DOE/EA--1100

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LAN-92-0039

# *Environmental Assessment*

# *High Explosives Wastewater Treatment Facility*

LOS ALAMOS NATIONAL LABORATORY

Los Alamos, New Mexico

Date Prepared: August 3, 1995

Prepared by: U.S. Department of Energy, Los Alamos Area Office

# DISCLAIMER

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## EXECUTIVE SUMMARY

The Department of Energy (DOE) has identified a need to improve the management of wastewater resulting from high explosives (HE) research and development work at Los Alamos National Laboratory (LANL). LANL's current methods of managing HE-contaminated wastewater cannot ensure that discharged HE wastewater would consistently meet the Environmental Protection Agency's (EPA's) standards for wastewater discharge. The DOE needs to enhance HE wastewater management to be able to meet both present and future regulatory standards for wastewater discharge. The DOE also proposes to incorporate major pollution prevention and waste reduction features into LANL's existing HE production facilities.

The *No Action Alternative* serves as a baseline for comparing alternatives for meeting DOE's purpose and need for Agency action. Under the *No Action Alternative*, LANL would continue to operate its existing treatment facility with no implementation of wastewater reduction technologies. The existing treatment facility consists of a prefabricated shed that houses a collection tank, pumps, carbon filters, and associated plumbing and utilities. Currently, wastewater from HE processing buildings at four Technical Areas (TAs) accumulates in sumps where particulate HE settles out and barium is precipitated. Wastewater (approximately 12 million gal/yr) is then released from the sumps to the environment at 15 permitted outfalls without treatment. The released water may contain suspended and dissolved contaminants, such as HE and solvents. In addition to HE process wastewater, the outfall piping also collects uncontaminated stormwater (1.5 million gal/yr) and non-HE industrial water (5 million gal/yr). Because the stormwater and industrial water passes through HE-contaminated outfall piping, they are also considered to be HE-contaminated. Slurry (particulate HE) that accumulates in the sumps is periodically collected by truck, then filtered, dried, and burned at LANL's HE burn ground at TA-16. Wastewater from the slurry (approximately 36,000 gal/yr) is collected and pumped through activated carbon filters at the existing treatment facility, which is located at the burn ground, before being released to the environment at another permitted outfall. The *No Action Alternative* would not meet the purpose and need for agency action; HE wastewater discharges would periodically violate existing and future EPA discharge standards.

This Environmental Assessment (EA) analyzes two alternatives, the *Proposed Action* and the *Alternative Action*, that would meet the purpose and need for agency action. Both alternatives would treat all HE process wastewater using sand filters to remove HE particulates and activated carbon to adsorb organic solvents and dissolved HE. Under either alternative, LANL would burn solvents and "flash" (heat briefly at high temperature) dried HE particulates and spent carbon following well-established procedures. Burning would produce secondary waste that would be stored, treated, and disposed of at TA-54, Area J.

The *Proposed Action* would reduce the amount of water used in HE processing by approximately 99% by installing new equipment that filters and recycles water and by replacing water-sealed vacuum pumps and wet HE collection systems with systems that do not use water. Sources of non-HE industrial water would be eliminated as well. Outfall piping would be decontaminated and stormwater would be allowed to discharge through the decontaminated piping. Solvents would be extracted at the processing facilities and would not contaminate the HE wastewater. About 130,500 gal/yr of HE wastewater would then require treatment, but this volume would exceed the capacity of the existing treatment facility. Trucks would collect HE wastewater from the processing facilities and deliver it to a new treatment facility that would be built adjacent to the existing treatment facility. A garage would be built to house the collection trucks. The new treatment facility would also use the existing filtration system and would treat the HE wastewater by pumping it through activated carbon filters. After treatment, wastewater would be released to the environment at the same outfall used by the current treatment facility.

The *Alternative Action* would not reduce the amount of wastewater or contaminants produced by the HE processing facilities, but it would eliminate the non-HE industrial water and allow stormwater to discharge through decontaminated outfall piping. Approximately 12 million gal/yr of HE wastewater would still require treatment. Because of this volume of water, trucks could not efficiently haul all wastewater to treatment facilities. Instead, most HE wastewater would be delivered via gravity-flow piping systems. Two new treatment facilities (one at TA-16 and one at TA-9) would be needed to accommodate the topographic requirements of gravity feed pipelines. A garage would be built to house the trucks used to collect water from outlying facilities. Methods of filtering slurry and activated carbon filtration would be the same as for the *Proposed Action* and the *Alternative Action*. After treatment, wastewater would be discharged to the environment at two of the permitted outfalls, one at TA-16 at the existing treatment facility and one at TA-9.

Both the *Proposed Action* and the *Alternative Action* would reduce the contaminants in HE wastewater that is released to the environment. Both would reduce water usage (the *Proposed Action* by about 17 million gal/yr, the *Alternative Action* by about 5 million gal/yr). The *Proposed Action* would eliminate HE wastewater discharge from 15 outfalls; the *Alternative Action* would eliminate HE discharge from 14 outfalls. Six outfalls would continue to discharge stormwater. The *Proposed Action* would increase the discharge of treated water at the existing treatment facility outfall from 36,000 gal/yr to 130,500 gal/yr. The *Alternative Action* would increase discharge of treated water at the existing treatment facility outfall to 6.2 million gal/yr and to 4.7 million gal/yr at a TA-9 outfall.

Changes in water discharge would affect small man-induced wetlands associated with the HE outfalls. Under the *Proposed Action*, as much as 3.31 acres of the total acres of outfall-associated wetlands in the affected TAs could dry up; under the *Alternative Action*, a maximum of 3.15 acres of wetland could be lost. Stormwater from the six remaining outfalls, other industrial discharges from other outfalls, and other sources of natural water may reduce these projected wetland losses. Increased flow at the existing TA-16 treatment facility outfall would occur under either alternative. Some increase in wetland habitat, either at, or downstream from, the treatment facility could be expected. Under the *Alternative* Action, increased flow at the TA-9 treatment facility outfall could cause scouring of the existing wetland, but would probably create some additional wetland downstream from the TA-9 outfall. Loss or deterioration of wetlands is expected to have minor and localized effects on biodiversity, especially of water-dependant species with small home ranges. Larger species, like deer and elk, would be expected to alter their daily and seasonal movement as a response to changes in water availability but these changes are expected to be within the normal year-to-year variations in their ranges.

One wetland contains a small stand of willows that could provide marginal habitat for Southwestern willow flycatchers. Continuing stormwater discharge is expected to maintain this wetland. Therefore, no adverse effects to Southwestern willow flycatchers are expected. A pair of Mexican spotted owls has been found nesting within 1.5 miles of the proposed site for constructing the High Explosives Wastewater Treatment Facility (HEWTF). Nesting habitat occurs within 0.6 miles of the proposed construction site; a small patch of roosting habitat occurs within 0.25 miles of the proposed construction site. Proposed construction and operation of the HEWTF, under either the *Proposed Action* or the *Alternative Action*, would not cause direct loss of spotted owl roosting or nesting habitat. In addition, construction and operation of the HEWTF would be subject to standard measures to ensure protection of spotted owls and critical habitat. Therefore, no adverse effects to Mexican spotted owl are expected.

Air emissions under either alternative would remain within regulatory guidelines. Emissions of volatile organic compounds (VOCs) and hazardous air pollutants (HAPs) would decrease about 85% under the *Proposed Action* and 10-60% under the *Alternative Action*. Emissions of particulate matter would increase slightly over current operations (less than 1% more) under either alternative and carbon monoxide emissions would increase from about 249 lb/yr under current operations to about 251 lb/yr under the *Alternative Action*.

Construction associated with the *Proposed Action* would disturb about 1 acre of mesa top soils. Construction associated with the *Alternative Action* would disturb about 7 acres of mesa top. A small amount of soil erosion would be expected under either alternative, but standard erosion control practices, including reseeding after construction, would be employed. Soils associated with the outfalls may contain contaminants from past and present activities at the HE processing facilities. LANL's Environmental Restoration program would evaluate the need for soil remediation (subject to a separate NEPA analysis) after the outfalls have been discontinued. If remediation is required, continuing to release water from the outfalls, as would occur under the *No Action Alternative*, would delay remediation activities. Cessation of outfall flow under the *Proposed Action* would reduce the likelihood that contaminants at those outfalls would be washed downstream. Increased flow at TA-9 and TA-16 under the *Alternative Action* could cause scouring of the existing wetlands, increased short-term soil erosion, and potentially increased dispersion of existing contamination downstream. Due to the relatively minor increase in flow at the treatment facility at TA-16, the *Proposed Action* is less likely to increase erosion or downstream dispersion of contaminants.

Risks to human health and safety would be negligible under normal operating conditions under any alternative. Waste minimization systems that would be installed under the *Proposed Action*, however, could present additional safety hazards in which a fire or explosion, resulting in loss of life to a worker, could occur. The likelihood of such an occurrence would be one event or fewer in 10,000 years of operation. Engineering controls and safe operating procedures would be used to reduce the risk of fire or explosion in the waste minimization systems.

# 1. INTRODUCTION

The Department of Energy (DOE) and its predecessor agencies have operated the Los Alamos National Laboratory (LANL) since 1943. LANL's primary mission has been nuclear weapons research and development (R&D). To carry out both this mission and conventional weapons R&D, LANL has conducted high explosives (HE) research, development, and testing; this work continues to be part of LANL's present and future work in the post-Cold War era. HE fabrication, machining, and testing take place at several technical areas (TAs) at LANL. Facilities at four TAs produce wastewater contaminated with HE and trace quantities of solvents. A temporary treatment facility located at TA-16 is currently used to treat HE slurry wastewater.

## 1.1 Purpose And Need For Agency Action

To ensure the protection of the environment, the DOE must manage and dispose of wastes generated by LANL's operational programs and activities safely and in compliance with applicable federal, state, and local regulations. LANL's National Pollutant Discharge Elimination System (NPDES) permit and other regulatory agreements with the Environmental Protection Agency (EPA), including Federal Facilities Compliance Agreements, require DOE to manage LANL wastewater so that any water released at HE wastewater (EPA Category 05A) outfalls will satisfy permit requirements for discharge to the environment.

The Environmental Protection Agency's (EPA) standards for discharge water quality have become more stringent in recent revisions to LANL's NPDES permit and are anticipated to be more rigorous in future revisions. LANL's current method of treatment practices for HE wastewater cannot ensure that discharged HE wastewaters will consistently meet these standards.

The DOE needs to enhance HE wastewater treatment to be able to meet both present and future anticipated regulatory standards for HE wastewater discharges. In conjunction with improving LANL's HE wastewater managment practices, DOE has identified the potential for employing recently available technologies that would allow HE pollution prevention or waste minimization at the various LANL production and processing facilities that discharge HE contaminated wastewater.

This environmental assessment (EA) has been prepared to analyze the potential environmental effects of the proposed action, reasonable alternatives, and the *No Action* (or status quo) *Alternative* to determine if a Finding of No Significant Impact (FONSI) can be supported or if an Environmental Impact Statement (EIS) is required per 40 CFR 1500-1508 and 10 CFR 1021.

