface impoundment (SWMUs 18 and 19).

DATE OF STARTUP: Unknown.

DATE OF CLOSURE: Active.

WASTES MANAGED: Radioactive wastewater.

RELEASE CONTROLS: Unknown.

HISTORY OF RELEASES: None reported.

CONCLUSIONS: Due to the lack of information regarding the design and location of this unit, the potentials for release cannot be determined.

SWMU 99: Building 6597 - Above-Ground Spill Containment Tank

UNIT DESCRIPTION: Sandia personnel stated during the VSI that they think an above ground tank for waste fuel oil storage exists in Area V (Plate 12). It is reportedly a 17,000 gallon capacity, steel, above-ground spill containment tank. The history, location, and contents of this tank are not known.

DATE OF STARTUP: Unknown.

DATE OF CLOSURE: Active.

WASTES MANAGED: Unknown. Sandia personnel think the tank may contain waste fuel oil.

RELEASE CONTROLS: A concrete pad may exist below this tank.

HISTORY OF RELEASES: None reported.

CONCLUSIONS: Due to the lack of information regarding wastes managed, release potentials cannot be determined.

SWMU 100: Building 865 - Above-Ground Waste Oil Tank

UNIT DESCRIPTION: The capacity of this 22 year old tank is approximately 200 gallons. The tank is associated with wind tunnel operations. During the VSI, the tank appeared to be extremely clean; no evidence of past spills were noted. No secondary containment system was noted during the VSI. The tank appeared to be constructed of steel. No further information was available regarding waste management operations.

DATE OF START UP: 1965's.

DATE OF CLOSURE: The unit is active.

WASTES MANAGED: Waste oil.

RELEASE OF CONTROLS: Unknown. None observed during the VSI.

HISTORY OF RELEASES: None reported.

CONCLUSIONS:

Air. Due to the lack of information regarding procedures for discharging wastes to this tank, release potentials cannot be determined.

Soil. The potential for a release depends on existing waste management practices.

Surface Water. A secondary containment system does not appear to exist. Therefore, the potential for release to soil depends on existing waste management practices.

Ground Water. This unit is located on the plateau west of Hubbell Springs fault and the fault zone. Ground water in this area is known to be at least 450 feet or more below ground surface. Therefore, the potential for release to ground water is low.

Subsurface Gas. The potential for generation of subsurface gases is unlikely because the tank is above-ground.

SWMU 101: Container Storage Area

UNIT DESCRIPTION: The container storage area, identified by SNLA as a SWMU (9, 5), is RCRA-regulated under interim status. This unit is located within the CLWA (Plate 5). Steel drums reported by SNLA to be in compliance with U.S. Department of Transportation specifications are labeled and stored on wooden pallets within an approximately 25,000-square-foot area. The drums are sealed closed and segregated according to hazard class to prevent close storage of incompatible wastes (25). Empty drums are stored directly on the ground. This information was verified during the VSI. Wastes stored in this area are destined for off-site disposal (Appendix 6).

DATE OF STARTUP: Unknown.

DATE OF CLOSURE: Closure and post-closure plans for the unit are included in the post-closure permit application for the chemical waste area and chromic acid surface impoundment (11, page 1-1).

WASTE MANAGED: Hazardous wastes listed in Appendix 6 are stored in the drums.

RELEASE CONTROLS: Surface run-on and runoff are locally controlled by berms and ditches in the CWLA.

HISTORY OF RELEASES: None reported. No evidence of release was noted during the VSI.

CONCLUSIONS:

Air. Since drums are reportedly sealed closed, the potential for a release appears to be low.

Soil. The potential for release to soil depends on the integrity of each drum.

Surface Water. There is a low potential for a release to surface waters. The high infiltration rates of the soil, and the network of run-on/runoff containment ditches and berms, are likely to prevent any spills from entering surface waters.

Ground Water. Releases to ground water from this unit are RCRA-regulated and are therefore not covered by this report.

Subsurface Gas. The facility is above grade, and therefore no potential for subsurface gas generation exists.

SWMU 102: Thermal Treatment Facility

UNIT DESCRIPTION: The thermal treatment facility is in the northern portion of Technical Area III adjacent to Building 6715 (Plate 11). The facility is used to detonate high explosives. The unit consists of a 4-foot by 4-foot, bermed, concrete slab, enclosed in a steel-mesh screen with a steel-mesh door on one site. Detonation occurs inside the screen on the concrete slab.

The liquid waste explosive is placed on the concrete slab, the steel mesh door is closed, and the liquid is then vaporized by activating two remote-controlled propane jets. The explosive detonates, reportedly leaving no residue of explosive or solvents. Waste explosive is detonated at the facility approximately once every two weeks. The maximum detonated at any one time is 1-1/2 pounds.

The thermal treatment facility was identified as a SWMU by SNLA (9,7). Regulations for facilities of this nature have not been promulgated, and therefore the unit is not included in the SNLA RCRA Part B Application. However, the unit is described in the application. Once regulations are in place, SNLA personnel plans to obtain a permit for the facility (9,7).

DATE OF STARTUP: Unknown.

DATE OF CLOSURE: Active.

WASTES MANAGED: Waste explosives, undetonated wash-down, and other liquid by-products.

RELEASE CONTROLS: Unknown.

HISTORY OF RELEASES: According to SNLA, no releases are known to have occurred (9,7).

CONCLUSIONS:

Air. The potential for releases to air is high. Although the explosives are destroyed by the treatment process, it is likely that combustion byproducts are released to the atmosphere.

Soil. Detonation is contained on a concrete slab; no residues or solvents are left after detonation. Therefore the potential for release to soil is low.

Surface Water. Since no residue or solvents are left after treatment, the potential for a release to surface waters is low.

Ground Water. Since no residues or solvents are left after treatment, the potential for a release to ground water is low. In addition, this unit is located on the plateau west of Hubbell Springs fault and the fault zone. Ground water in this area is known to be at least 450 feet or more below ground surface. Therefore, the potential for release to ground water is low.

Subsurface Gas. Due to the nature of the wastes and facility construction, there is no potential for subsurface gas generation.

SWMU 103: Incinerator

UNIT DESCRIPTIONS: The incinerator, located in the northwest quadrant of Technical Area III, west of Area V (Plate 9), is used to destroy approximately 2000 pounds of classified documents per week. The incinerator was identified as a SWMU by SNLA in a SWMU report (9,10). Additional information such as construction details, or age were not available.

DATE OF STARTUP: Unknown.

DATE OF CLOSURE: The unit is active.

WASTES MANAGED: The facility burns classified documents and occasionally film. The facility has a waiver for an Air Quality Permit issued by the Bernallilo County Air Quality Board.

RELEASE CONTROLS: No information is available regarding release controls.

HISTORY OF RELEASES: None reported.

CONCLUSIONS:

Air. Air releases are regulated by an Air Quality Permit issued by the Bernallilo County Air Quality Board.

Soil. The potential for release to the soil appears to be low unless significant particulate air releases occur.

Surface Water. The potential for release to the soil appears to be low unless significant particulate air releases occur.

Ground Water. This unit is located on the plateau west of Hubbell Springs fault and the fault zone. Ground water in this area is known to be at least 450 feet or more below ground surface. Therefore, the potential for release to ground water is low.

Subsurface Gas. Due to the nature of the unit, there is no potential for subsurface gas generation.

SWMU 104: Hammermill Pulverizer

UNIT DESCRIPTION: The Hammermill pulverizer is adjacent to the incinerator (SWMU 103) west of Area V (Plate 9). It is used to destroy non-hazardous wastes such as lightweight classified documents and film. The end product, pulverized material, is discarded at a sanitary landfill. The unit operates under an air quality permit from the City of Albuquerque. No information was available regarding permitting, construction details, and processing details. The unit was identified by SNLA as a SWMU (9,10).

DATE OF STARTUP: Unknown.

DATE OF CLOSURE: The facility is active.

WASTES MANAGED: Paper and film is pulverized.

RELEASE CONTROLS: None reported.

HISTORY OF RELEASES: No information is available regarding releases from this unit.

CONCLUSIONS:

Air. Air releases are regulated by an Air Quality Permit issued by the Bernallilo Air Quality Control Board.

Surface Water. The potential for releases appears to be low due to the wastes managed and the design of this unit.

Soil. The potential for releases appears to be low due to the wastes managed and the design of this unit.

Ground Water. This unit is located on the plateau west of Hubbell Springs fault and the fault zone. Ground water in this area is known to be at least 450 feet or more below ground surface. Therefore, the potential for release to ground water is low.

Subsurface Gas. The potential for subsurface gas generation is low due to the design of this unit.

SWMU 105: Building 895

UNIT DESCRIPTION: The hazardous waste container storage area, located in Building 895 in the northern portion of Technical Area I (Plate 4), is a RCRA-regulated unit. SNLA identified Building 895 as a SWMU (9,5). This building stores containerized and solidified wastes for less than 90 days. Liquid wastes are solidified in 55-gallon drums by the addition of vermiculite.

Building 895 is a concrete block structure measuring approximately 119 feet by 15 feet. The building is divided into four rooms of equal size, each having outdoor access (Plate 8). The three northernmost rooms (bays) are used for waste management activities, while the southernmost room stores chemicals and equipment used to treat water used in the cooling towers. These bays are designated the South Bay, the Middle Bay, and the North Bay.

SNLA states that Building 895 has been modified specifically to accomodate hazardous waste activities. The building has an epoxycoated cement floor with 3-inch-high asphalt and 4-inch-high concrete berms for spill containment. Surface-water run-on is diverted by berms surrounding the building.

SNLA states that Building 895 is routinely inspected for problems associated with safety, emergency equipment, security, containers, container storage facilities, and loading and unloading facilities. Potential problems are posted on a "Weekly Inspection Schedule and Checklist for Hazardous Waste Facilities." Building 895 will be closed once an open waste management facility is constructed.

DATE OF STARTUP: Unknown.

DATE OF CLOSURE: Active.

WASTES MANAGED: A variety of hazardous material generated by SNLA are delivered weekly to Building 895, where they are segregated into compatible types and placed in the bermed areas. The wastes are subsequently transported to the on-site waste storage area or to an off-site licensed recycling or disposal facility. The maximum amount of wastes stored in Building 895 at any one time is 5500 gallons (1). The South Bay stores caustics, organic acids, inorganic acids, cyanides, sulfides, neutral metals or salts. The Middle Bay stores katlin reactives and shock-sensitive and heat reactive wastes. The North Bay stores hydrocarbons, organics and flammable wastes. During the VSI, three drums labelled "unknown" were stored on wooden pallets in the central portion of the South Bay.

RELEASE CONTROLS: Epoxy-coated cement floor with 4-foot-high walls separating each bay area and 6-inch-high berms for spill containment for each bay area. Surface-water run-on is diverted by berms surrounding the building. Routine inspections of the facility and equipment are conducted and posted on a weekly inspection schedule and checklist.

HISTORY OF RELEASES: No information is available regarding releases from this unit.

CONCLUSIONS:

Air. Because Building 895 is enclosed, there is a low potential of particulate or vapor emissions to the surrounding environment. As long as SNLA waste management practices include keeping waste containers closed at all times and Building 895 is routinely inspected, there is little potential for released to air.

Soil. Wastes are stored inside a building, on a concrete, epoxy-coated floor. Therefore, the potential for release to soil is low.

Surface Water. Since wastes are stored inside a building, the potential for releases to surface waters is low.

Ground Water. Releases to ground water from this unit are RCRA-regulated and are therefore not addressed in this report.

Subsurface Gas. Because of the design of this unit, there is no potential for subsurface gas generation.