# 2. ALTERNATIVES

This section describes two alternatives that would enable DOE to meet its purpose and need for Agency action. The *Proposed Action* would reduce the amount of water used in HE processing by approximately 99% and would reduce contaminants in wastewater. This waste minimization would involve extensive process modifications, including installation of new equipment, improvements to existing systems, and segregation of solvents from HE wastewater. A new permanent facility would be built to treat the remaining wastewater replacing the temporary treatment facility currently being used for this purpose. Treated HE wastewater would be discharged to a single permitted outfall, eliminating 15 outfalls. The *Alternative Action* would not reduce the amount of water used in HE processes. Instead, the wastewater would be piped or hauled to two new permanent treatment facilities. Treated wastewater would be discharged at two permitted outfalls; 14 outfalls would be eliminated. LANL and the TAs discussed in this EA are shown in Figures 2-1 and 2-2.The locations of treatment facilities and current outfalls are shown in Figure 2-3.

For purposes of comparison, this section also analyzes the *No Action* (or status quo) *Alternative*, to establish a baseline for comparison of the alternatives considered. Alternatives that were considered but are not analyzed further in this EA are also presented.

## 2.1 Current He Wastewater Management Practices

The following paragraphs focus on aspects of the current management. Figure 2-2 shows the location of TAs that produce HE-contaminated wastewater with respect to other LANL TAs. Figure 2-4 is a schematic view of the current HE wastewater management.

*Sources of HE-contaminated water.* Currently, 34 processing facilities located at four TAs in a secure access-controlled area within the southwest corner of LANL produce wastewater contaminated with suspended and dissolved HE and trace quantities of solvents and hazardous chemicals listed in Table 2-1. Although the NPDES permit regulates certain metals, none of them are introduced in HE processing. Most of the HE wastewater derives from facilities where water is used to cool HE machine tools, to seal vacuum pumps, or to wash down HE dust. Amounts and types of potential contaminants in HE wastewater vary with changing research activities conducted in each HE processing building. Therefore, not all potential contaminants are present in any given batch of HE wastewater. Since research activities do not necessitate daily HE processing, discharge of HE wastewater to the environment is not continuous from any one outfall, and the total amounts of HE wastewater discharged from any single facility varies from one processing event to another.

In addition to the 34 HE processing facilities that currently discharge to EPA Category 05A outfalls, other sources of industrial and storm water route their wastewater through these outfalls. In one case (Buildings 300 through 307 at TA-16), the buildings no longer release HE process water but they still release other industrial water through the outfall pipes that are contaminated by past discharge of HE process water. Some stormwater is also discharged through HE contaminated outfall pipes. Regardless of its source, all wastewater discharged from the outfalls designated as EPA Category 05A is considered HE contaminated and is required to meet NPDES permit discharge criteria. HE wastewater must comply with the current discharge standards shown in Table 2-2.