SWMU 106: Burn Pit/Drum Storage Area

UNIT DESCRIPTION: This unit is in the Sandia Military Reservation south of Manzano Base, in the vicinity of the KAFB Laser Facility (Plate 13). The site was visited during the VSI; the pit could not be found. No further information regarding the pit is available. The drum storage area contains burned wooden pallets, a few empty drums and is surrounded by a broken wire fence.

DATE OF STARTUP: Information on the operational history was not available.

DATE OF CLOSURE: The site is inactive and has not been used since before November 19, 1980.

WASTES MANAGED: Wastes disposed at the site are not well documented, but apparently were limited to an undetermined quantity of wooden pallets (9, App.B) and possibly drum storage.

RELEASE CONTROLS: No release controls were observed during the VSI.

HISTORY OF RELEASES: Unknown.

CONCLUSIONS:

Air. Historically the potential for air release could be high from the burn pit. The current potential for releases to air is low from the drum storage area due to the nature of the wastes at this unit.

Soil. Release to soil in the burn pit is likely because wastes were burned directly on the ground surface. Because of the limited information on the containment, and types of wastes handled in the drum storage area, the current potential for releases to soil cannot be determined.

Surface Water. Run-on/runoff controls do not appear to exist at these units. In addition, the unit is located in the foothills of the Manzano Mountains where slopes are steep and run-on/runoff generated by precipitation is likely to discharge to tributaries of the arroyos. Therefore, the potential for release to surface-water runoff and intermittant tributaries of the arroyos is high.

Ground Water. These units are located within the fault zone bounded by the Hubbell Springs and Manzano faults. Ground water in this region appears to be at or near ground surface based on the presence of springs and the Travertine Hills in the vicinity. Because the depth to ground water may be very shallow, the potential for release to ground water from surface water infiltration is high.

Subsurface Gas. The potential for generation of subsurface gas appears to be low due to the design of these units.

SWMU 107. Drum Crushing Area

UNIT DESCRIPTION: During the VSI, a drum crushing machine was observed within the CWLA area. SNLA personnel stated that excess empty drums left over from repack operations in the temporary repack storage area (SWMU 110) are crushed. It is not know whether these drums are new or whether they once stored wastes.

DATE OF STARTUP: Unknown.

DATE OF CLOSURE: Active.

WASTE MANAGED: Unknown.

RELEASE CONTROLS: None observed during the VSI.

HISTORY OF RELEASES: None reported.

CONCLUSIONS: Release potentials cannot be determined due to the lack of information regarding wastes managed and waste management practices.

SWMU 108: Building 9990 - Drum Storage Area

UNIT DESCRIPTION: The drum storage area adjacent to Building 9990 (Plate 13) is in the Cibola National Forest east of Manzano Base. The unit was used for temporary drum storage. Drums were probably stored for more than 90 days according to Sandia personnel. Abandoned drums are believed to be in this area (9, App.B).

DATE OF STARTUP: The unit was active in the early 1980s.

DATE OF CLOSURE: The unit is inactive.

WASTE MANAGED: The unit was used for temporary drum storage. Based on information obtained during the VSI, the unit may have been used to store waste containing methylene chloride. The exact wastes stored are unknown.

RELEASE CONTROLS: Unknown.

HISTORY OF RELEASES: None reported.

CONCLUSIONS:

Air. Due to the lack of information regarding wastes managed, the potential for release cannot be determined.

Soil. Due to the lack of information regarding wastes managed, the potential for release cannot be determined.

Surface Water. Due to the lack of information regarding wastes managed, the potential for release cannot be determined.

Ground Water. Due to the lack of information regarding wastes managed, the potential for release cannot be determined.

Subsurface Gas. There is no potential for subsurface gas generation because wastes were stored in drums above ground.

SWMU 109: Classified Waste Incinerator

UNIT DESCRIPTION: An incinerator was located near Building 9990. The unit was used during the 1960s for destroying classified documents and has since been completely removed (9). No information was available regarding the exact design of the incinerator.

DATE OF STARTUP: 1960s.

DATE OF CLOSURE: 1960s.

WASTES MANAGED: Classified documents, papers.

RELEASE CONTROLS: Unknown.

HISTORY OF RELEASES: None reported.

CONCLUSIONS:

Air. The historical effects of atmospheric releases cannot be determined. Since the unit no longer exists, there is no current potential for releases to air.

Soil. Since the unit has been removed, there is no potential for release. The potential for prior releases is low due to the design of this unit.

Surface Water. Since the unit has been removed, there is no potential for release. The potential for prior releases is low due to the design of this unit.

Ground Water. Since the unit has been removed, there is no potential for release. The potential for prior releases is low due to the design of this unit.

Subsurface Gas. There is no potential for subsurface gas generation at the site due to the design of this former unit.

SWMU 110: Temporary Repack Storage Area

UNIT DESCRIPTION: The Temporary Repack Storage Area is located inside a building in a fenced area of the chemical waste landfill area (CWLA) (Plate 3). The CWLA is in Technical Area III. Drums are repacked in this area, prior to storage in the container storage area (SWMU 101). The repacking operations are performed inside two small concrete buildings. According to information obtained during the VSI, this is the only repack area operating at Sandia. The site is active and is RCRA-regulated.

DATE OF STARTUP: Unknown.

DATE OF CLOSURE: Active.

WASTE MANAGED: Hazardous wastes listed in Appendix 6.

RELEASE CONTROLS: The repack operations are performed inside concrete buildings.

HISTORY OF RELEASES: None reported.

CONCLUSIONS:

Air. The potential for releases of volatile constituents to air during repack operations is high.

Soil. Since wastes are managed inside a building, the potential for release to soil is low.

Surface Water. Since wastes are managed inside a building, the potential release to surface water is low.

Ground Water. Release potentials to ground water are not addressed in this report since this unit is RCRA-regulated.

Subsurface Gas. Because this is an above grade unit, the potential for subsurface gas generation release is unlikely.

SWMU 111: Old Burn Site

UNIT DESCRIPTION: This unit was used to study the effects of fire on weapon components. The site was supposedly cleaned up; radioactive soil was removed and taken to the Area III trenches (SWMUs 24 through 29). The dimensions and construction of the unit are not known. The exact location of this unit could not be determined during the VSI.

DATE OF STARTUP: Unknown.

DATE OF CLOSURE: Inactive.

WASTES MANAGED: Weapons components and depleted uranium. The exact nature of wastes present at this unit are unknown.

RELEASE CONTROLS: None.

HISTORY OF RELEASES: Unknown.

CONCLUSIONS:

Air. Due to the nature of the wastes and the burning activities, the potential for past releases to air is high. The potential for current releases is low since this unit is inactive.

Soil. Apparently past soil releases have occurred. The potential for for ongoing releases depends on whether contaminated soils remain in place.

Surface Water. Run-on/runoff controls do not appear to exist at the unit. In addition, the unit is located in the foothills of the Mangano Mountains where slopes are steep and run-on/runoff generated by precipitation is likely to discharge to tributaries of the arroyos. Therefore, the potential for release to surface-water runoff and intermittant tributaries of the arroyos is high if contaminated soils remain.

Ground Water. This unit is located within the fault zone bounded by the Hubbell Springs and Manzano faults. Ground water in this region appears to be at or near ground surface based on the presence of springs and the Travertine Hills in the vicinity. Because the depth to ground water may be very shallow, the potential for release to ground water from surface water infiltration is high if contaminated soils remain.

Subsurface Gas. Based on the design of this unit, there is no potential for subsurface gas generation and release.

SWMU 112: Tijeras Arroyo - Old Acid Waste Line Outfall

UNIT DESCRIPTION: The waste line outfall discharged 130,000 gallons per day of acidic wastewater from Area I into Tijeras Arroyo. Approximately 200 gallons per day of the outfall consisted of chromic acid. Ferric chloride was also discharged. Discharges included cooling tower blowdown and waste liquid from etching processes.

The exact location of the outfall in the Tijeras Arroyo is unknown.

DATE OF STARTUP: Unknown.

DATE OF CLOSURE: Inactive.

WASTE MANAGED: Acid wastewater, chromic acid, ferric chloride, cooling water blowdown, waste liquid from etching processes.

RELEASE CONTROLS: None.

HISTORY OF RELEASES: Soil sampling by Sandia personnel indicated high levels of ferric chloride in surface soils.

CONCLUSIONS:

Air. Due to the apparent nonvolatile nature of the wastes, the potential for release to air is low.

Soil. High levels of ferric chloride were found in soil samples. Therefore documented releases have occurred. The potential for ongoing releases is high since contaminated soils remain in place.

Surface Water. The potential for release to surface water is high since contaminated soils are located in an arroyo.

Ground Water. Because the exact location of this SWMU is unknown, the potential for release to ground water cannot be determined.

Subsurface Gas. The potential for subsurface gas generation is low since wastes were discharged onto surface soils.

SWMU 113: Storm Drain System

UNIT DESCRIPTION: The storm drain system is in Area I and discharges to Tijeras Arroyo. The drain system receives surface water runoff from Area I and conveys it to the arroyo via underground piping. The waste is high in suspended solids; the storm drain ditches are reportedly heavily contaminated with oil in some areas. No further information was available at the time of the VSI.

DATE OF STARTUP: Pre 1970s.

DATE OF CLOSURE: Active.

WASTE MANAGED: Industrial effluent, high in suspended solids

RELEASE CONTROLS: Unknown.

HISTORY OF RELEASES: Three major releases are known:

1) In 1979, 500 gallons of No. 2 diesel were washed to the drain from tank overflow. The spill area was diked and liquid pumped out; the liquid was used as a dirt control agent in Area II.

2) In 1983, 1000 gallons of hydrochloric acid from the Cooling Tower (Building 806) caught fire during disassembly of wooden slats; the debris was washed to the drains.

3) In 1984, 200 gallons of 20 percent sodium hydroxide spilled from above-ground tank 870. The fire department diluted the liquid and flushed it to the drain.

CONCLUSIONS:

Air. It is likely that volatile constituents have been released to air in the past. The potential for ongoing releases is high due to the wastes managed.

Soil. Soil is known to contain acids and diesel fuel at the discharge location. The potential for continued releases at the discharge location is high due to waste management practices. The potential for release from the storm drain system depends on the piping integrity which could not be determined during the VSI.

Surface Water. During flood events, storm drains will carry effluent downstream in Tijeras Arroyo. Therefore the potential for release to surface water is high.

Ground Water. This unit is located on the plateau west of Hubbell Springs fault and the fault zone. Ground water in this area is known to be at least 450 feet or more below ground surface. Therefore, the potential for release to ground water is low.

Subsurface Gas. The potential for release of subsurface gas is low due to the nature of wastes discharged to the surface.

SWMU 114: Area I - Hazardous Material Catch Boxes

UNIT DESCRIPTION: In Building 840-841, industrial drains contain catch boxes to retain toxic and explosive material. The boxes are periodically cleaned; the wastes are taken to the Area III repackaging facility and shipped off site. The toxic and explosive material collected in the catch boxes are the result of lead casting, beryllium machining, and development of high explosives. The drain system may contain lead, beryllium and high explosive residue.

DATE OF STARTUP: Unknown.

DATE OF CLOSURE: Active.

WASTES MANAGED: Primarily lead, beryllium and high explosive residue.

RELEASE CONTROLS: Unknown.

HISTORY OF RELEASES: Unknown.

CONCLUSIONS:

Air. The potential for release of hazardous constituents to the air in this area is low because wastes are contained inside a building.

Soil. The potential for release to soil is unlikely because these units are inside buildings.

Surface Water. The potential for release of hazardous constituents to the surface water is unlikely because the units are inside buildings.

Ground Water. The potential for release of hazardous constituents to the ground water is unlikely because these units are inside buildings.