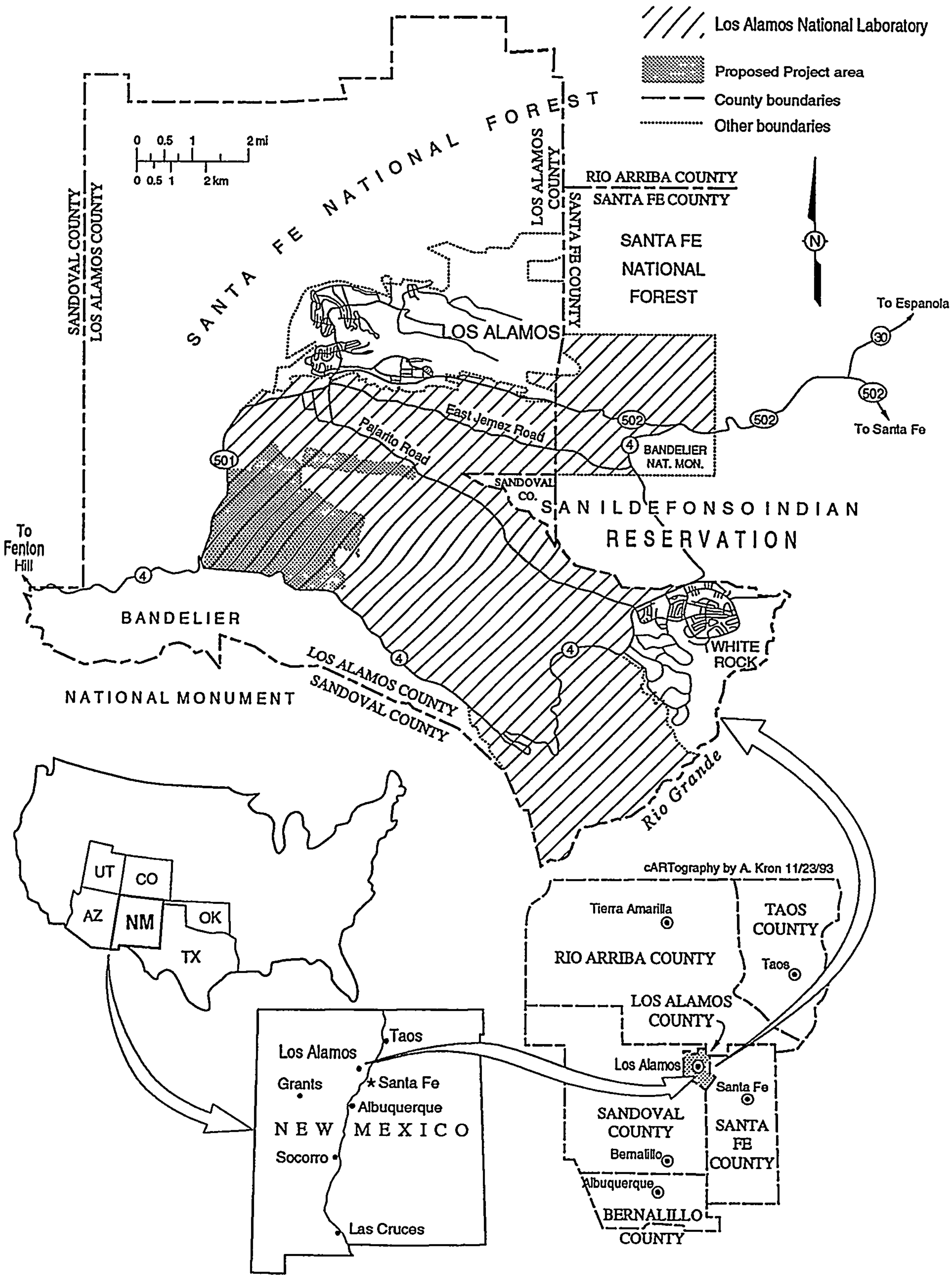


**Figure 2-1. Location of LANL and proposed project area**

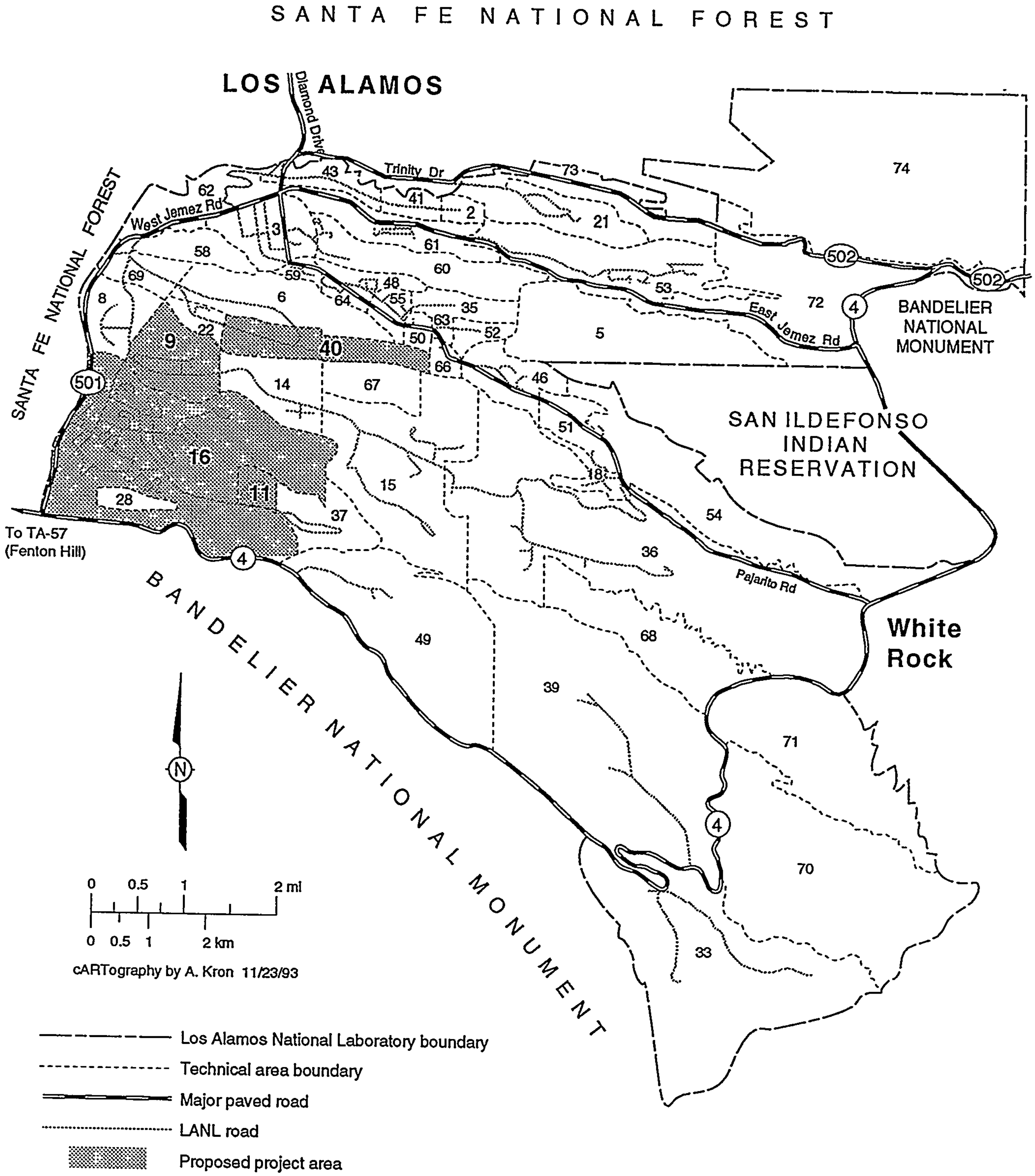


**Fig. 2-2. Location of LANL TAs that Produce HE Wastewater**

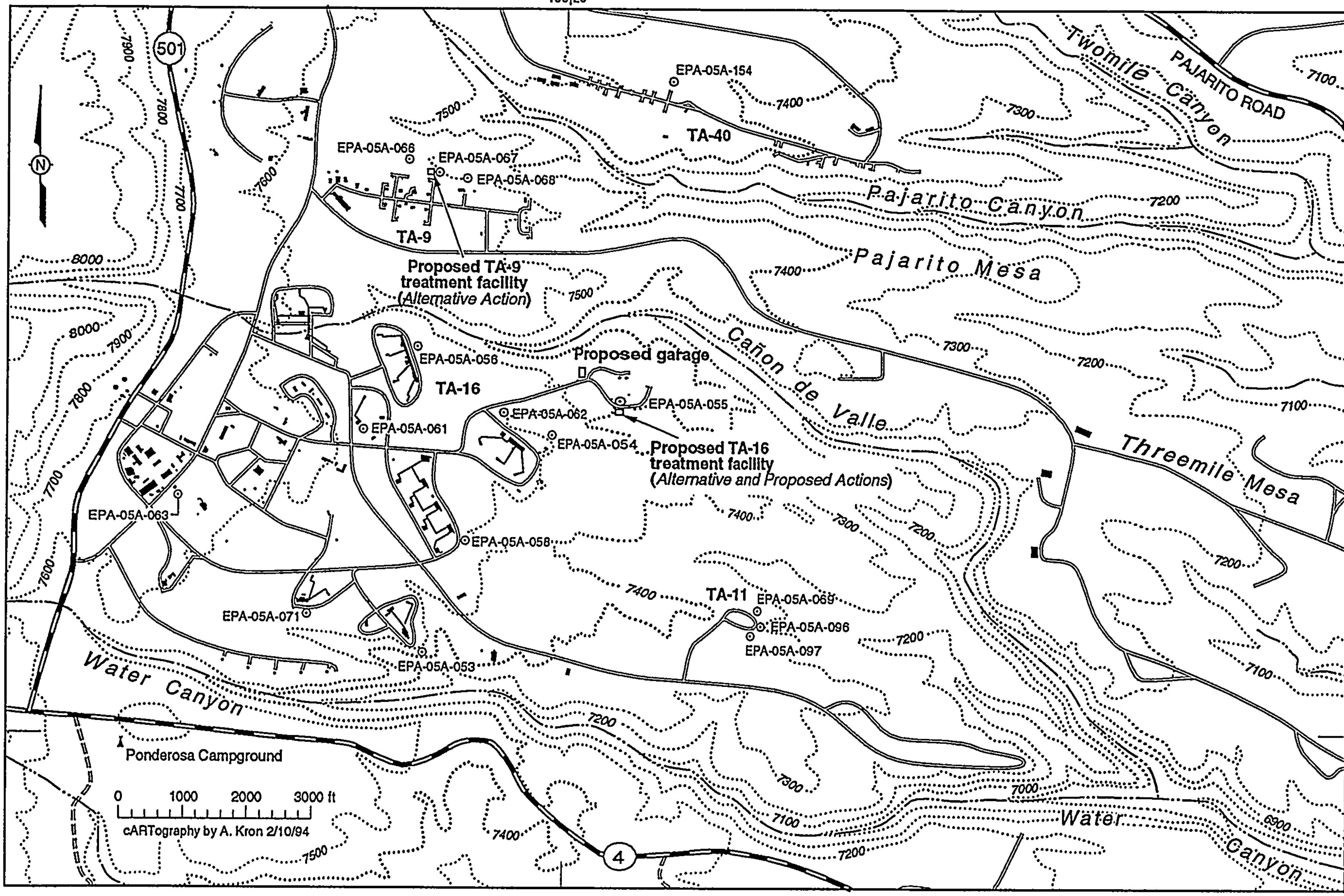


**Figure 2-3**
**Locations of HE wastewater outfalls and proposed treatment facilities**

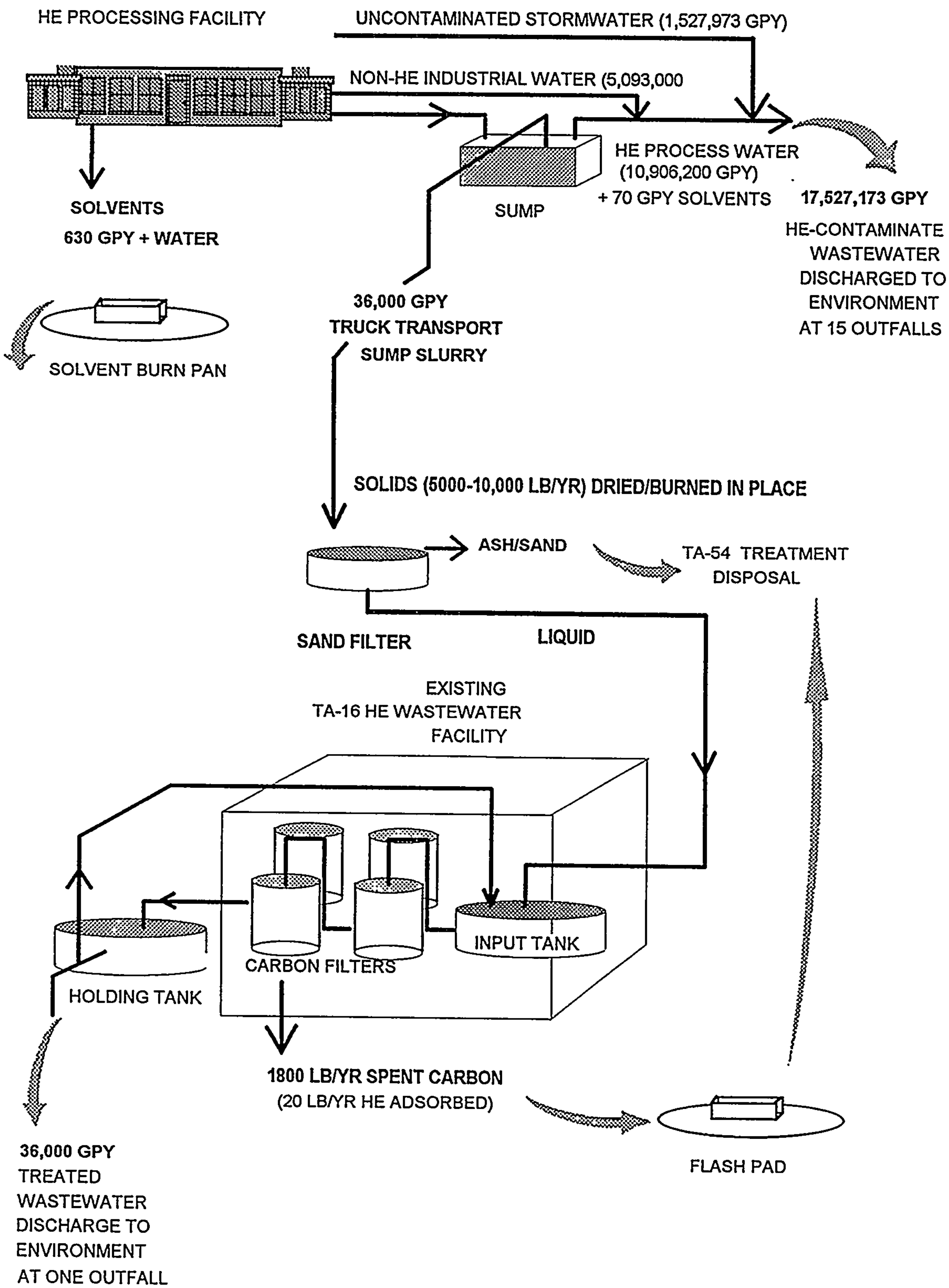


**Figure 2-4. Existing HE Wastewater Management** *(No Action Alternative)*

TABLE 2-1 Potential Contaminants in HE Wastewater

| COMPOUND | EPA Hazardous Waste Number |
|---|---|
| Inerts | |
| Barium nitrate | |
| Cyanuric acid | |
| Pentaerythritol (Pentek) | |
| Binders (very low solubility) | |
| OXY 461 (Exxon 461) | |
| Kel-F Elastomer (KFE) | |
| Polystyrene | |
| Estane | |
| Viton | |
| Plasticizers | |
| Bisdinitropropylacetal formal (BDNPA-F) (energetic) | |
| Dibutyl phthalate (DBP) | U069 |
| Dinitropropyl acetal (DPA) | |
| Dioctal phthalate (DOP) | U107 |
| Trischloroethyl phosphate (CEF) | |
| HE Compounds | |
| Nitrocellulose (Pyroxylin) | |
| Composition B (RDX/TNT) | D003 |
| LAX 112 | D003 |
| Cyclotrimethylenetrinitramine (RDX) | D003 |
| Dinitrotoluene (DNT) | U105, U106 |
| Nitroguanidine | D003 |
| Octahydrotetranitrotetrazocine (HMX) | D003 |
| Pentaerythritol Tetranitrate (PETN) | D003 |
| Triaminotrinitrobenzene (TATB) | D003 |
| Trinitrotoluene (TNT) | D003 |
| Hexanitrostilbene (HNS) | |
| Nitrotriazole-one (NTO) | D003 |
| Solvents[1] | |
| Methyl ethyl ketone (MEK) | U159 |
| Ethyl acetate | U112 |
| Butyl acetate | |
| Toluene | |
| Ethanol | |
| Methanol | U154 |
| Acetone | |
| Cyclohexane | U056 |

Source: LANL

[1] Two facilities —Building 340 at TA-16 (primarily from vacuum system cooling water) and Building 21 at TA-9 produce all the solvent-contaminated HE wastewater at LANL. (Operations in Building 342 at TA-16 are also capable of contaminating wastewater with solvents, but this building is not in use and there are no plans to use it in the near future. If it becomes necessary to use this facility for HE processing purposes, a separate NEPA analysis will be conducted at that time.)

TABLE 2-2 Current Discharge Standards for HE Wastewater

| Effluent Characteristics | Regulatory Limit - 1994 NPDES Permit | |
|---|---|---|
| | Daily Average | Daily Maximum |
| Chemical Oxygen Demand (COD) | 125 mg/L | 125 mg/L |
| Total Suspended Solids (TSS) | 30 mg/L | 45 mg/L |
| pH | 6.0 (min) | 9.0 (max) |
| Oil and Grease | 15 mg/L | 15 mg/L |
| Water Quality Parameters | | |
| Aluminum | 5.0 mg/L | 5.0 mg/L |
| Arsenic | .04 mg/L | .04 mg/L |
| Boron | 5.0 mg/L | 5.0 mg/L |
| Cadmium | 0.2 mg/L | 0.2 mg/L |
| Chromium | 5.1 mg/L | 5.1 mg/L |
| Cobalt | 1.0 mg/L | 1.0 mg/L |
| Copper | 1.6 mg/L | 1.6 mg/L |
| Lead | 0.4 mg/L | 0.4 mg/L |
| Mercury | 0.01 mg/L | 0.01 mg/L |
| Selenium | 0.05 mg/L | 0.05 mg/L |
| Vanadium | 0.10 mg/L | 0.10 mg/L |
| Zinc | 95.4 mg/L | 95.4 mg/L |
| $^{226}Ra + ^{228}Ra$ | 30.0 pCi/L | 30.0 pCi/L |
| Tritium | 3,000,000 pCi/L | 3,000,000 pCi/L |

Currently the water released at the Category 05A outfalls consists of 1,527,973 gal/yr (5,784,006 L/yr) of HE contaminated stormwater (resulting from the use of HE-contaminated outfall pipes for stormwater drainage), 5,093,000 gal/yr (19,279,099 L/yr) of HE-contaminated wastewater from non-He processes, and 10,942,200 gal/yr (41,420,725 L/yr) of HE process water of which only 36,000 gal/yr (136,275 L/yr) is treated before release (Table 2-3). Annual flows from each outfall are shown in Table 2-4.