Subsurface Gas. There is no potential for release of subsurface gas because wastes are contained within a building.

SWMU 117: Building 840 - Waste Oil Drum Storage Area

UNIT DESCRIPTION: Temporary waste oil storage is conducted adjacent to Building 840 in Area I (Plate 6). Approximately 12 55-gallon drums containing waste oil and 7 other drums, of unknown contents, were observed stacked in this area during the VSI. Some of the drums are stored on pallets, and others directly on the soil. As noted during the VSI, some of the containers are labeled "waste oil". Most of the drums appeared to be in good condition. No other information regarding the unit was available.

DATE OF STARTUP: None observed during the VSI.

DATE OF CLOSURE: Active.

WASTES MANAGED: Based on information obtained from the VSI, waste oil is managed at this unit. It is possible that other wastes are stored in this area also.

RELEASE CONTROLS: None observed during the VSI.

HISTORY OF RELEASES: None reported.

CONCLUSIONS:

Air. Wastes are contained in closed drums. Therefore the potential for a release is low.

Soil. Wastes are contained in closed drums. All drums observed during the VSI appeared to be in good condition. Therefore the potential for a release is low.

Surface Water. Wastes are all contained in above-ground closed containers. Therefore the potential for release is low.

Ground Water. Wastes are all contained in above-ground closed containers. Therefore the potential for release is low.

Subsurface Gas. There is no potential for subsurface gas generation due to the above grade storage of wastes.

SWMU 118: Building 6587 - Waste Solvent Drum

UNIT DESCRIPTION: This drum is located near Building 6587 and is used for collection of waste solvents from the wood shop. It is labeled "dirty mineral spirits and lacquer thinner". The drum (55-gallon) is stored on a pallet which is situated in an asphalt parking area. Sandia personnel suggested that the drum was awaiting pick-up. No other information is available for this unit.

DATE OF START UP: Unknown.

DATE OF CLOSURE: The unit is active.

WASTES MANAGED: "Dirty Mineral Spirits and Lacquer Thinner".

RELEASE CONTROLS: None observed during the VSI.

HISTORY OF RELEASES: None reported.

CONCLUSIONS:

Air. Due to the lack of information regarding waste management practices, release potentials cannot be determined.

Soil. Since this drum is located in a parking area covered with asphalt, the potential for release to soils is low.

Surface Water. Since the drum appeared to be in good condition and it is located in an asphalt-covered parking area, the potential for release to surface water is low.

Ground Water. This unit is located on the plateau west of Hubbell Springs fault and the fault zone. Ground water in this area is known to be at least 450 feet or more below ground surface. Therefore, the potential for release to ground water is low.

Subsurface Gas. Due to the design of this unit, there is no potential for subsurface gas generation or release.

SWMU 119: Drums in Lurance Canyon

UNIT DESCRIPTION: Experiments using radioactive explosives are performed in shelters in Lurance Canyon (Plate 15). Radioactive-contaminated soil is excavated and placed in drums at the site. These drums are then transferred to the CWLA in Area III. The site is used only once or twice a year, according to SNLA personnel.

DATE OF STARTUP: Unknown.

DATE OF CLOSURE: Active.

WASTES MANAGED: Low level radioactive-contaminated soil containerized in drums.

RELEASE CONTROLS: Excavation of low-level radioactive soil.

HISTORY OF RELEASES: Radioactive constituents are released to the soil, then cleaned up, once or twice a year.

CONCLUSIONS:

Air. Because wastes are conatinerized in drums, the potential for releases to air appears to be low.

Soil. Because wastes are containerized in drums, the potential for release to soil is low.

Surface Water. The potential for release to surface water is low because the wastes are containerized.

Ground Water. Based on the design of this unit, the potential for release to ground water is low.

Subsurface Gas. Based on the design of this unit, there is no potential for subsurface gas generation and release.

SWMU 120: Building 851 - Waste Hydraulic Fluid Drum

UNIT DESCRIPTION: The unit, a 55-gallon drum located on a wooden pallet, appears to be associated with the geothermal technology development unit (Plate 6). The drum, which contains waste hydraulic fluid, is to be disposed by Division #3314 (Environmental and Hazardous Waste Management Division).

DATE OF STARTUP: Unknown.

DATE OF CLOSURE: Active.

WASTES MANAGED: Waste hydraulic fluid.

RELEASE CONTROLS: None.

HISTORY OF RELEASES: Unknown.

CONCLUSIONS:

Air. Due to the lack of information regarding waste management practices, the potential for release cannot be determined.

Soil. Due to the drum's location in an asphalt-covered parking area and the apparent good condition of the drum, the potential for release to soil is low.

Surface Water. The potential for release of hazardous constituents to the surface water in this area is low due to the location of this unit in an asphalt-covered parking area.

Ground Water. This unit is located on the plateau west of Hubbell Springs fault and the fault zone. Ground water in this area is known to be at least 450 feet or more below ground surface. Therefore, the potential for release to ground water is low.

Subsurface Gas. The potential for release of subsurface gas at the unit is unlikely due to the nature of containment.

SWMU 121: Hoppers

UNIT DESCRIPTION: There are an unknown number of hoppers throughout the Sandia site which are designed to remove particulates from air discharged from process buildings. The following hoppers were observed during the VSI:

a) hopper adjacent to Building 6587 - discharges waste and shavings from the wood shop.

b) hopper at Building 841 - discharges air and particulates from the wood model and pattern shop.

c) hopper at Building 840 - discharges air containing lead oxides from the ceramics shop and photofabrication lab.

d) hopper at Building 954 - discharges air and particulates from the workshop.

Most of the hoppers observed during the VSI had collection units below them to collect waste particulates. The collection units appeared to be office/lab trash dumpsters (SWMU 123).

DATE OF STARTUP: Unknown.

DATE OF CLOSURE: Active.

WASTES MANAGED: Air emissions and particulate discharges from various manufacturing processes at SNLA.

RELEASE CONTROLS: The hoppers observed during the VSI had concrete pads located below them.

HISTORY OF RELEASES: Unknown.

CONCLUSIONS:

Air. Due to the design of the hoppers, the potential for release to air is high.

Soil. The potential for release is low due to the existing concrete pads.

Surface Water. The potential for release is low due to the existing concrete pads.

Ground Water. Due to the nature of the wastes and design of these units, the potential for a release to ground water is unlikely.

Subsurface Gas. There is no potential for subsurface gas generation due to the design of these units.

SWMU 122: Scrap Metal Dumpsters

UNIT DESCRIPTION: Scrap metal dumpsters, located throughout the facility, are used to store metal and other materials having reclaim value. These green dumpsters are managed by the Sandia Reclamation Department. They are open containers and do not have lids. The Department estimates that there are 75 dumpsters at Sandia.

DATE OF STARTUP: Unknown.

DATE OF CLOSURE: Active.

WASTES MANAGED: Scrap Metal

RELEASE CONTROLS: None.

HISTORY OF RELEASES: None reported.

CONCLUSIONS: The potential for release by all pathways is low due to the non-hazardous nature of the waste.

SWMU 123: Office/Lab Trash Dumpsters

UNIT DESCRIPTION: Office and/or lab trash dumpsters are located throughout the facility. The metal dumpsters are managed by the Transportation Department. The Department estimates that 140 dumpsters are present on site. Most of these dumpsters are brown; however, during the VSI, it was observed that several office/lab trash dumpsters were green. Their box-like shape and attached lid design distinguish them from the green scrap metal dumpsters. A sign posted on each dumpster states that liquid and hazardous wastes are not to be deposited in these units.

DATE OF STARTUP: Unknown.

DATE OF CLOSURE: Active.

WASTES MANAGED: General office and laboratory trash.

RELEASE CONTROLS: None.

HISTORY OF RELEASES: None reported.

CONCLUSIONS: The potential for release, to all pathways, is low due to the non-hazardous nature of the wastes.

SWMU 124: Bunker Area North of Pendulum Site

UNIT DESCRIPTION: Weapons tests are conducted in this area (Plate 13). Sandia personnel reported that radioactive soil was found during a radiometric survey. No further information about this site was available. This site could not be observed during the VSI because it is in a restricted area.

DATE OF STARTUP: Unknown.

DATE OF CLOSURE: Active.

WASTES MANAGED: Depleted uranium, beryllium, lead, high explosives.

RELEASE CONTROLS: None.

HISTORY OF RELEASES: Radioactive soil contamination was found during a radiometric survey (60 picuries per gram of uranium). Lead and beryllium are also likely to be present.

CONCLUSIONS:

Air. The potential for release of hazardous constituents to air in this area could be high due to the nature of the wastes and during explosive experiments.

Soil. The potential for prior release is high since contaminated soil has been found. The potential for ongoing releases is high since radioactive soils have not been removed.

Surface Water. Run-on/runoff controls do not appear to exist at the unit according to SNLA personnel. In addition, the unit is located in the foothills of the Manzano Mountains where slopes are steep and run-on/runoff generated by precipitation is likely to discharge to tributaries of the arroyos. Therefore, the potential for release to surface-water runoff and intermittant tributaries of the arroyos is high.

Ground Water. This unit is located within the fault zone bounded by the Hubbell Springs and Manzano faults. Ground water in this region appears to be at or near ground surface, based on the presence of springs and the Travertine Hills in the vicinity. Because the depth to ground water may be very shallow, the potential for release to ground water from surface water infiltration is high.

Subsurface Gas. The potential for subsurface gas generation is low due to the nature of the wastes, and the fact that wastes were released directly to the ground surface.

SWMU 125: Building 9920 - Firing Site

UNIT DESCRIPTION: This site was used for explosive test experiments. Shock wave experiments were conducted using air detonation of hydrogen MAPP gas and bromofluoro methane. In the 1960s, buried shot, including 0.5 to 1 kilograms of beryllium, were exploded in pits. Pits collapsed after detonation and most of the residual remained in the hole. Disks of cadmium sulfide, each 5-10 grams, were also blown apart. The exact location of this site is unknown.

DATE OF STARTUP: Estimated to be prior to 1960.

DATE OF CLOSURE: Inactive.

WASTES MANAGED: Explosives containing barium, lead, beryllium, lithium, manganese, cadmium and uranium, and small quantities of solvents (toluene, methanol, acetone).

RELEASE CONTROLS: Unknown.

HISTORY OF RELEASES: Small quantities of solvents (toluene, methanol, acetone) were dumped on the ground. In the 1960s, beryllium shots were detonated. Disks of cadmium sulfide were blown up in area.

CONCLUSIONS:

Air. The potential for prior release to air is high during explosive test experiments. The potential for ongoing releases depends on whether wastes remaining are small enough to be transported by winds.

Soil. Releases to soil have occurred in the past. The potential for ongoing releases is high since wastes remain on surface soils.

Surface Water. The potential for release of hazardous constituents to the surface water runoff is high because wastes remain on surface soils.

Ground Water. This unit is located on the plateau west of Hubbell Springs fault and the fault zone. Ground water in this area is known to be at least 450 feet or more below ground surface. Therefore, the potential for release to ground water is low.

Subsurface Gas. The potential for subsurface gas generation is minimal due to the nature of the wastes managed.

SWMU 126: Building 9820 - Explosive Contaminated Drains

UNIT DESCRIPTION: Drains inside Building 9820 (Plate 13) contain residue products of synthesis of high explosives. Solvents (including toluene, TCE) have also been discharged to the drains. No additional information was available at the time of the VSI.

DATE OF STARTUP: Unknown.

DATE OF CLOSURE: Inactive.

WASTES MANAGED: Solvents, explosive residue.

RELEASE CONTROLS: Unknown.