Table 2-3 Sources of HE-Contaminated Water under Current Conditions

| Source | Stormwater (gal/yr) | Process Water (gal/yr) | Flow at Outfalls (gal/yr) |
|---|---|---|---|
| TA-16 Buildings 300-307 | 227,700 | 5,093,000[1] | 5,320,700[2] |
| Other HE process buildings | 1,300,273 | 10,906,200 | 12,242,473[3] |
| Treatment facility | 0 | 36,000[4] | 36,000[5] |
| Subtotal - Non-HE industrial water | | 5,093,000 | |
| Subtotal - HE process wastewater | | 10,942,200 | |
| Total HE-contaminated water | 1,527,973 | 16,035,200 | 17,563,173 |

[1] Non-HE industrial wastewater

[2] Untreated, potentially HE-contaminated

[3] Untreated, HE-contaminated

[4] Includes 5,000 gallons of HE process water from TA-16-300-307 buildings and slurry (31,000 gal) from all HE process buildings

[5] Treated wastewater

*Steps in HE wastewater management.* HE wastewater managment currently consists of:

- partial solvent removal at the point of generation;
- release of wastewater to individual facility settling sumps where particulate HE settles out and forms a slurry (precipitation of barium may also occur at this stage if present in the wastewater) and the wastewater then is discharged through outfalls to the environment;
- HE slurry collection and removal to the sand filter location;
- trickle sand filtration to remove particulate HE from slurry wastewater;
- and treatment of slurry wastewater by carbon filtration to remove dissolved HE at the temporary treatment facility;
- final release of treated wastewater to the environment.

*Solvent removal.* HE processing facilities remove approximately 90% of waste solvents (630 gal/hr, 2,385 L/hr) from HE wastewater with condensers at the point of generation; extracted solvents mixed with water are burned at an existing solvent burn pan located at TA-16 according to standard procedures. The solvent burn pan, as well as a flash pad, two burn trays, and the two sand filters, operate under interim status in accordance with LANL's 1988 Hazardous Waste Permit Application and the standards in 40 CFR 265, under the Resource Conservation and Recovery Act (RCRA). About 630 gal/yr (2385 L/yr) of solvents are burned in 24 solvent burn sessions conducted per year. Solvent burning is also permitted under State of New Mexico Air Quality Regulations (AQCR)-Regulations to Control Open Burning (AQCR 301).

Table 2-4 Discharge Volume from High Explosives Wastewater Outfalls

| | | | Annual Outfall Discharges | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Rainfall and Stormwater | | Process Water | | Total | |
| Permit # | TA # | Bldg # | liters | gallons | liters | gallons | liters | gallons |
| 05A-053 | 16 | 410 | 389,897 | 103,000 | 79,494 | 21,000 | 469 960 | 124,000 |
| 05A-054 | 16 | 340 | | 0 | 13,509,375 | 3,568,800 | 13 525 752 | 3,568,800 |
| 05A-056 | 16 | 260 | | 0 | 9,560,434 | 2,525,600 | 9,560,148 | 2,525,600 |
| 05A-058 | 16 | 300-series | 861,938 | 227,700 | 19,279,699 | 5,093,000[1] | | 5,320,700 |
| 05A-061 | 16 | 280 | 249,273 | 65,851 | | 0 | | 65,851 |
| 05A-062 | 16 | 342 | | 0 | 17,413 | 4600 | 17 434 | 4,600 |
| 05A-063 | 16 | 400 | | 0 | 17,413 | 4600 | 17 434 | 4,600 |
| 05A-066 | 9 | 21+ 5 others | 2,806,746 | 741,464 | 13,694,482 | 3,617,700 | 16 521 231 | 4,359,164 |
| 05A-067 | 9 | 34+ 7 others | 1,240,191 | 327,624 | 17,413 | 4600 | 1 259 129 | 332,224 |
| 05A-068 | 9 | 48 | 235,960 | 62,334 | 4,163,952 | 1,100,000 | 4 405 246 | 1,162,334 |
| 05A-069 | 11 | 50 | | 0 | 26,499 | 7000 | 26 530 | 7,000 |
| 05A-071 | 16 | 430 | | 0 | 136,275 | 36,000 | 136 440 | 36,000 |
| 05A-096 | 11 | 51 | | 0 | 26,499 | 7000 | 26 530 | 7,000 |
| 05A-097 | 11 | 52 | | 0 | 26,499 | 7000 | 26 530 | 7,000 |
| 05A-154 | 40 | 41 | | 0 | 8,706 | 2300 | 8 717 | 2,300 |
| Total Discharge - Processing Facilities | | | 5,784,005 | 1,527,973 | 60,563,553 | 15,999,200 | | 17,461,322 |
| 05A-055[2] | Treatment Facility | | | 0 | | 36,000 | 136 440 | 36,000 |
| Total Discharge - Category 05A Outfalls | | | | 1,527,973 | | 16,035,200 | | 17,563,173 |

Source: LANL 1994, estimated volumes based on process knowledge and metering

[1] Non-HE industrial water contaminated by discharge through HE-contaminated outfall piping

[2] Treatment facility discharge

*Collection in sumps and sump water discharge.* After solvents have been extracted, HE wastewater from each facility is routed through a series of baffles into settling sumps. Larger pieces of HE settle out of the wastewater as it passes under baffles in the sump. If sampling and analysis detects the presence of barium, it is precipitated out as barium sulfate by adding sodium sulfate to wastewater. Barium sulfate then collects with particulate HE that has settled out of the wastewater. When wastewater has filled the sump, excess wastewater is released through an overflow outlet to an outfall. Building 260 at TA-16 and Building 48 at TA-9 produce over 95% of all HE slurry. The processing facilities discharge at 15 outfalls and the existing treatment facility discharges at one other outfall. Discharges from these outfalls carry varying levels of dissolved and suspended contaminants.

*Slurry collection, filtration, and disposal of particulate HE.* Slurry that accumulates in the bottom of the sumps, including any precipitated barium, is periodically removed (approximately every month) by a 500 gal (1895-L) vacuum truck and moved over internal LANL roadways to one of two sand filters at the burn grounds at TA-16 where it is emptied into the sand filters. Periodically, the slurry remaining on top of the sand filters after filtration is completed is dried and burned in place according to standard operating procedures. The resulting ash and sand mixture is sent to TA–54 for on-site treatment and disposal. If concentrations of barium exceed 100 mg/L, the ash/sand mixture is managed as a Resource Conservation and Recovery Act (RCRA) characteristic hazardous waste. It is treated again with sodium sulfate to precipitate insoluble barium sulfate. The treated, formerly characteristic, waste is disposed of at TA-54, Area J in accordance with the New Mexico Solid Waste Act. Approximately 4,000 lbs (1,814 kg) of waste ash and sand are hauled to TA-54 annually.

*Treatment and discharge of slurry wastewater.* HE-contaminated wastewater from the slurry percolates through the sand filter and flows by gravity through underground piping to a 1,000 gal (3,785 L) metal collection tank (a stock tank) located beneath the treatment facility. The existing treatment facility is a small, commercially available, wood-framed shed that houses assorted plumbing and treatment canisters and the facility's electric power supply. The shed is about 112 sq ft (10.4 sq m) in size and is situated about 200 ft (61 m) from the sand filters at TA-16. The shed is equipped with electricity, but does not have fire protection, industrial water, or secondary containment. When slurry wastewater in the collection tank rises to a predetermined level, it is pumped through a series of canisters containing activated carbon to remove dissolved solvents, if present, and HE. As a last treatment stage, it is adjusted for pH and stored in an above-ground holding tank. The treated water is then sampled and analyzed for water quality parameters. If it meets permit discharge limits, it is discharged through Outfall 05A-55 into a small tributary drainage of Cañon de Valle; otherwise, it is recirculated through the treatment facility until it meets permit standards. The treatment facility could treat up to a maximum of 72,000 gal/yr (272,880 L/yr), but generally treats only 36,000 gal/yr (136,400 L/yr).

Spent carbon from the treatment facility is taken to the flash pad at the TA-16 "burn grounds" where it is "flashed" (heated briefly to a high temperature) to remove any explosive hazards. The carbon itself is not consumed during flashing. The carbon is then taken to TA-54 and managed as a RCRA listed hazardous waste.

Workers are generally not present at the facility during the treatment cycle or during slurry burning at the sand filters. LANL dries the slurry by forcing hot air through the filter vessel for 48 hours. Workers in a control room outside the burn grounds then electrically ignite the slurry and observe the burn through a periscope that rises above the protective barricade at the control room. Approximately 200 person-hours per year are spent in hands-on HE wastewater management and facility maintenance.

Currently, the water released at the Category 05A outfalls consists of 1,527,973 gal/yr (5,784,006 L/yr) of HE-contaminated stormwater, 5,093,000gal/yr (19,279,099 L/yr) of HE-contaminated industrial water from non-HE, and 10,942,200 gal/yr (41,420,725 L/yr) of HE process water of which only 36,000 gal/yr (136,275 L/yr) is treated before release (Table 2-4).

## 2.2 *Proposed Action*: He Wastewater Reduction And Construction And Operation Of One New Treatment Facility

This section describes aspects of the *Proposed Action* that are essential for understanding its potential effects. Unless specifically described in the following paragraphs, the associated activities under the *Proposed Action* would be the same as those discussed for the current HE wastewater management practices. Appendix A presents specific information about the waste minimization equipment that would be installed in the various process facilities and the way that it would minimize both waste and the amount of water used. It also presents details regarding the elimination of HE contaminated stormwater and non-HE industrial water that is also common to the *Alternative Action* discussed in this section.

### 2.2.1 Changes in HE wastewater management

The *Proposed Action* would consist of reducing the amount of water used in HE processing, eliminating non-HE industrial wastewater, preventing contamination of stormwater, and treating all HE-contaminated wastewater at a new permanent treatment facility. The proposed HE wastewater management process is shown schematically in Figure 2-5. Volumes of HE-contaminated wastewater resulting from these wastewater reduction efforts are tabulated in Table 2-5.

**Table 2-5 Sources of Wastewater under the *Proposed Action***

| Source | Uncontaminated Stormwater (gal/yr) | HE Process Water (gal/yr) | Non-HE Industrial Water (gal/yr) |
|---|---|---|---|
| TA-16 Buildings 300-307 | 227,700 | 26,400[1] | 0 |
| Other HE process buildings | 1,300,273 | 104,100 | 0 |
| Volume delivered to treatment facility | 0 | 130,500 | 0 |
| Volume released at outfalls | 1,527,973 | 130,500 | 0 |

[1]All non-HE industrial water discharge would be eliminated by waste minimization measures; unexpected water losses from leaks or similar events would be contained and discharged to the sanitary sewage system