HISTORY OF RELEASES: Unknown.

CONCLUSIONS: Due to the lack of information regarding the design of the drains and where they discharge to, the potentials for release cannot be determined.

SWMU 127: Explosives Test Pit

UNIT DESCRIPTION: The unit is across from the water towers at the old Thunderbird test area (Plate 13). The unit is a concrete-lined pit, approximately 10 to 12 feet in diameter, and of unknown depth. It may have been used for buring. During the VSI, vermiculite was observed on the ground in the area. The pit is surrounded by barbed wire. No further information on the unit was available.

DATE OF STARTUP: Unknown.

DATE OF CLOSURE: Inactive.

WASTE MANAGED: Unknown.

RELEASE CONTROLS: Unknown.

HISTORY OF RELEASES: Unknown.

CONCLUSIONS:

Air. Due to the lack of information regarding the nature of the wastes and waste management activities, release potentials cannot be determined.

Soil. Due to the lack of information regarding the nature of the wastes and waste management activities, release potentials cannot be determined.

Surface Water. Due to the lack of information regarding the nature of the wastes and waste management activities, release potentials cannot be determined.

Ground Water. Due to the lack of information regarding the nature of the wastes and waste management activities, release potentials cannot be determined.

Subsurface Gas. The potential for release of subsurface gas from the unit is low due to the fact that wastes were disposed on or near the ground surface.

SWMU 128-129: Satellite Accumulation Stations (Buildings 834 and 864)

UNIT DESCRIPTION: Two waste accumulation stations are located in Technical Area I (Plate 6). These stations are used to store hazardous waste. The first station (SWMU 128) is a wire-mesh enclosed shed, adjacent to Building 834. It contains two bays. One bay is used to store virgin chemicals, the other is used to store waste acetone in 55-gallon drums. The drums are removed once a week. A closed piping system from inside the building discharges wastes to the drums. A concrete pad is located at the bottom of this SWMU. No information regarding overtopping controls was available during the VSI.

The second station (SWMU 129) is a yellow shed labeled "Flammable Liquid" near the southeast corner of Building 864. During the VSI, two drums containing TCE were observed. Sandia personnel reported that other non-chlorinated hydrocarbon solvents are sometimes discharged to these drums. Full drums are emptied into a vacuum truck and disposed off site. Information collected during the VSI suggest that the facility dedicates these drums for management of solvent waste disposal.

No other information regarding waste storage practices is available.

DATE OF STARTUP: Unknown.

DATE OF CLOSURE: Active.

WASTES MANAGED: Volatile solvents are stored at the sites including waste acetone and TCE and other non-chlorinated hydrocarbon solvents.

RELEASE CONTROLS: SWMU 128 has a concrete base and is surrounded by a concrete parking area. SWMU 129 has a steel floor which has a 4 inch curb to prevent run-on/runoff and acts as a secondary containment system.

HISTORY OF RELEASES: None reported.

CONCLUSIONS:

Air. The potential for release cannot be determined without further information regarding how wastes are discharged to these units.

Soil. It appears that the potential for release is low because SWMU 128 is surrounded by concrete pads and SWMU 129 has a secondary containment system.

Surface Water. The potential for releases to surface water is low due to the storage of waste in drums in a shed and the presence of secondary containment systems.

Ground Water. Wastes are contained in closed drums inside a shed or area with a secondary containment system. Therefore the potential for a release to ground water is low.

Subsurface Gas. There is no potential for subsurface gas generation due to the design of these units.

SWMU 130: Area II - Decontamination Area

UNIT DESCRIPTION: This SWMU was identified during the VSI. It is in Technical Area II across from Building 920. The unit, used as a wash-down area for radioactive contaminated waste, is a field enclosed by a fence. A radiation warning sign is posted at the gate. The total size of the area is unknown, but may be limited to the area within the fence (less than 2 acres).

DATE OF START UP: Unknown.

DATE OF CLOSURE: The unit is active.

WASTES MANAGED: This unit is used as a wash-down area for decontamination of radioactive equipment.

RELEASE CONTROLS: None observed during the VSI.

HISTORY OF RELEASES: None reported.

CONCLUSIONS:

Air. The potential for releases to air could be high due to misting during washdown operations.

Soil. Releases to soils have occurred since washwater is discharged directly onto surface soils. Because the unit is active, the potential for ongoing releases is high.

Surface Water. The potential for a release to surface water runoff is high since no secondary containment or run-on/runoff controls exist.

Ground Water. This unit is located on the plateau west of Hubbell Springs fault and the fault zone. Ground water in this area is known to be at least 450 feet or more below ground surface. Therefore, the potential for release to ground water is low.

Subsurface Gas. The potential for a release of subsurface gas from this unit is unlikely since wastes are discharged onto the ground surface.

SWMU 131: Building 920

UNIT DESCRIPTION: Building 920, constructed of concrete, is in Technical Area II. The inside of the unit could not be examined during the VSI because the facility's door was frozen shut. It was suggested by SNLA personnel during the VSI that the storage area is probably not full.

The unit stores used PCB transformers. Sandia personnel stated that material is stored in bermed areas and that floors are epoxy-coated.

DATE OF START UP: Unknown.

DATE OF CLOSURE: The unit is active.

WASTES MANAGED: The unit is used to store used PCB transformers.

RELEASE CONTROLS: Sandia reported that the unit contains bermed, epoxy coated floors.

HISTORY OF RELEASES: None reported.

CONCLUSIONS: Because waste material is apparently stored inside a building on an epoxy-coated bermed, concrete floor, the potential for a release, via all pathways, is low.

SWMU 132: Lead Firing Site

UNIT DESCRIPTION: The site is used to explode lead into equipment and test objects in unlined trenches. Explosion debris is deposited over a large area several acres in size. The lead particles range in size from submicron particles to fist-size fragments.

DATE OF STARTUP: Unknown.

DATE OF CLOSURE: The unit is active.

WASTES MANAGED: Lead test units are constructed of an inner core of steel surrounded by 3 to 4 inches of lead; the outer coating is steel. Each unit contains 3000 to 4000 pounds of lead. Wastes consist of exploded lead test units and other test objects.

RELEASE CONTROLS: None.

HISTORY OF RELEASES: Approximately 100 tons of lead have beem exploded onto soils since the unit's inception. Soil sampling conducted by Sandia indicates that soils fail the EPA toxicity test for lead.

CONCLUSIONS:

Air. The potential for release of hazardous constituents to the air in this area is high when experiments are exploded.

Soil. Releases to soil have occurred. The potential for continuing releases is high due to waste management practices.

Surface Water. The potential for release of hazardous constituents to the surface water runoff in this area is high because no run-on/ runoff controls exists.

Ground Water. This unit is located on the plateau west of Hubbell Springs fault and the fault zone. Ground water in this area is known to be at least 450 feet or more below ground surface. Therefore, the potential for release to ground water is low.

Subsurface Gas. The potential for release of subsurface gas is unlikely due to the nature of the wastes.

SWMUs 133-134: Bunkers Underground (No. 1 and 2)

UNIT DESCRIPTION: Two underground bunker facilities are located 2 miles south of Manzano Base. One bunker contains an outfall that discharges into an arroyo. It is likely that liquid wastes have been discharged to the arroyo according to SNLA personnel. The nature of the wastes is unknown. No information is available regarding the second bunker.

DATE OF STARTUP: 1960s.

DATE OF CLOSURE: Inactive since the 1970s.

WASTE MANAGED: Unknown.

RELEASE CONTROLS: Unknown.

HISTORY OF RELEASES: Unknown.

CONCLUSIONS: The potential for release to all pathways, cannot be determined due to the lack of information regarding wastes managed.

SWMU 135: Sandia Engineering Reactor

UNIT DESCRIPTION: The unit is a vessel reactor, located in Area V, and is considered to have high-level radioactive contamination. No further information is available.

DATE OF STARTUP: 1962.

DATE OF CLOSURE: 1970s.

WASTES MANAGED: Apparently high-level radioactive material.

RELEASE CONTROLS: Unknown.

HISTORY OF RELEASES: Unknown.

CONCLUSIONS: Due to the lack of information regarding wastes managed, the potentials for releases cannot be determined.

SWMUs 136 through 139: Coyote Test Field - Blast Bunker Area, Concrete Bunker Blast Area, Burn Area, Blast Tank Area

UNIT DESCRIPTION: The area (Plate 13) includes a blast bunker, a concrete block experiment blast site, burn experiment sites, an open-top tank used for explosive testing, and a building which could contain asbestos. The area was used to support the Model Blast Effects Program.

No further information was available regarding the operations at these areas. As it appears that wastes generated in these areas were deposited over soils during expolsives testing, they are considered to be SWMUs.

DATE OF STARTUP: Estimated to be in the late 1950s.

DATE OF CLOSURE: Inactive since approximately 1960.

WASTES MANAGED: Shrapnel, TNT, scrap metal, radionuclides.

RELEASE CONTROLS: None.

HISTORY OF RELEASES: Due to the function of this unit, releases to air and soil appear to be systematic.

CONCLUSIONS:

Air. The potential for prior release of hazardous constituents to was high during explosives testing. The potential for ongoing releases is high since wastes are not covered.

Soil. Releases to soil have occurred. The potential for ongoing releases is high since wastes remain on surface soils.

Surface Water. The potential for release of hazardous constituents to the surface water runoff in these areas is high since run-on/runoff controls do not exist.

Ground Water. These units are located on the plateau west of Hubbell Springs fault and the fault zone. Ground water in these areas is known to be at least 450 feet or more below ground surface. Therefore, the potential for release to ground water is low.

Subsurface Gas. The potential for release of subsurface gas is low due to the nature of the wastes in these units.

VII OTHER AREAS OF CONCERN

There are a number of areas at Sandia that do not meet the regulatory definition of a SWMU, but nevertheless pose a threat of environmental contamination. Releases of hazardous constituents from these areas have either been previously documented or are considered highly likely given the nature of activities in the area. These areas of concern area discussed below:

A. The Thunder Range cratering site is an area where explosives were detonated and classified tests performed between 1958 and 1970. Residuals from the detonations, both explosive and nuclear, remain on the ground; potassium permanagante is a common remant. Sandia personnel plan to sample this area during the CEARP - Phase II investigation.

B. At the beryllium firing site in Thunder Range near Bunker 9964, beryllium-containing components appear to be currently tested. The units are set off with small powder charges, which have been retained in catch boxes. Sandia personnel will sample during the CEARP - Phase II investigation.

C. The Firing Site adjacent to Building 9926 was constructed in the early 1960s. It is used to develop high explosives; shots are fired into lead containers. There may be lead, barium, beryllium, and uranium in the soil. Sandia personnel plan to sample the area during the CEARP Phase II investigation.

D. At the Firing Site inthe vicinity of Building 9990, experiments to simulate the effects of lightning on various weapons components are performed. The area is littered with shrapnel and high explosives debris (including lead, beryllium, and uranium). Adjacent bunkers contain nitromethane drums. Sanida personnel plan to conduct sampling in the area during the CEARP Phase II investigation.

E. Operations at the Madera Canyon test area began in the 1960s. Three main areas are used to test high explosives: 1) a meadow north of Lurance Canyon Road where, in 1983, balloons dropped explosives on targets in the meadow; 2) a gun-firing site where 155 mm guns fired conventional projectiles into mounds; there is some shrapnel in this area; and 3) the rocket launch area where rockets and missiles were launched; the area contained concrete pads, a launch rail and residual rocket propellant.

F. In the Moonlight Shot area near Building 9925, mock-up weapons and weapon components were fired. Residue includes depleted uranium. The site is currently inactive. Sanida personnel plan to conduct sampling in the area during the CEARP Phase II report.