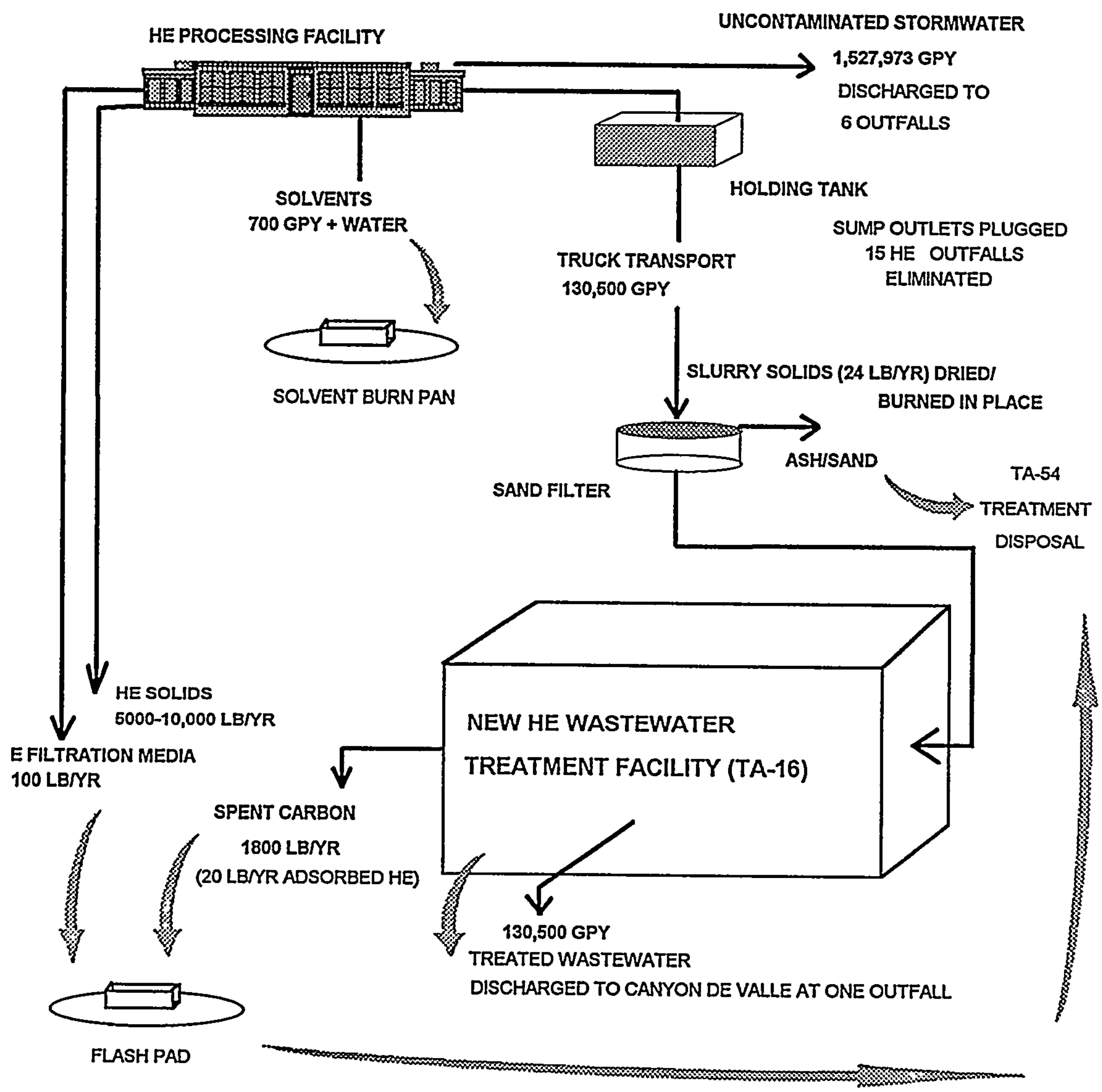


**Fig. 2-5. Proposed Management of HE Wastewater** ***(Proposed Action Alternative)***

2.2.2 Reduction of HE process water use, segregation of solvents, elimination of non-HE industrial water and HE-contaminated storm water

A total of 15 Category 05A outfalls would be eliminated by the *Proposed Action*. This would be achieved in part through the elimination of nearly 11 million gal/yr (41,690,000 L/yr) used in process water. Process water would be eliminated by modifying or replacing equipment that uses water on a once-through basis so that water is cleaned or cooled for continual recirculation or reuse and by replacing water-sealed vacuum pumps and wet dust collection systems with systems that do not use water (see Appendix A for description details). The 15 outfalls eliminated from use would be considered for future cleanup action under the LANL Environmental Restoration Program.

Modifications would take place at 26 buildings (TA-16, Buildings 260, 280, 304, 306, 340, 342, 400, 430, and 460; TA-9, Buildings 21, 22, 28, 29, 32, 35, 37, 38, 41, 42, 43, 45, 46, and 48; TA-11, Structure 25 (drop tower); TA-40, Building 41. These modifications include plugging and alarming of sumps and removal of existing vacuum pumps and pipes, wet dust collection systems, conduits, controls, and similar equipment and associated debris. All discarded materials would be flashed and then trucked to TA-54, Area J. Approximately 15,000 lbs (6,750 kg) of discarded equipment and associated debris would be disposed of at Area J.

All waste solvents would be physically segregated and condensed at the point of generation. Some traces of dissolved solvent could enter the wastewater from accidental spills and would be removed by activated carbon absorption filtration at the new treatment facility.

Because filters in the HE processing facilities would capture most of the HE, the concentration of HE remaining as suspended particles or dissolved material is expected to be reduced to less than 20 parts per million (ppm), and the mass of solids in the slurry would be reduced to about 24 lb/yr (11 kg/yr) by the elimination of water-sealed vacuum pumps and wet dust collection systems.

Discharge of over 5 million gallons (18,927,055 L) of non-HE industrial water to the environment from Buildings 300-307 at TA-16 would be eliminated by replacing water-sealed pumps with oil-sealed pumps, as discussed in the Appendix A. In addition, outfall piping would be decontaminated, flushed, and reclassified so that about 1.5 million gal/yr (5,678,117 L/yr) of stormwater would be eliminated from the total that is now considered HE-contaminated. Uncontaminated stormwater would continue to discharge to the environment through the decontaminated outfall piping at six outfalls.

2.2.3 Elimination of sump discharges

Sumps at HE processing buildings would be used as holding tanks by plugging the outfall outlet. The holding tank would then be fitted with a fluid level alarm to protect against accidental overflows. Wastewater would no longer discharge to the environment at the processing facilities, but would be collected from the holding tanks using two 1000-gallon (3790-L) capacity vacuum trucks and taken to a new treatment facility.

2.2.4 Construction of new treatment facility

A new permanent treatment facility would be built adjacent to the site of the existing treatment facility at TA-16, replacing the current facility. The proposed siting of the new faciilty, about meters 200 ft (61 m) downhill from the sand filters, would allow it to make use of the existing sand filters. The proposed new treatment facility would be large enough to accommodate new HE treatment technologies as they become available or as they become necessary to meet future NPDES permit requirements. In addition to the treatment facility, an 1100 sq ft (102 sq m) garage to house vacuum or pump trucks would be constructed. In subsequent years, small ancillary structures may be built to house supplies, monitoring and control equipment, etc., or to serve similar support functions. A separate NEPA analysis would be conducted for these facilities prior to design and construction. Over its lifetime (projected to be 30 years), the facility may also be retrofitted with improved filtration, air handling, monitoring and control systems, or other improvements. Routine preventive maintenance and repairs would be expected as well.

The new treatment facility would be a single-story, 1,000 sq ft (92 sq m), pre-engineered metal frame building. It would include an equipment room with a collection sump, a control area, and a storage room. The treatment capacity of the facility would be 130,500 gal/yr (493,996 L/yr) and its design life would be about 30 years. The building would be equipped with electric heating and ventilation, industrial water, fire alarms, fire suppression systems, power, and lighting. Because paved road access, paved parking, electric power and water are already available to the proposed site, clearing to supply the new facility with these infrastructures would be minimal. Permanent above-ground 3,000 gal (11,356 L) holding tanks would be installed at the new facility. The facility would contain nonhazardous HE operations (DOE Order 6430.1A and the DOE Explosives Safety Manual). As such it would not require explosives protection; however, HE-type electrical equipment would be installed as an additional safety precaution.

The garage would be a single-story metal building. It would contain restrooms that would be connected by a sanitary sewer line to the existing nearby sanitary sewer line. Sanitary sewage from the restrooms would be treated at the existing LANL Sanitary Wastewater System Consolidation (SWSC) treatment facility prior to release.

Constructing the treatment facility and garage would require clearing and leveling about 0.5 acres (0.2 ha) near the existing treatment facility and 0.5 (0.2 ha) acres at the garage site. In addition, fire hydrants to provide fire protection water to the treatment facility would be installed and a new 3000 ft long(914 m), 8-in diameter (20.3 cm) water line would be installed to connect them to existing water lines at TA-16, Building 340. A new distribution pipeline from the sand filters to the new treatment facility would be installed. New connecting piping would be installed to connect the new facility to the existing NPDES-permitted outfall (05A-055). The sand filters, piping, tanks, and utilities may require replacement or upgrade during the life of the facility. A separate NEPA analysis would be conducted for these facilities prior to design and construction.

Approximately 15,000 person-days would be required for construction activities, including installation of waste minimization systems. Construction activities would be expected to last about 7 months.

### 2.2.5 Wastewater treatment

The *Proposed Action* would generate less HE wastewater containing fewer contaminants than current practices do. All of it would be treated by carbon filtration. Waste solvents would be physically segregated at the point of generation and would not contaminate HE wastewater. Wastewater from HE processing would also contain less suspended particulate HE due to process changes and thus would result in less slurry accumulation in the holding tanks. Barium would be precipitated as necessary. Periodically, trucks would collect wastewater and slurry from the tanks and deliver it to the new treatment facility. Wastewater would be filtered through the existing sand filters to remove particulate HE. The wastewater would then flow by gravity through pipes to the new treatment facility where activated carbon filters would remove organic contaminants (HE and solvents). The facility would operate in batch mode and would not require on-site personnel during operation. Spent carbon from the treatment facility would be "flashed" (heated briefly to a high temperature) to remove any explosive hazards. The carbon itself would not be consumed but would then be taken to TA-54 and managed as a RCRA-listed hazardous waste.

Treated wastewater would be discharged at the existing NPDES-permitted outfall (05A-055) and 15 Category 05A outfalls would be eliminated. All effluents would meet or exceed effluent quality standards in the NPDES permit.

Approximately 200 person hr/yr would be expended in operation related to HE wastewater management and collection, treatment facility operaiton, and maintenance.

#### 2.2.6 Future Treatment Possibilities

Due to its size, the existing treatment facility can house only the current carbon treatment technology. The proposed treatment facility design is slightly oversized in order to accommodate new HE treatment technology as it is demonstrated, becomes available, and is needed. LANL's burn permit may be modified in the future such that open air burning of HE particulate material removed from the HE wastewater would no longer be allowed. If this happens, other methods to manage this waste would be needed. Among the candidate technologies are biodegradation, base hydrolysis, and wet oxidation. If DOE proposes to add any of these new technologies to the HE wastewater treatment system, a NEPA analysis of the operation of these processes would be completed at the time that these actions require DOE decision.

#### 2.2.7 Decontamination and Decommissioning

The new treatment facility would be designed to simplify decommissioning and/or demolition at the end of the facility's operating life (30 yrs). Design features would facilitate removal of all equipment, decontamination of the building as necessary, and adaptation of the building for generic use. Decontamination and decommissioning would be conducted according to existing regulations, DOE Orders and LANL guidelines. A separate NEPA analysis would be completed at the time that these actions require DOE decision.

The existing treatment facility, associated piping, and tanks would be subject to decontamination, decommissioning, and demolition when the new treatment facility comes into service. Because of potential HE contamination, discarded equipment, fixtures, and structural elements would be flashed at TA-16 and then sent to TA-54 disposal. Approximately 1,000 cu ft (28.3 cu m) of solid waste could be generated.

### 2.3 *Alternative Action*: Two Treatment Facilities And A System Of Collection Pipes

This section describes aspects of the *Alternative Action* that are essential for understanding its potential effects. Unless specifically described in the following paragraphs, the associated activities under the *Alternative Action* would be the same as those discussed for the current HE wastewater management practices. This alternative differs from the description of the *Proposed Action* in that no actions to minimize water used in HE processing or actions to eliminate non-HE industrial wastewater would be undertaken. Figure 2-6 is a schematic of the management of HE wastewater under this alternative.