G. At the Workman Site, work was performed during the 1940s to develop the proximity fuse. Debris from explosives tests remains. Equipment from blast overpressure tests performed at the Nevada Test Site has also been left at the site. Sandia personnel plan to conduct sampling in the area during the CEARP Phase II investigation.

H. At the Boxcar Site, the serial effects of detonation of a weapon unit into a railroad car carrying several weapon units were studied. Residual materials include TNT, lead, beryllium and depleted uranium. The dates of operation are unknown, but the site is currently inactive. Sandia personnel plan to conduct sampling the area during the CEARP Phase II investigation.

I. Area III contains two Sled Tracks currently used for impact and acceleration tests. The area around the tracks contains shrapnel, depleted uranium, lead, beryllium, metals and rocket propellant.

J. The Guard Tower and Trailer Firing Area is currently used for firing and explosives tests. There is shrapnel and finely-divided material, including high explosives, lead, beryllium, barium, and uranium in the soil. Sandia personnel plan to conduct sampling the area during the CEARP Phase II investigation.

K. The TNT explosive area is currently being used. Shrapnel and TNT are scattered over the area. Sandia personnel plan to conduct sampling in the area during the CEARP Phase II investigation.

L. The old battery gas cylinder storage has not been confirmed. Sandia personnel plan to investigate this area further during the CEARP Phase II by sampling soils and conducting geophysics surveys in the area.

M. A hydrochoric acid spill from an above ground hydrochloric acid tank, which was removed sometime after 1984. The tank capacity was approximately 7700 gallons. The tank was a fiberglass-reinforced plastic outside the northeast corner of Building 870, Area I (Plate 4). The tank stored 30 percent hydrocholoric acid. The tank did not have a secondary containment system.

Soil samples taken from the spill area were analyzed for pH. All soil samples had pH levels greater than 2.0 and were considered nonhazardous by EPA (37). Soil was not removed.

The elevation of Building 870 is unknown, but it is probably above the 100-year floodplain because it is not close to the arroyos or any gullies.

This property is owned by DOE, but currently operated by Bendix. Based on information received during the VSI, the approximate date of the spill was 1984. The release occurred when a technician working on the tank incorrectly diagnosed it as empty and removed a 1-inch-long flange from its base. Approximately 1000 gallons of the 30-percent hydrochloric acid was released and allowed to spill over the curb, down L Street, through Gate 9, and to the intersection of L and 14th streets. The acid was then washed into storm drains.

N. During a waste transfer operation in 1986, some drums with PCBs were spilled in the reclamation yeard (Plate 7). Though a spill was reported, no evidence of PCBs was found.

O. Outside Building 838 a mercury battern exploded in 1976, (Plate 4). Sandia plans to sample soil here during the CEARP Phase II investigation. Soil in area may be contaminated by mercury. The potential for a continuing release is high because waste has not been removed.

P. Five hundred gallons of No. 2. diesel was spilled from storage tanks on the north side of the Steam Plant (Building 605) (Plate 6). The spill was retained and recoverd. The exact date of the spill is unknown. Soil containing diesel fuel was reportedly removed from the site.

Q. In the vicinity of Building 875-876 (Area I) (Plate 4), motor pool fuel oil spilled into a gutter in 1983. The contaminated soil was removed and disposed at the chemial waste landfill in Area III.

R. In Area III (Plate 11), oil spills have occurred adjacent to the centrifuge and vibration facility. It is not known if the spills were cleaned up and the extent of these releases is unknown.

S. On the east side of Building 6596 (Area V), 1500 gallons of Shell 61 mineral oil from the Hermes Storage Tank spille on the ground in February 1985. Soils were tested for PCBs, but none were detected.

T. Two 100-gallon spills of waste oil have occurred from the above ground Proto oil storage tank. The spills were cleaned by draining the waste oil to a sump; the waste oil was removed from the sump by a commercial oil recycler.

Sandia personnel plan to sample soils here during CEARP Phase II investigation. Soils in the area may contain waste oil residue. The current potential for a release is high.

U. Fuel was stored in a outdoor 1000-gallon underground tank adjacent to Building 9920 (Plate 13). Oil spills occasionally occurred, when the tank was overfilled. The tank was first used in 1959.

Sandia personnel plan to investigate the area during the CEARP Phase II program.

V. In 1980 an oil spill caught fire in a 30-foot-diameter area adjacent to the Solar facility. The solar facility is south of Manzano Base (Plate 13). Trace hazardous materials contained in waste oil may still be present in the soil. Therefore the potential for a release is high.

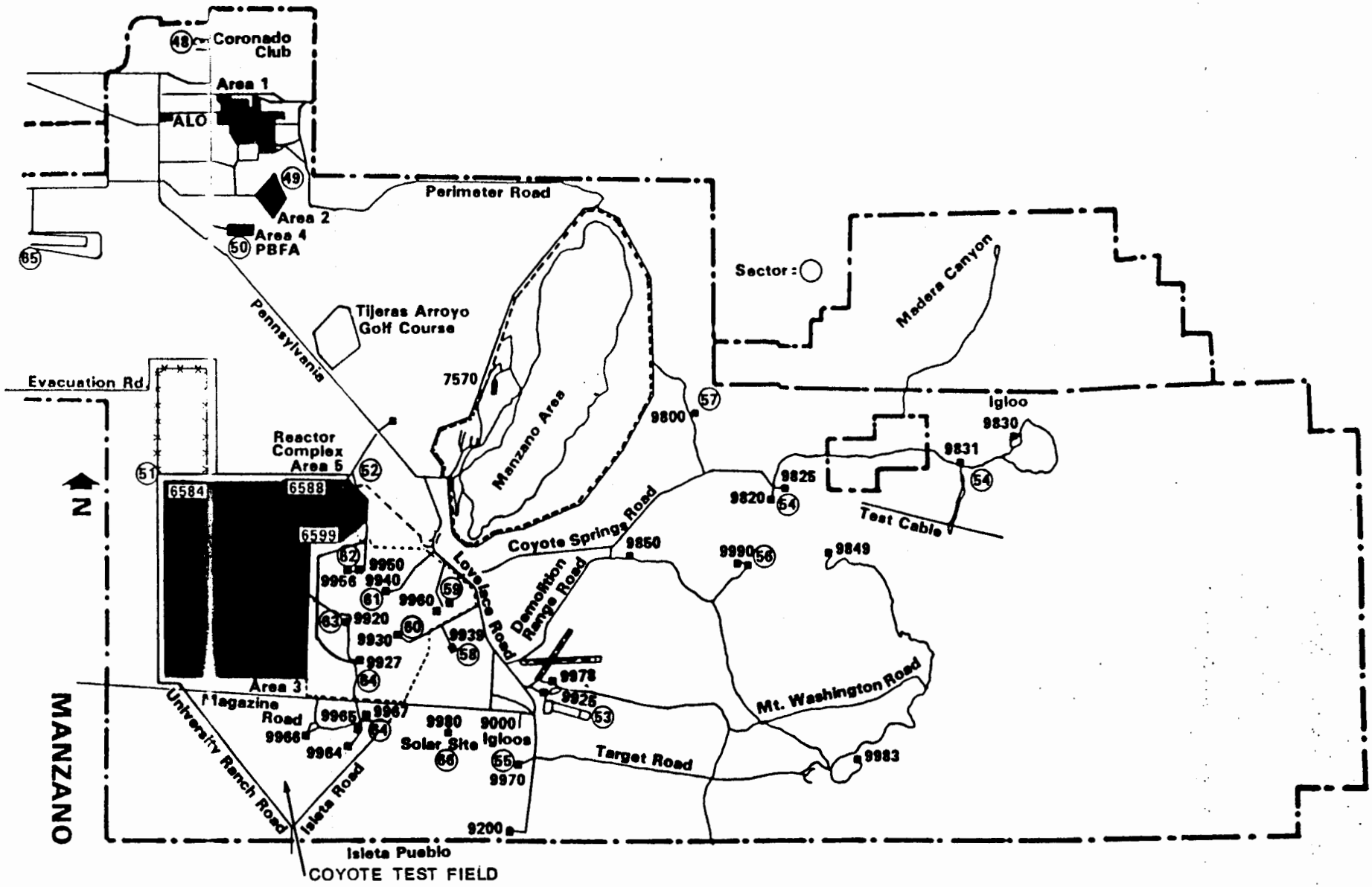
Sandia personnel plan to investigate the area during the CEARP Phase II program.

W. Igloo Area Spill. Fifteen gallons of Diesel No. 2 fuel spilled adjacent to the Igloo Area (Building 6020) (Plate 13). The contaminated soil was excavated and taken to Kirtland Air Force Base landfill.

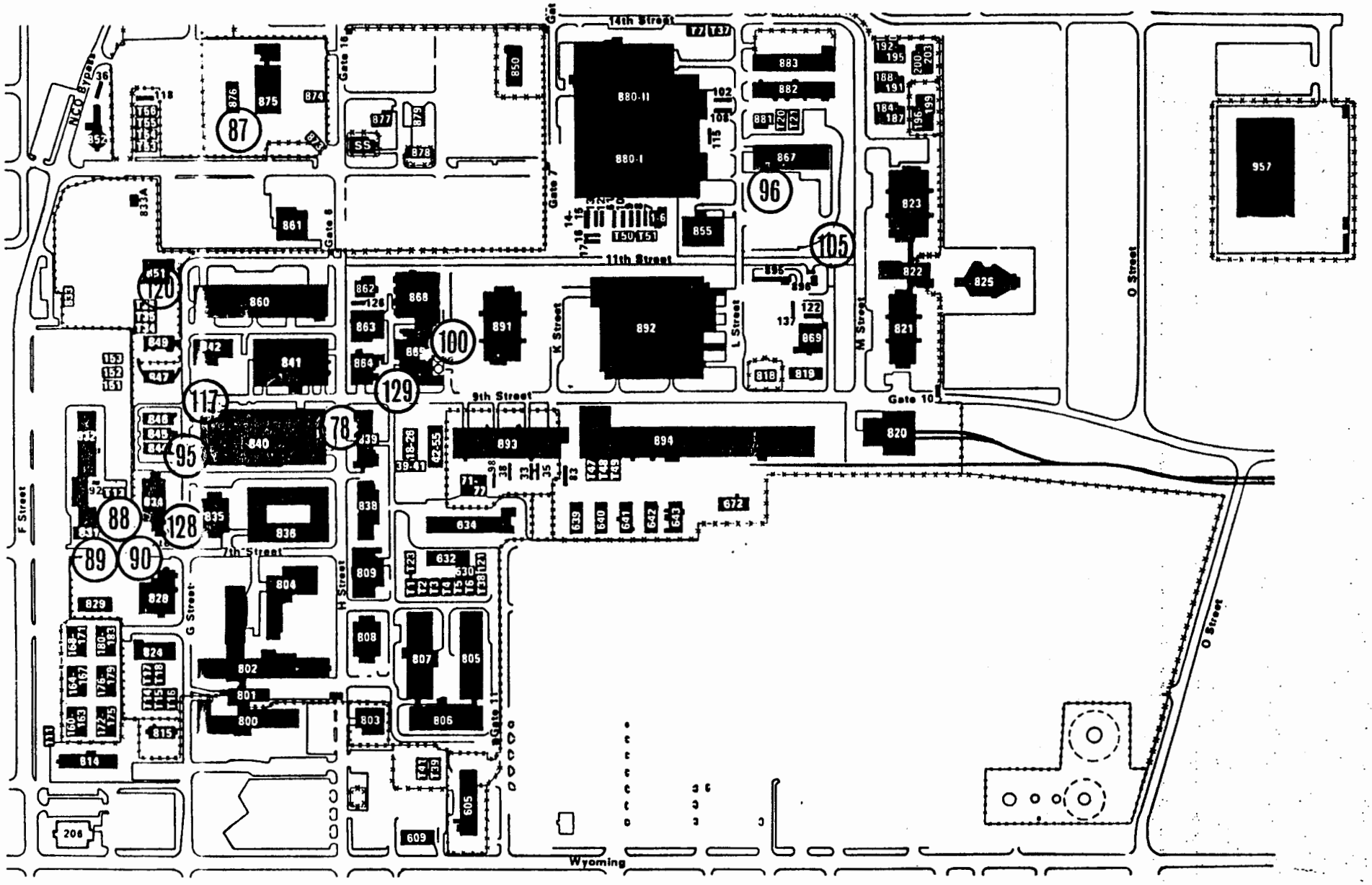
X. Stacks are located throughout the facility. The stack in Area IV is used to remove radioactive particles from exhaust from the hot cell laboratory and the reaction control containment room (filter building). Many of the stacks have HEPA filters. Stacks from the steam plant (Building 605) emit nitrogen dioxide, nitrogen disulfide, sulfur dioxide, and carbon monoxide. The stacks are emission controls units. Information regarding their efficiencey or how they are monitored was not available during the VSI.