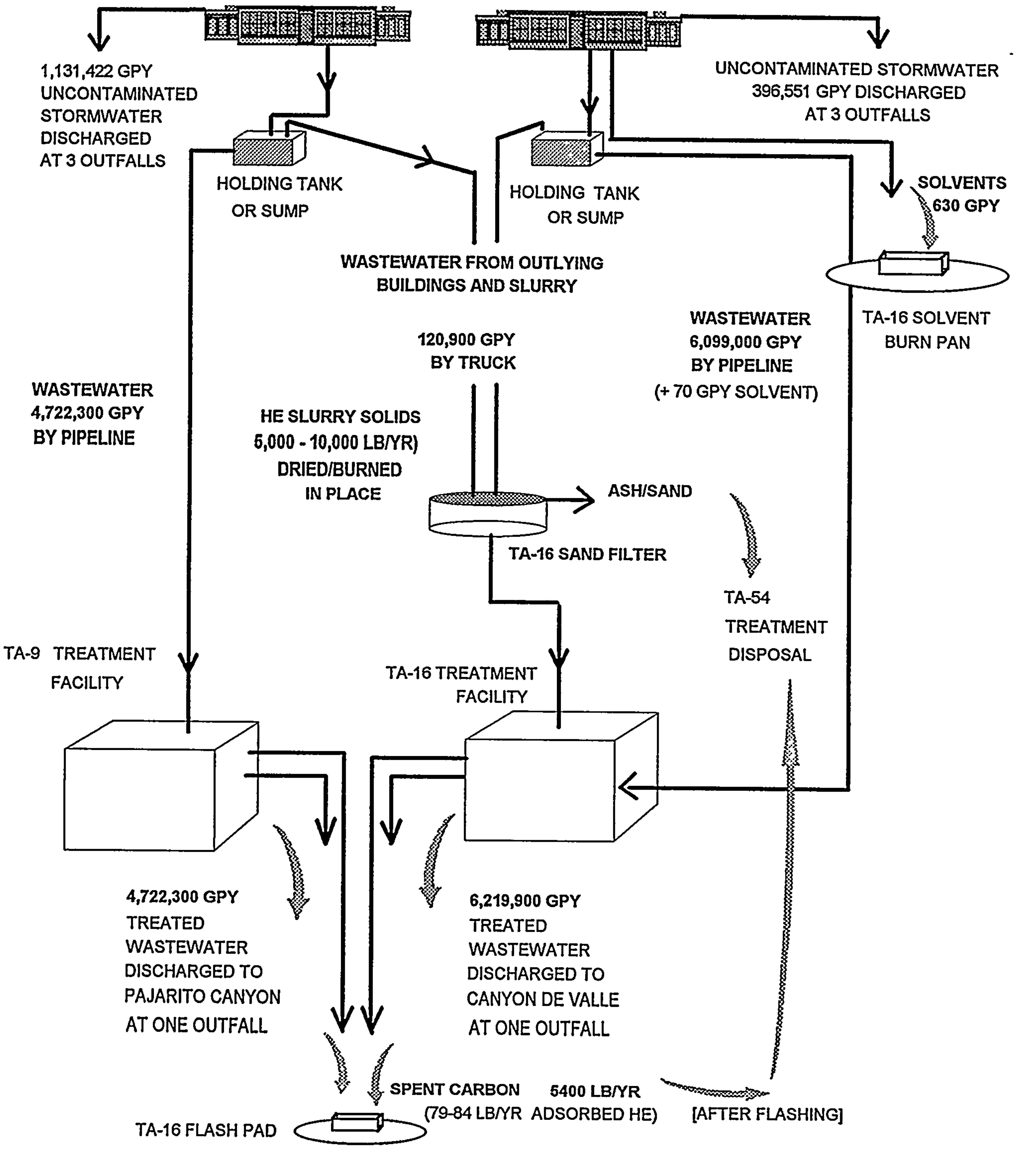


**Figure 2-6. Alternative Management of HE Wastewater** *(Alternative Action)*

### 2.3.1 Changes in wastewater management

Under the *Alternative Action,* HE process water use (about 12 million gallons/yr, 45,424,933 L/yr) and slurry production (5,000-10,000 lbs/yr) (2,268-4,536 kg/yr) would remain at current levels. Waste solvents would continue to be separated from HE wastewater by the current system of condensers and small amounts of solvents (about 10 percent of the total used) would continue to contaminate the HE wastewater. However, no HE wastewater would be discharged to the environment without treatment. Fourteen Category 05A outfalls would be eliminated from use under this alternative; these would be considered for cleanup actions unders the LANL Environmental Restoration Program.

### 2.3.2 Eliminating non-HE process water and preventing stormwater contamination

Discharge of non-HE industrial water would be eliminated through waste minimization measures that recycle water or that substitute dry processes for wet processes. Most outfall piping would be decontaminated, flushed, and reclassified. Uncontaminated stormwater would then be discharged through the decontaminated outfall piping. Sources of wastewater for the *Alternative Action* are shown in Table 2-6.

**Table 2-6 Sources of Wastewater under the *Alternative Action***

| Source | Uncontaminated Stormwater (gal/yr) | HE Process Water (gal/yr) | Non-HE IndustrialWater (gal/yr) |
|---|---|---|---|
| TA 16 Buildings 300-307 | 227,700 | 26,400 | 0 |
| Other HE Process Buildings | 1,300,273 | 10,915,800 | 0 |
| Volume delivered to treatment facility | | 10,942,200 | 0 |
| Volume discharged to outfalls | 1,527,273 | 10,942,200 | 0 |

### 2.3.3 Collection using sumps and by pipeline

Some sumps would be plugged and used as holding tanks; and the rest would be connected directly to treatment facilities by new collection piping. Liquid level monitors and alarms would be installed to prevent overflows. No HE wastewater would be released to the environment without treatment.

Because of the large volume of HE process wastewater that would require treatment under this alternative, nearly 12 million gal/yr (45,424,933 L/yr), trucking all the wastewater to a treatment facility would be inefficient and impractical. Also, the HE processing facilities are separated by canyons; designing collection pipelines to convey all HE wastewater to a single centralized treatment facility would pose major design difficulties and excessive costs would be incurred. Therefore, the proposed *Alternative Action* consists of piping wastewater directly from sumps at some HE processing facilities to one of two new treatment facilities. One new treatment facility would be located at TA-16 and one at TA-9, that is, one facility on each mesa top where the majority of HE processing facilities are located. Slurry from the sumps would be collected periodically and trucked to the sand filters at TA-16. After slurry separation, the collection pipelines would bring HE wastewater by gravity flow into the treatment facilities from nearby HE processing facilities. The proposed pipe collection system would consist of about 7,700 ft (2,333 m) of double-walled pipe, with associated manholes and leak detectors. The system would be divided into two networks (Figure 2-7), one serving Buildings 340, 342, and 260 at TA-16, and

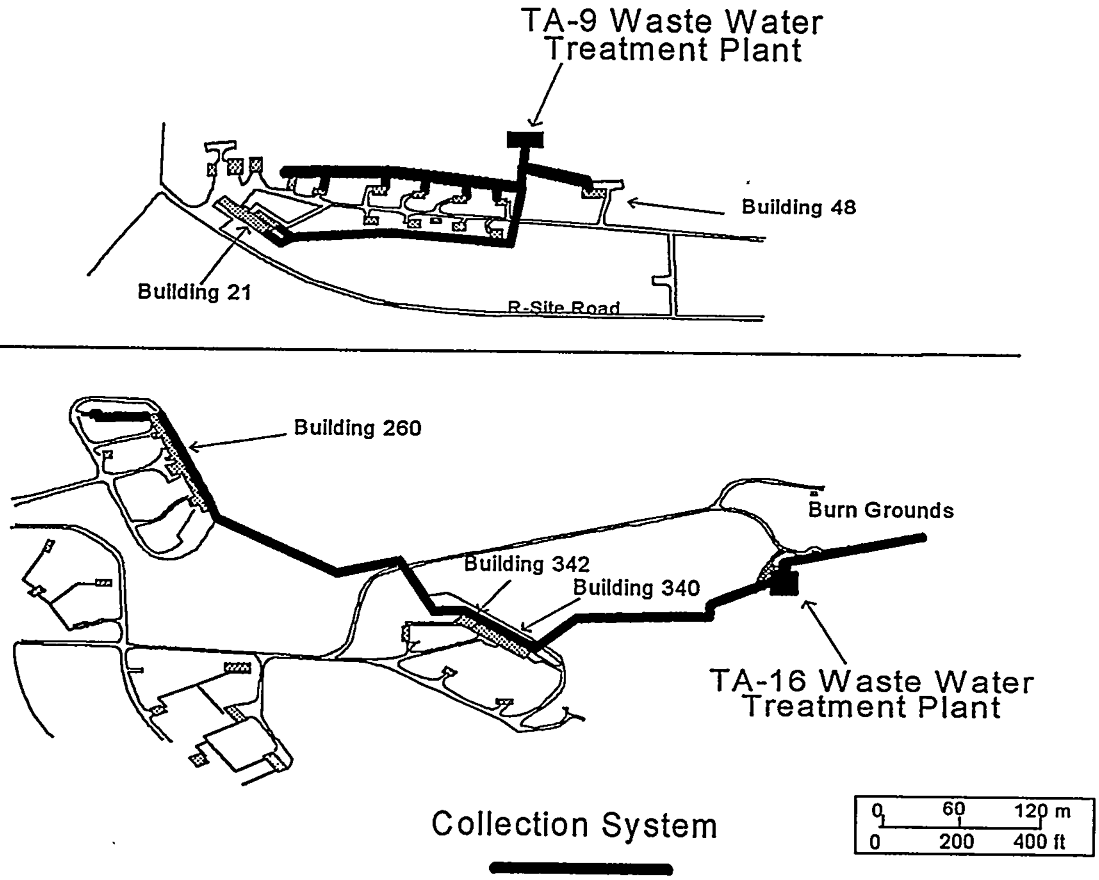


**Figure 2-7. Proposed Collection System for the *Alternative Action***

one serving Buildings 21, 28, 29, 32, 33, 34, 35, 37, 38, 40, 42, 43, 45, 46, and 48 at TA-9. The 8 in (20 cm) lines would be equipped with leak detectors and buried in trenches 4-13 ft (1.2 - 3.9 m) deep. A small lift station would be constructed to serve Building 340 at TA-16. Trenching for the collection system would involve two areas; one at TA-9 connecting Buildings 21 and 48 to the new TA-9 treatment facility, and another at TA-16 between Building 260 and the new TA-16 treatment facility. The total amount of land disturbed by pipeline activities would be about 5 acres (2.02 ha).

At outlying facilities, or facilities located at a lower elevation than the proposed treatment facilities (which preclude use of gravity flow), sumps would be plugged and used as holding tanks. These holding tanks would be equipped with overflow alarms. Periodically, the contents of these tanks and any slurry, including any precipitated barium, would be collected and hauled by vacuum truck to the existing sand filters at TA-16. A total of nine buildings would require vacuum truck collection.

2.3.4 Construction of two new treatment facilities and garage facility

The two new treatment facilities would be similar to the treatment facility described in the *Proposed Action*. One new single-story, 1,000 sq ft, (28.3 cu m) metal frame treatment facility would be built near the site of the existing treatment facility at TA-16, replacing the current facility, to make use of the existing sand filters. The existing sand filters at TA-16 may be inadequate to handle the volume of water that would be filtered through them under the *Alternative Action*. Consequently, this alternative would probably involve rebuilding them or replacing them in-kind with new, higher-capacity sand filters. Sand and gravel from the old filters would be reused in new, larger housing; the old metal housing (1-2 tons of sheet metal) would be flashed and disposed of at TA-54. A second treatment facility of the same construction and size would be built at TA-9 near Building 48. In addition to the treatment facilities, an 1,100 sq ft (102 sq m) garage to house vacuum or pump trucks would be constructed. It would be necessary to clear and pave a short (approximately 200 ft) (61 m) access road to the TA-9 treatment facility. The TA-16 treatment facility would be designed to treat 7,350,000 gal/yr (27,822,722 L/yr), the TA-9 facility would be designed to treat about 4,700,000 gal/yr (17,791,432 L/yr). Slightly less than one acre would be cleared and graded for construction of the two treatment plants and road, and about one-half acre at TA-16 would be required to construct the garage facility. Both facilities would be equipped with buried industrial water service lines and overhead electric, communications, and fire-alarm services. The TA-16 facility would require the installation of approximately 3,200 ft (970 m) of 8 in (20 cm) water line; the TA-9 facility would require the installation of approximately 450 ft (136 m) of 8 in (20 cm) water line. The garage facility would require a 1000 gal (2790 L) sanitary waste holding tank to serve its restroom. Sanitary wastes would be collected periodically and removed by tanker truck to the LANL SWSC Facility.

In subsequent years, small ancillary structures may be built to house supplies, monitoring and control equipment, etc., or to serve similar support functions. Separate NEPA analysis would be conducted for these facilities prior to design and construction. Over their lifetime (projected to be 30 years), the facilities may also be retrofitted with upgraded filtration, air handling, monitoring and control systems, or other improvements. Routine preventive maintenance and repairs would be expected as well.

About 20,000 person-days would be required for construction activities under this alternative. Construction activities would be expected to last about nine months.

2.3.5 Decontamination and Decommissioning

The treatment facility would be designed to simplify decommissioning and/or demolition at the end of the facility's operating life (30 years). Design features would facilitate removal of all equipment, decontamination of the building, and adaptation of the building for generic use. Decommissioning and decontamination would take place in accordance with applicable DOE Orders and LANL guidelines. A separate NEPA analysis would be completed at the time any of these actions are ready for DOE decision.

The existing treatment facility would be subject to decontamination and decommissioning when the new treatment facility was in service. Because of potential HE contamination, discarded equipment, fixtures, and structural elements would be flashed at TA-16 and then sent to TA-54 for treatment and disposal. Approximately 1000 cu ft (28.3 cu m) of solid waste would be generated.

2.3.6 Treatment

HE wastewater would be treated by carbon filtration as described in the *Proposed Action*. The two treatment facilities would generate about 5,400 lbs/yr (2,449 kg/yr) of spent carbon.

The treatment facilities would operate in batch mode and would not require personnel on site during treatment. Approximately 400 person-days/yr would be expended in operations related to HE collection and treatment facility operation and maintenance.

## 2.4 Alternatives Considered but not Analyzed

Three additional alternatives were considered but dismissed from further analysis in this EA. These include:

- upgrading and using the existing treatment facility,
- treating wastewater at point of generation with or without waste minimization, and
- locating the treatment facility at a location other than at TA-16 or TA-9.

The alternative of modifying and using the existing treatment facility is not a reasonable alternative for meeting the DOE's purpose and need due to the structural inadequacy of the existing treatment shed. The existing facility was installed as a temporary solution to treat slurry wastewater in order to prevent NPDES violations while a permanent solution to discharge limit excedences was being sought. It has a useful life of about 10 years and lacks room to provide essential features, such as secondary containment, and safety control features, such as enclosures for isolating electrical equipment. Also, it would require the addition of a much larger holding tank or additional tanks, and a second post-treatment tank to be able to treat additional wastewater volumes, 130,500 gal/yr (493,996 L/yr) under the *Proposed Action* or nearly 12 million gal/yr (45,242,993 L/yr) under the *Alternative* Action. Because the treatment facility itself is a wood-frame shed, it could not be modified to the extent needed without completely dismantling it and reassembling it--essentially building a new facility. Additionally, the extent of such modifications would force the existing facility to cease operations for an extended period of time; HE wastewater requiring treatment would continue to be produced during that period, and without treatment capability, effluent discharges could violate permit conditions. The facility, even if modified to accommodate basic health, safety, and environmental controls and the necessary associated tanks, would still be too small to accommodate new treatment processes that might be required to meet future discharge limitations. Structures sized to house these future processes would need to be constructed in the same technical area and would have similar types of potential effects.

Treating HE wastewater at the point of generation with or without wastewater minimization was considered and dismissed as an unreasonable alternative due to technical and practical constraints. Under this alternative, individual sumps would need to be plugged and individual facility sand filters and treatment facilities would need to be installed. Explosives safety requirements that specify distances that must be maintained between HE burning areas and other facilities would make it difficult to institute this alternative. The small wastewater volumes and varying contaminant loads at some facilities would be difficult to treat efficiently or in a cost-effective manner with individual wastewater treatment units. Treatment facilities at each processing facility would increase worker safety hazards since approximately 30 separate facilities would require regular maintenance, repair, and waste handling. Operational and maintenance activities would become more expensive and complicated.

Locating treatment of wastewater at any location other than TA-16 or TA-9 burn was dismissed because of explosive safety requirements. HE slurry filtration is an essential component of HE wastewater management. Slurry removed from the wastewater is burned at the existing sand filters because of safety hazards associated with disturbing dried slurry. The DOE explosives safety procedures require that the treatment area be located at a specified distance from other facilities depending on the quantity of explosive material present (quantity-distance criteria). Other possible locations have been eliminated because they could not satisfy the quantity-distance criteria.

In addition to these alternatives, engineering analyses also considered various techniques or processes to treat HE wastewaters and solids. In general, they were not analyzed in detail because they were unable to treat wastes consistently, they were unproven technologies, or they posed safety concerns. These variations on the proposed or alternative actions are discussed in the Title I Design Summary Report (Chavez-Grieves 1994). If these technologies become available and necessary to treat HE wastewater to meet NPDES discharge standards, they would be the subject of a separate NEPA review at that time.

### 2.5 *No Action* Alternative

The *No Action Alternative* assumes that LANL would continue the current HE wastewater management with no change in operations. Wastewater volume estimates for the *No Action Alternative* reflect projected HE wastewater production for the foreseeable future.

Limited minor changes to the existing physical plant to upgrade operating safety features or to make maintenance easier, would occur under this alternative. This EA considers the *No Action Alternative* as a baseline for comparison with the environmental effects of the *Proposed* and *Alternative Actions*. The *No-Action Alternative*, however, does not meet the purpose and need for agency action; untreated HE wastewater discharges from the facility sumps would periodically violate existing and future NPDES permit standards. Since the 05A category outfalls associated with the *No Action Alternative* are designated as Solid Waste Management Units (SWMUs), they are slated to be assessed under the LANL Environmental Restoration Program. Continued discharge at these outfalls would delay environmental cleanup.

## 2.6 COMPARISON OF ALTERNATIVES

Table 2-7 summarizes the *No Action, Proposed Action,* and *Alternative Action* alternatives outlined above. Figure 2-8 illustrates the total volume of HE-contaminated water considered under each alternative. Figure 2-9 shows the volume of HE-contaminated water that would be treated under each alternative. The amount of solvent and HE contamination in HE wastewater under each alternative is shown in Table 2-8.

Table 2-7. Comparison of Alternatives

| Project Component | *No Action* | *Proposed Action* | *Alternative Action* |
|---|---|---|---|
| Construction | none | one treatment facility, garage | two treatment facilities, pipelines, garage |
| Processing Building Modifications | none | sumps converted to holding tanks | some sumps converted to holding tanks; some sumps piped directly to treatment facility |
| Process Modifications | none | typical process modifications include replacing water-sealed pumps and wet dust collection; improving solvent recovery; recycling coolant water | none |
| Sources of HE in wastewater | water-sealed vacuum pumps, wet dust removal systems, washdown water, HE machining and processing coolant water (11 Mgal/yr1) | washdown water (130,500 gal/yr) | same as *No Action* |
| HE particulates | some suspended particulates released with sump wastewater; most captured as slurry at sumps at processing facility and at sand filters at treatment facility, 5,000 - 10,000lb/yr burned at sand filters; ash and sand managed as listed hazardous waste | most captured at processing facility (5,000-10,000 lb/yr flashed at TA-16); remaining solids captured as slurry at holding tank at processing facility and at sand filters at treatment facility (24 lb/yr burned at sand filters); ash and sand managed as listed hazardous waste | same as *No Action* |
| Wastewater delivery | trucks for slurry | trucks for water and slurry | trucks for slurry and some water and pipelines for water |
| Solvent treatment | 630 gal/yr captured at processing facility, burned at TA-16; 70 gal/yr released with sump wastewater | 700 gal/yr captured at processing facility, burned at TA-16 | 630 gal/yr captured at processing facility, burned at TA-16; 70 gal/yr to treatment facility; 33-67% removed with carbon adsorption |
| Treatment of sump wastewater | water released without treatment after HE settles out and barium precipitated in sumps | barium precipitation at sump; particulate filtration at sand filters; carbon adsorption plus new technologies as available and proven at treatment facility | same as *Proposed Action* |
| Discharge of wastewater | 11 M gal/yr untreated HE process wastewater, 1.5 Mgal/yr HE-contaminated stormwater, 5 Mgal/yr HE-contaminated industrial water released at 15 outfalls; 1 outfall releases 36,000 gal/yr treated wastewater | 130,500 gal/yr treated wastewater released to 1 outfall; 1.5 Mgal/yr uncontaminated stormwater released at 6 outfalls | 11 Mgal/yr treated wastewater released to 2 outfalls; 1.3 Mgal/yr uncontaminated stormwater released at 5 outfalls |
| Spent Activated Carbon | 1,800 lb/yr burned at TA-16; managed as listed hazardous waste | 1,800 lb/yr burned at TA-16; managed as listed hazardous waste | 5,400 lb/yr burned at TA-16; managed as listed hazardous waste |