VIII SUMMARY OF CONCLUSIONS

The table presented in Appendix 5 summarizes current release potentials for all SWMUs found at SNLA. Where a prior release differs from current release potentials, the factors which contribute to these differences are discussed in the "Comments" column. The factors contributing to high release potentials are also discussed in the "Comments" column.



KAFB and SNLA Areas I through V and Remote Test Areas



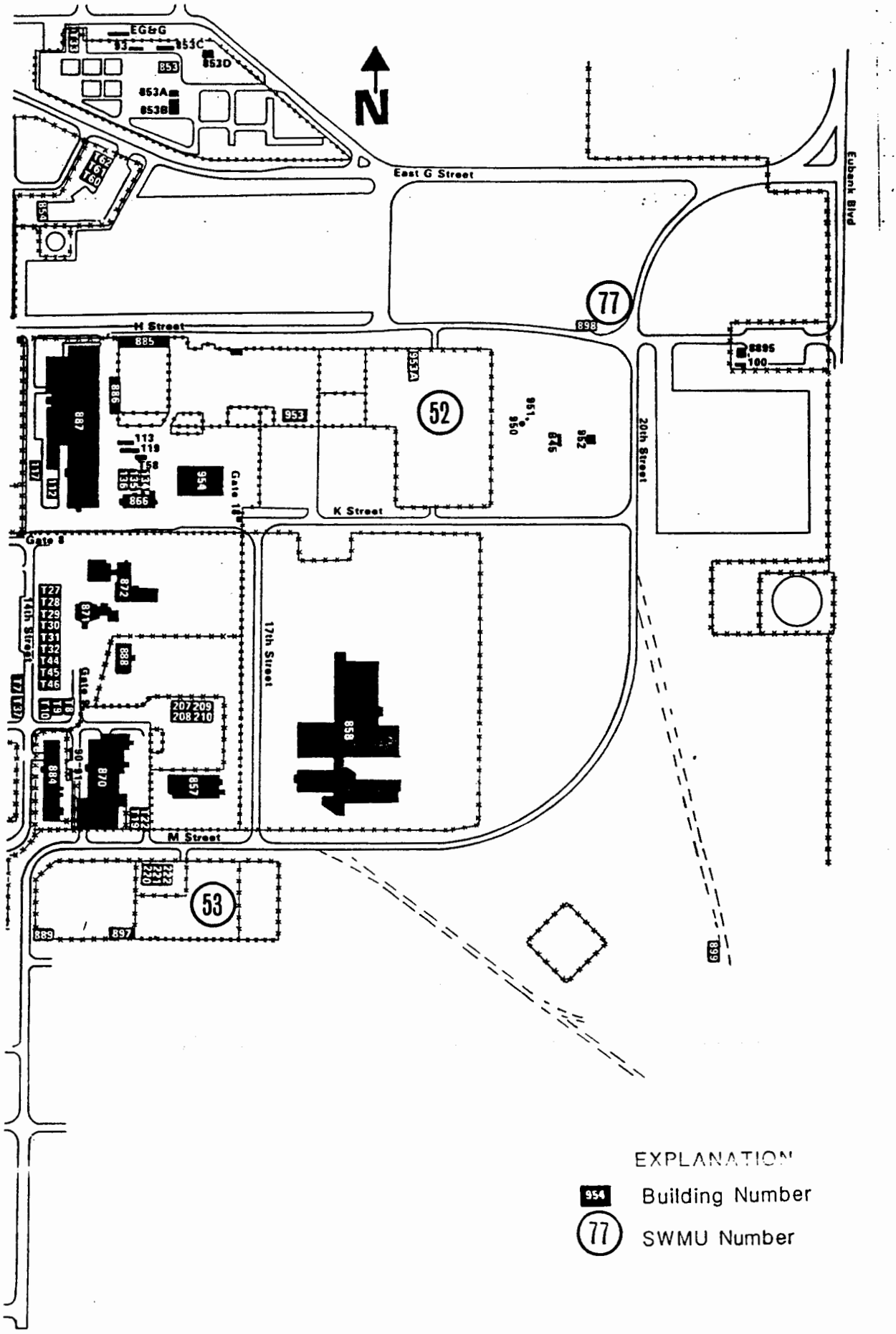
EXPLANATION

609 Building Number

96 SWMU Number

Area I SWMUS

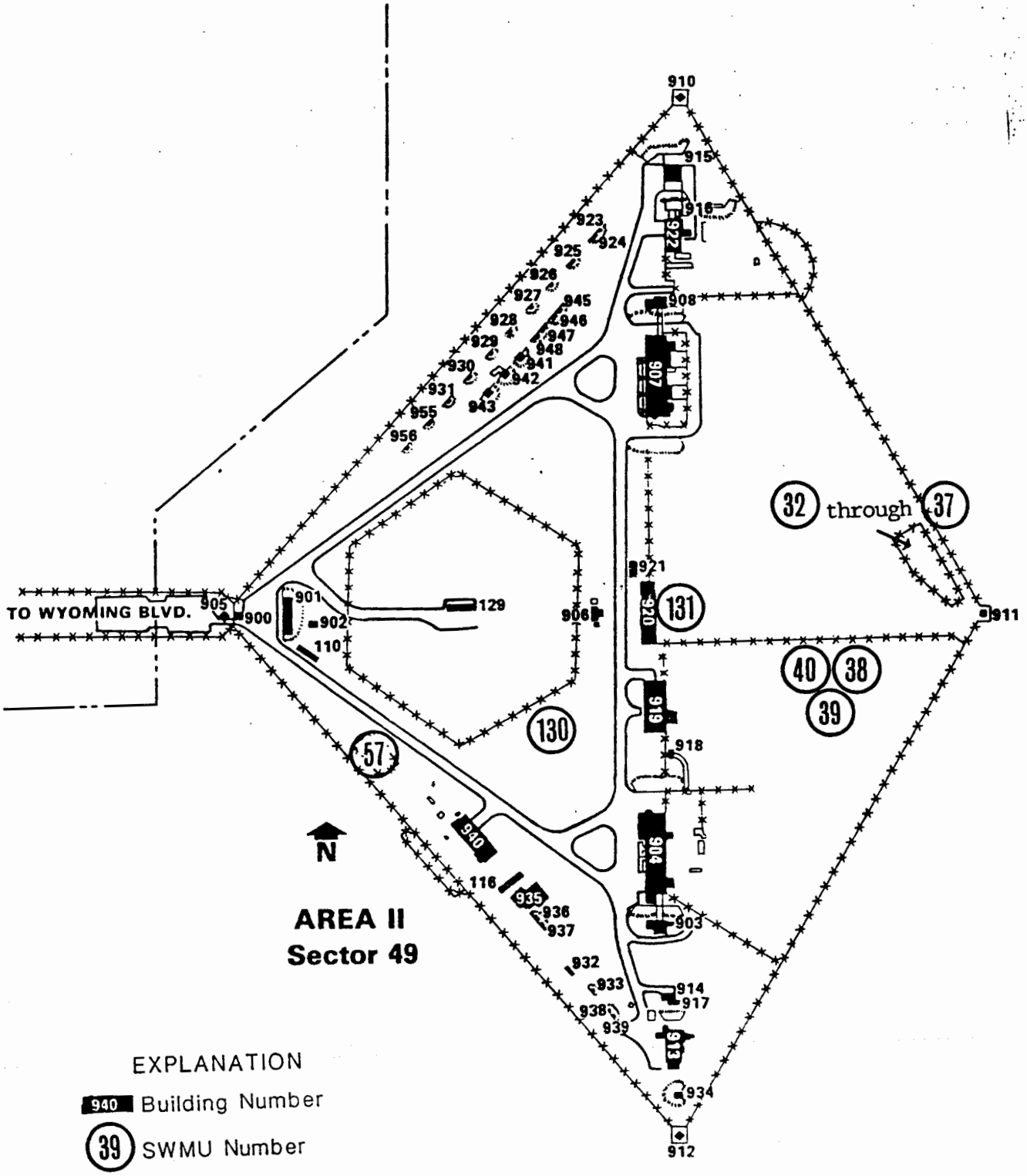
Plate 4



Plate

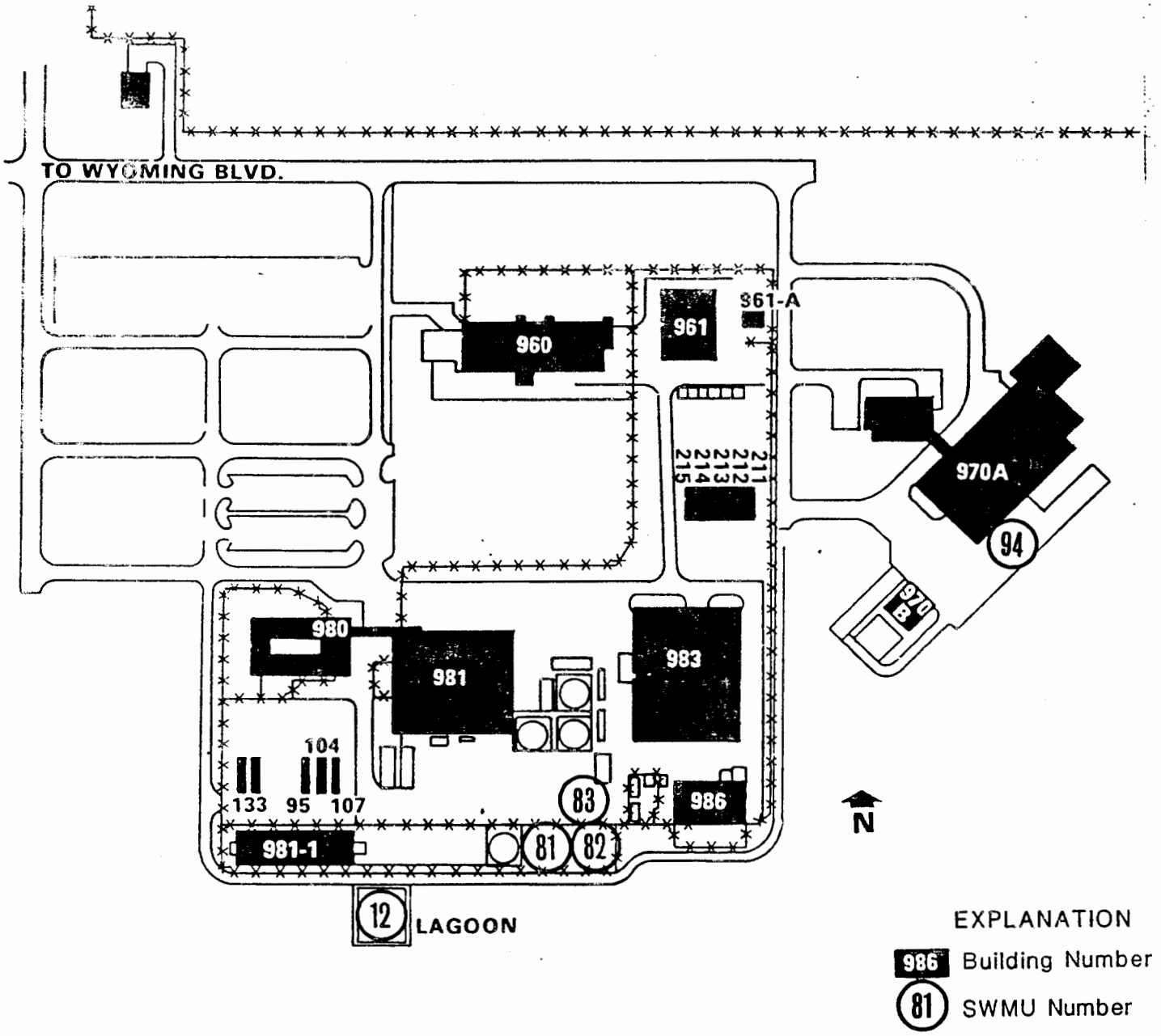
5

Area I SWMUS

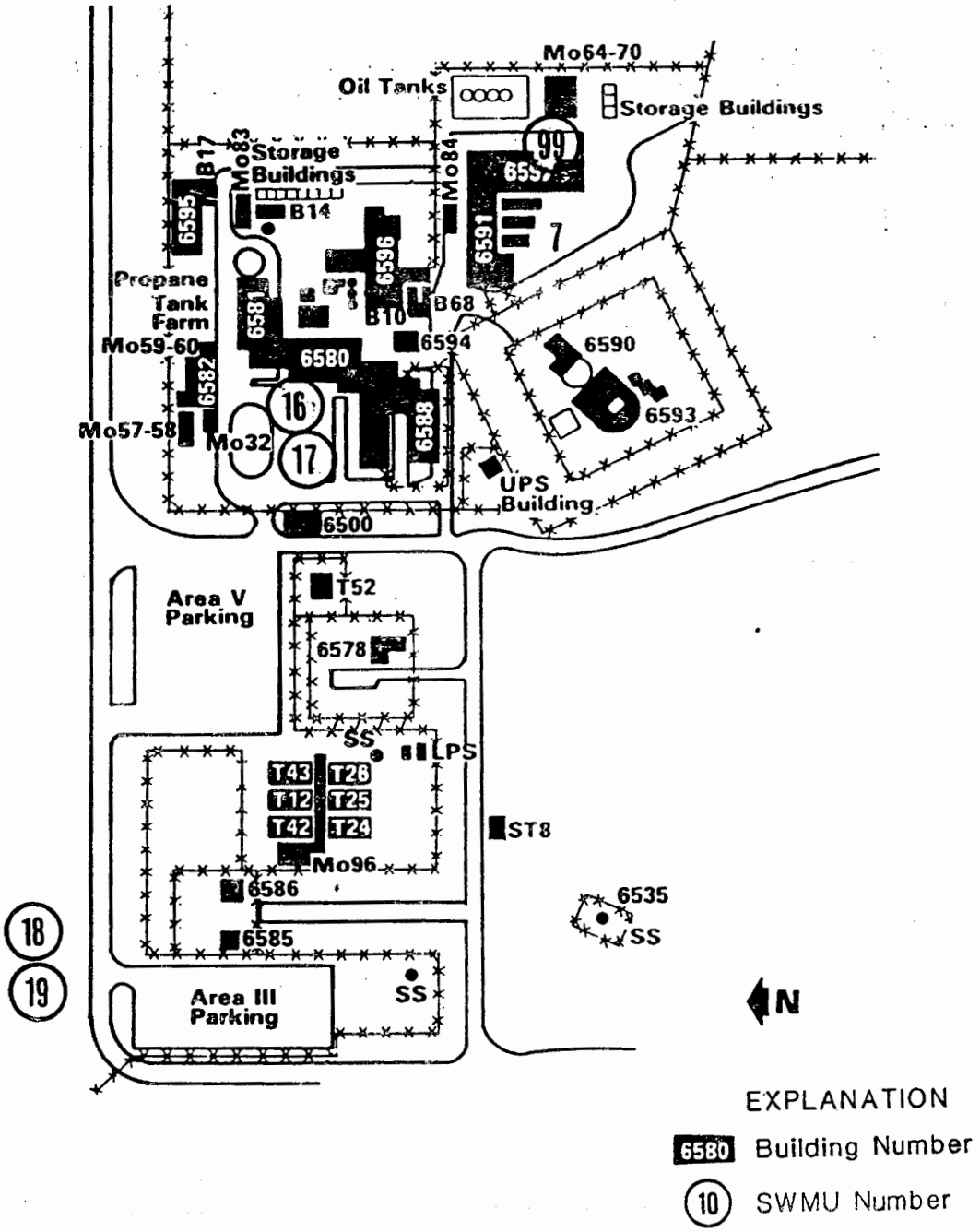


Area II SWMUS

Plate 7



Area IV SWMUS


Mo64-70
Oil Tanks
Storage Buildings
99
6557
7
6591
Mo84
Storage Buildings
B14
B17
Mo83
6595
6596
Propane Tank Farm
6581
B10
B68
6594
6590
Mo59-60
6580
6582
16
6593
Mo57-58
Mo32
17
6588
UPS Building
6500
Area V Parking
T52
6578
SS
LPS
T43
T28
T12
T25
T42
T24
ST8
Mo96
6586
6535
SS
18
6585
19
Area III Parking
SS
N
EXPLANATION
6580 Building Number
10 SWMU Number

Area V SWMUS

Appendix 1

VISUAL SITE INSPECTION SUMMARY

VISUAL SITE INSPECTION SUMMARY

A visual site inspection was conducted at Sandia National Laboratories, Albuquerque, New Mexico (SNLA) from January 19 through January 23, 1987. The weather was clear and cold (temperatures were below 32°F). The site was covered with snow during the entire VSI, therefore, many of the SWMUS were difficult to locate and photograph.

The VSI was conducted by Lauretta Dry and Carol Serlin, hydrogeologists with Harding Lawson Associates. The following individuals were also present during all or part of the VSI.

Gordon Smith	Supervisor Environmental Protection and Hazardous Waste Management; SNLA
Jim Phelan	Industrial Hygenist; SNLA
Margie Martz	Environmental Specialist; Los Alamos Laboratory
Denise Gelston	Engineer; DOE
Bob Parks	
Louise Dalton	
J. Ken Greer	Environmental Engineer; DOE
Sharon Felicitti	Environmental Specialist; SNLA
Russell Smith	Photographer, SNLA
Phyliss Pei	Environmental Specialist; SNLA

During the entire VSI, photographs were taken by Sandia personnel. Russell Smith took photographs from January 19, 1987 through the afternoon of January 21, 1987 using a Pentax camera with a 55 mm lens. Jim Phelan took

photographs from the afternoon of January 1, 1987 through January 22, 1987 using an Olympus OM1. All photographs were developed by Sandia and reviewed by SNLA and DOE classification personnel prior to release to HLA.

Chronology

January 19, 1987

09:30	Serlin arrives at site and is met by G. Smith. Serlin gets badge; is escorted to Smith's offices.
10:00	Arrive at Environmental Protection and Hazardous Waste Management Division's offices. Serlin begins reviewing draft Phase I CEARP report in presence of G. Smith and J. Phelan.
13:30	Dry arrives on site. Phelan and Serlin pick her up and return to offices. Serlin and Dry meet with Phelan, Gelston, G. Smith and R. Smith. Overview of SNLA operations presented by G. Smith and Phelan. Phelan and Dry discuss SWMU's to be seen. Serlin continues reviewing CEARP report.
15:00	Serlin, Dry, Phelan, Gelston, G. Smith, and R. Smith begin survey of SWMUs. R. Smith drives a separate car. Visit Building 895, underground tanks in Area I, Satellite Accumulation Facilities, Reapplication Yard, Blue Oil Tank, and site of Hydrochloric Acid Spill (now on property managed by Bendix). While driving Dry noted presence of drums of waste oil stacked next to Building 840. Photographs were taken at each location.
16:00	Return to office. Dry and Phelan discuss areas to be seen on Tuesday, January 20, 1987. Serlin continues reviewing CEARP report.
16:30	Phelan takes Serlin and Dry to Building 800. They return badges and check out.
17:00	Serlin and Dry off site.

January 20, 1987

08:00	Dry and Serlin on site. Phelan arrives and picks up badges, escorts Serlin and Dry to offices.
09:00	Serlin and Dry meet with Phelan, Gelston, Martz, Sides and Felicitti. Felicitti gives a briefing on the ground-water regime at SNLA, specifically in the area of the chemical waste landfill. Serlin continues reviewing CEARP report.
10:30	Serlin, Dry, Phelan, Martz, Sides and Gelston begin drive through of Area III. Met with R. Smith who drives separate truck. Visit Chemical Waste Landfill, Gas Cylinder Disposal Pit, Salvage Yards, Building 6924, Radioactive Landfills for classified wastes, Thermal Treatment Unit, and Incinerator. Photographs taken at each location.
12:00	Stop for lunch. Picked-up additional participant, Greer.
13:00	Resume drive-through with visit to Area II. See Radioactive Dumpsite, Classified Waste Disposal Site, Chemical Waste Disposal Site, Decontamination Area, and Radioctive Salvage Yard. Complete II and drive to Area IV. Visit Area IV Lagoon, Underground Tank and Concrete Sump, then return to Area III. Photographs taken at each location.
15:00	Drop off Greer at DOE offices. Resume VSI near Area V. Visit building debris in Coyote Arroyo, Stack in Area V, and Lagoon next to Area V (water was discharing to lagoon). Area V cannot be entered without a clearance; Dry, Serlin and Sides do not have clearances. Visit Building 6587 area. See hopper, Dumpster for Scrap Metal, one Drum labeled "dirty mineral spirits", and Underground Tank. Photographs taken at each location.
14:00	Return to offices. Serlin finishes reviewing CEARP report. Phelan gives Dry three papers: IT SWMU report, radioactive disposal sites report, and chemical waste landfill report.
17:00	Dry, Serlin and Sides are escorted to Building 800 by Phelan. Return badges and check out.
17:30	Serlin and Dry off site.

January 21, 1987

08:15	Serlin and Dry arrive at site. Meet Sides at badge area. Check in. Meet Phelan who escorts all to offices.
08:30	Meeting in conference room with Dry, Serlin, Sides, Martz, Phelan, Greer, Gelston, and Pei. Pei gives overview of all underground and above-ground waste holding tanks. It is determinated that neutralization tanks (SWMU 23, HLA initial RFA report) are at KAFB and do not belong to SNLA. Discuss dumpster categories and management.
10:00	Greer asks to review documents given to HLA by SNLA. Decides that some documents have not gone through classification procedures and therefore cannot be released to HLA. He retains document on radioactive disposal sites and will not allow SNLA to release IT report "RCRA Interim Status Ground-water Monitoring Plan - Chemical Waste Landfill, Project No. 651003, December 1985" to HLA because they may contain Section 148 material. DOE will have to review these documents and release to EPA at which point EPA will decide if they can be released to HLA.
11:45	Prepare to continue drive-through with Dry, Serlin, Sides, Gelston, Martz, and Phelan. Greer cannot go. Visit Coyote test field and remote areas. See Lurance Canyon Lagoon, Landfill, Drums, Salvage Yard and the New Aerial Cable Site, Mine Salvage Yard, Coyote Canyon Open Dump, Pendulum Site Mounds, Pressure Vessal test Site, Coyote Canyon Test Field, Schoolhouse Mesa Burial Site and Open Dump, and Scrap Yard Northwest of Old Aerial Cable Site. Photographs taken at each location.
16:30	Drop Geltson off at DOE. Return to offices.
17:00	Phelan escorts Sides, Serlin and Dry to Building 800. Return badges and check out.
17:15	Serlin and Dry off site.

January 22, 1987:

08:00	Serlin and Dry on site. Held up at front gate because guards are searching for someone inside KAFB.
9:00	Serlin and Dry meet Phelan. Get badges and proceed to offices. Serlin, Dry, Martz, and Phelan discuss agenda for the day. DOE wants close out meeting. Will be conducted Friday January 23, 1987.
10:00	Serlin, Phelan, Dry and Martz leave to continue VSI. Visit East Salvage Yard, Pickax Site, North Salvage Yard, Shock Tube Debris Area, Lead Firing Site, Gas Cylinders - Building 9964, Burial Mounds, Old Burn Site, Outfall, Building 9990, and Tijeras Arroyo dump. Return to Area I. See Hoppers at Buildings 841 and 840 and Above-Ground Tank at Building 865.
15:30	Return to offices. Discuss spills described in Unusual Occurrence Report file (UOR). There were seven reported spills in 1986; all spills were inside buildings. One release of tritium, to the sanitary sewer was reported.
16:00	Dry and Serlin are escorted to Building 800. Return badges and check out.
16:30	Dry and Serlin off site.

January 23, 1987

08:00	Serlin returns to California.
08:30	Dry arrives at SNLA, meets Phelan and is escorted to office. Meets with Phelan and Martz to address last minute questions.
11:00	Close-out meeting beings. Participants are Parks, Dalton, Gelston, Greer, Phelan, G. Smith, Martz, and Dry. Discuss results of visit. Dry is told that photos will be developed, reviewed by SNLA and DOE classification personnel, and will then be sent to HLA. Should not be more than two weeks. HLA can contact Jim Phelan directly with questions. Dry and Greer discuss DOE's role. Greer gives Dry copy of Radioactive Landfill Disposal report.
12:00	Phelan escorts Dry to Building 800, returns badge and Dry checks out. VSI is completed.

Site observations during the VSI were recorded in VSI logbooks maintained by Dry and Serlin; photographs of SWMUs are included with this summary.

Appendix 2

VISUAL SITE INSPECTION FIELD LOGBOOKS

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APPENDIX 4

Tables D-2, D-3, D-7, and D-8 are excerpts from the following Reference Document prepared by International Technology Corporation (IT) and dated December, 1985: "RCRA INTERIM STATUS GROUNDWATER MONITORING PLAN "
Chemical Waste Landfill
Sandia National Laboratories
Alburquerque, New Mexico

INTERNATIONAL TECHNOLOGY CORPORATION

TABLE D-2

RESULTS OF SELECTED METALS ANALYSES OF SELECTED BOREHOLE SAMPLES COLLECTED AT SNLA CHEMICAL WASTE LAND DISPOSAL FACILITY(1)

SAMPLE NUMBER	ARSENIC	BARIUM	BERYLLIUM	CHROMIUM	LEAD	MERCURY	SILVER
T1-3	3.4	<1	<1	12	11	.20	2.0
T2-3	1.9	6.1	<1	7	3.0	<0.11	2.0
T2-5	2.6	13	<1	15	19	<0.11	2.0
T2-7	0.77	2.7	<1	5.0	1.0	<0.11	<1.0
T3-3	2.4	7.2	<1	22	9.0	.64	2.0
T4-3	4.5	14	<1	11	11	<0.11	2.0
T4-5	1.8	8.3	<1	9.0	10	<0.11	2.0
T5-3	3.8	15	<1	11	15	<0.11	2.0
T7-3(2)	<30	180	0.3	5.0	54	--(3)	<3
T8-3	3.4	13	<1	11	11	.23	2.0
T9-3	15	29	<1	12	13	<0.11	4.0
T10-3	36	12	<1	11	8.0	<0.11	2.0
T11-3	2.4	9.5	<1	11	5.0	<0.11	2.0
T12-3	5.6, 5.7	13	<1	15	4.0	<0.11	2.0
PE-3	6.4	12	<1	8.0	10	<0.11	2.0
PN-3	3.7	13	<1	19	15	<0.11	4.0
PS-3	4.0	14	<1	12	11	<0.11	2.0
PW-3	5.6	20	<1	14	11	.12	2.0

(1) All results reported as ppm metal in soil; analyses were performed on digested soil samples as described in the text.

(2) Metals analysis performed by inductively coupled plasma atomic absorption spectrophotometry.

(3) Analysis not available.

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APPENDIX 4

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INTERNATIONAL TECHNOLOGY CORPORATION

TABLE D-3

RESULTS OF SELECTED METALS ANALYSES OF SELECTED TRENCH SAMPLES COLLECTED AT SNLA CHEMICAL WASTE LAND DISPOSAL FACILITY(1)

SAMPLE NUMBER	ARSENIC	BARIUM	BERYLLIUM	CHROMIUM	LEAD	SILVER
TR2-1	<30	89	0.5	13	73	<3
TR2-4	<30	100	0.4	4.0	<10	<3
TR3-3	69	81	0.4	57	610	<3
TR3-5	<30	120	0.5	7.0	23	<3
TR4-1	46	120	0.3	4.0	17	<3
TR4-5	<30	130	0.4	4.0	<10	<3
TR4-9	<30	110	0.3	5.0	37	<3
TR6-1	<30	100	0.3	4.0	33	<3
TR7-1	<30	88	0.3	31	65	<3
TR9-2	<30	100	0.3	4.0	25	<3
TR10-2	<30	86	1.6	4.0	6900	<3

(1) All results reported as ppm metal in soil; analyses were performed on digested soil samples as described in the text.

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APPENDIX 4

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Chemical Waste Landfill
Sandia National Laboratories
Alburquerque, New Mexico

TABLE D-7

RESULTS OF ANALYSES FOR ORGANIC COMPOUNDS IN SELECTED BOREHOLE SAMPLES COLLECTED AT SNLA CHEMICAL WASTE LAND DISPOSAL FACILITY
(Continued)

SAMPLE NUMBER	VOLATILE ORGANICS(1)	BASE NEUTRAL EXTRACTABLE ORGANICS(2)	ACID EXTRACTABLE ORGANICS(2)
T10-3	ND	di-n-Octyl Phthalate - 0.23	ND
T11-3	ND	Bis(2-ethylhexyl) Phthalate - 0.21 di-n-Butyl Phthalate - 0.20	ND
T12-3	ND	Bis(2-ethylhexyl) Phthalate - 0.22	ND
PE-3	ND	Bis(2-ethylhexyl) Phthalate - 0.28 di-n-Butyl Phthalate - 0.14	ND
PW-3	Chloroform - 12	Bis(2-ethylhexyl) Phthalate - 0.24 di-n-Butyl Phthalate - 0.12	ND
PN-3	ND	Bis(2-ethylhexyl) Phthalate - 0.28	ND
PS-3	ND	Butylbenzyl Phthalate - 0.39	ND

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TABLE D-7

RESULTS OF ANALYSES FOR ORGANIC COMPOUNDS IN SELECTED BOREHOLE SAMPLES COLLECTED AT SNLA CHEMICAL WASTE LAND DISPOSAL FACILITY

SAMPLE NUMBER	VOLATILE ORGANICS(1)	BASE NEUTRAL EXTRACTABLE ORGANICS(2)	ACID EXTRACTABLE ORGANICS(2)
T1-3	1,1,1 Trichloroethane -19	N-Nitrosodiphenylamine - 0.26	ND
T2-3	Methylene Chloride - 47 Carbon Disulfide - 12	Bis(2-ethylhexyl) Phthalate - 0.33	ND
T3-3	Methylene Chloride - 45	Bis(2-ethylhexyl) Phthalate - 1.4 N-Nitrosodiphenylamine - 0.99	ND
T4-3	ND	ND	ND
T4-5	ND	ND	ND
T5-3	ND	ND	ND
T7-3	Acetone - <10 2-Nitropropane - <10	--	--
T8-3	ND	di-n-Octyl Phthalate - 0.20	ND
T9-3	Chloroform - 23	di-n-Butyl Phthalate - 0.10 di-n-Octyl Phthalate - 0.42	ND

(1) Concentrations reported in ppb for all compounds detected; compounds listed in Table 4 present in concentrations less than 10 ppb are not detectable by the analytical methods used; "ND" = no compounds listed in Table 4 detected; "--" = no analysis.

(2) Concentrations reported in ppm for all compounds detected; compounds listed in Tables 5 and 6 present in concentrations less than 10 ppm are not detectable by the analytical methods used; "ND" = no compounds listed in Tables 5 and 6 detected; "--" = no analysis.

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APPENDIX 4

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Sandia National Laboratories
Alburquerque, New Mexico

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TABLE D-8

RESULTS OF ANALYSES FOR VOLATILE ORGANIC COMPOUNDS IN SELECTED TRENCH SAMPLES COLLECTED AT SNLA CHEMICAL WASTE LAND DISPOSAL FACILITY

SAMPLE NUMBER	VOLATILE ORGANIC COMPOUND (1)
TR2-1	Chloroform Methylene Chloride Toluene Hexane Acetone - 15
TR2-4	Chloroform Methylene Chloride Acetone - 13
TR3-3	Methylene Chloride Trichloroethylene Trichlorotrifluoromethane Acetone - 17
TR3-5	Methylene Chloride Trichloroethylene - 10 Hexane - 10
TR4-1	Methylene Chloride - 26 Acetone - 150
TR4-5	Benzene Chloroform - 16 Methylene Chloride - 10 Acetone - 71 Dimethoxymethane
TR4-9	Acetone - 26
TR6-1	2-Nitropropane

(1) Concentrations reported in ppb for compounds detected in concentrations greater than or equal to 10 ppb; compounds detected but with concentrations less than 10 ppb are noted without concentration data; compounds listed in Table 4 are those that would be identified by the analytical methods used; "ND" = no compounds listed in Table 4 detected.

SANDIA NATIONAL LABORATORIES

APPENDIX 4

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Alburquerque, New Mexico

INTERNATIONAL TECHNOLOGY CORPORATION

TABLE D-8

RESULTS OF ANALYSES FOR VOLATILE ORGANIC COMPOUNDS
IN SELECTED TRENCH SAMPLES COLLECTED AT
SNLA CHEMICAL WASTE LAND DISPOSAL FACILITY
(Continued)

SAMPLE NUMBER	VOLATILE ORGANIC COMPOUND (1)
TR7-1	Chlorobenzene Chloroform 1,2-Dichloropropane Ethylbenzene Tetrachloroethylene Toluene - 16 Trichloroethylene - 10 Acetone - 15 Cyclohexane,1,1,3 Trimethyl Xylene - 47
TR7-3	2-Nitropropane Acetone
TR9-2	ND
TR10-2	ND

(1) Concentrations reported in ppb for compounds detected in concentrations greater than or equal to 10 ppb; compounds detected but with concentrations less than 10 ppb are noted without concentration data; compounds listed in Table 4 are those that would be identified by the analytical methods used; "ND" = no compounds listed in Table 4 detected.