1 Approximate volumes of water in millions of gallons/year (Mgal/yr)

**Figure 2-8. Total Volumes of Wastewater**

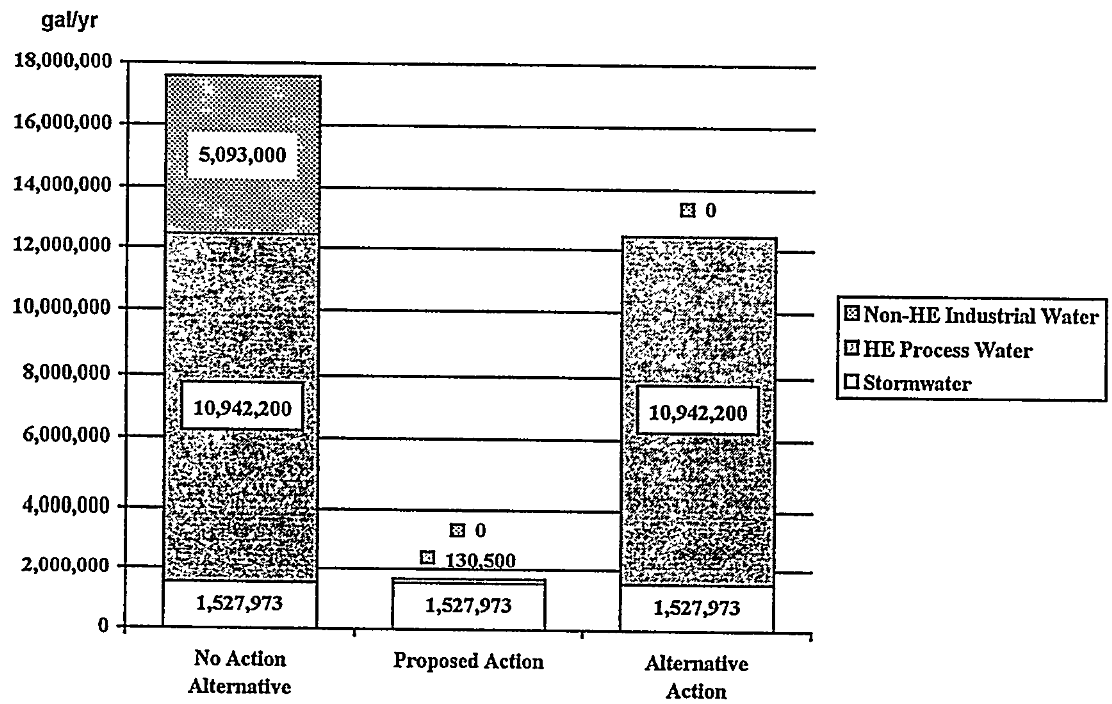


**Figure 2-9. Volumes of wastewater requiring treatment for HE contamination**

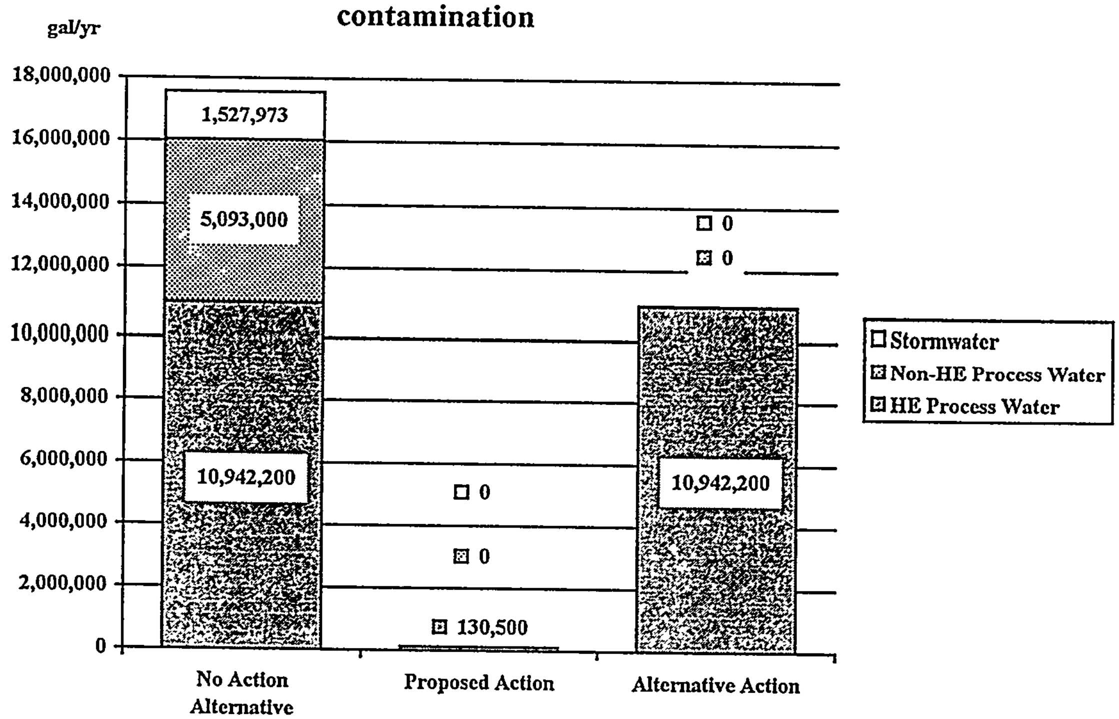

**Table 2-8 Contaminants in HE wastewater before and after treatment under each alternative**

| | *No Action Alternative* | | *Proposed Action* | | *Alternative Action* | |
|---|---|---|---|---|---|---|
| | **Annual quantity** | **Average annual concentration (mg/L)[1]** | **Annual quantity** | **Average annual concentration (mg/L)** | **Annual quantity** | **Average annual concentration (mg/L)** |
| Total water volume | 10,942,200 gal | | 130,500 gal | | 10,942,200 gal | |
| Dissolved-HE total | 88 lb (40 kg) | 5.3 | 22 lb (10 kg) | 20 | 88 lb (40 kg) | 5.3 |
| Discharge from sumps | 61 lb (28 kg) | 0.7 | 0 | 0 | 0 | 0 |
| Received at treatment facility | 27 lb (12 kg) | 90 | 22 lb (10 kg) | 20 | 88 lb (40 kg) | 5.3 |
| Adsorbed by carbon | 20 lb (9 kg) | 68 | 20 lb (9 kg) | 18 | 79-84 lb (36-38 kg) | 0.9 |
| Released in treated water | 7 lb (3 kg) | 22 | 2 lb (1 kg) | 2 | 4-9 lb (2-4 kg) | 0.05-0.1 |
| Solvents Total | 482 lb (219 kg); 70 gal | 5.3 | 0 | 0 | 482 lb (219 kg); 70 gal | |
| Discharged from sumps | 482 lb (219 kg); 70 gal | 5.3 | 0 | 0 | 0 | 0 |
| Received at treatment facility | 0 | 0 | 0 | 0 | 482 lb (219 kg); 70 gal | 5.3 |
| Adsorbed by carbon | 0 | 0 | 0 | 0 | 161-321 lb (73-146 kg) | 1.7-3.5 |
| Released in treated water | 0 | 0 | 0 | 0 | 164-321 lb (73-146 kg) | 1.7-3.5 |
| Total solvent released from sumps | 571 lb (247 kg) | 6 | 0 | 0 | 0 | 0 |
| Total HE released after treatment | 7 lb (3 kg) | 22 | 2 lb (1 kg) | 2 | 165-330 lb (75-150 kg) | 2-4 |
| Total HE & solvents released to environment | 64 lb (250 kg) | 28 | 2 lb (1 kg) | 2 | 165-330 lb (75-150 kg) | 2-4 |

[1] Athough annual averages indicate low concentrations, measured concentrations range from 0 to 20 mg/l at facilities and up to 123 mg/l at the treatment facility.

# 3. AFFECTED ENVIRONMENT

LANL and the associated residental and commercial areas of Los Alamos and White Rock are located in Los Alamos County in north-central New Mexico (Figure 2-1). Annual LANL environmental surveillance reports (e.g., LANL 1993a) give a more complete description of DOE land in Los Alamos County. LANL facilities cover approximately 1,400 ac (560 ha) out of 24,400 ac (9,760 ha) owned by the DOE in Los Alamos County. The developed area includes 30 active TAs. Unoccupied land area surrounds LANL facilities, providing security from intrusion, buffer zones, and a reserve for future development.

The proposed project area is situated in the southwest corner of LANL and includes TA-9, TA-11, TA-16, and TA-40 (Figure 2-1). This area is remote and closed to the public. Neither the proposed nor the existing treatment facilities can be seen from any public access area (Fig. 2-3).

West Jemez Road (SR 501) bounds TA-16 on the west; New Mexico State Road 4 and Bandelier National Monument lie to the south of the proposed project area. Pajarito and Two-Mile Canyons lie near the northern boundary of TA-9 and the southern boundary of TA-40. Other TAs border the proposed project area on the east. LANL development—roads, buildings, trailers, fencing, cleared fields, borrow pits, and other structures—have disturbed the vegetation over more than half of the area.

The residential area nearest to the proposed project location—locally described as the "Western Area" of Los Alamos townsite—is 2.0 mi (3.2 km) north of TA-9 and approximately 2.5 mi (4 km) north of TA-16 (Figure 2-2). The boundary of Bandelier National Monument lies approximately 1.1 mi (1.8 km) to the south. A National Park Service campground and picnic site lies 1.6 mi (2.6 km) south of TA-16 and 1.9 mi (3.0 km) south of TA-9 (Figure 2-1).

## 3.1 ENVIRONMENTAL RESOURCES OF THE PROPOSED PROJECT AREA

This section of the EA addresses resources that could be affected by the proposed action and its alternatives. These resources include soils, surface water, air, wetlands, threatened and endangered species, other wildlife, noise, and socioeconomic resources. The EA also addresses environmental justice, transportation, and human health.

LANL was withdrawn from public use in 1943. The proposed project area contains no prime farmlands, no wild and scenic rivers, and no coastal or tundra areas. No wild horses or burros are found within the proposed project area. Although Bandelier National Monument borders the proposed project area on the south, no parks, monuments, public recreational areas, or areas of aesthetic importance lie within the proposed project area. HE wastewaters are not sources of drinking water and water from the project area does not contribute to recharge of the main aquifer. Although cultural resources are present in the proposed project area, none are located in areas affected by any of the alternatives. Small floodplains are present in the proposed project area, but none of the alternatives would place treatment or collection areas on or near a floodplain. Therefore, these issues are not discussed in this EA.

## 3.2 TOPOGRAPHY, GEOLOGY, AND SOILS

Terrain in the proposed project area is typical of the Pajarito Plateau, consisting of mesas incised by deep, narrow canyons. Canyon bottoms and mesa tops slope gently eastward toward the Rio Grande, while canyon sides slope at moderately steep to steep angles. The elevation ranges from a maximum of 7,700 feet (2.3 km) along the western boundary of the proposed project area to about 7,200 feet (2.19 km) in the canyons that drain the proposed project area.

Four canyons fall within the proposed project area. Two Mile Canyon, a tributary to Pajarito Canyon, receives flow from one HE outfall at TA-40 and is the most northerly of the canyons. Pajarito Canyon, which lies south of Two Mile Canyon, receives water from three HE outfalls at TA-9. Water Canyon and Cañon de Valle (a large tributary to Water Canyon) receive water from the TA-16 outfalls. Water Canyon and Pajarito Canyon flow into the Rio Grande about 8 mi (12.8 km) downstream from the proposed project area.

Bandelier tuff—a soft, porous rock composed of volcanic ash—underlies the proposed project area and most of the Pajarito Plateau. Soil composition in the area ranges from fine, sandy loam to rock outcrops. The erosion potential of these soils is moderate.

Although not all Category 05A outfalls have been studied, HE contamination has been documented in soils below various Category 05A outfalls. Historic HE contamination is estimated at 0.5 to 30% by weight (weight percent) of the soil matrix in the immediate vicinity of the outfalls. This would be consistent with the role that wetlands play in trapping contaminants. HE contamination, however, has also been detected at low levels (less than 2% by weight) in sediments approximately 200 ft (60 m) downstream from the outfall source. Low-level HE contamination has also been found below the confluence of Water Canyon and Cañon de Valle in areas where sediments accumulate. LANL studies of sediments below the HE outfalls indicate that HE contamination varied substantially from year to year, apparently in response to the amount of HE processing activity, and dissipated substantially when HE activities declined. In addition to HE contaminants, various metals (such as barium and lead) have been found at levels above natural background. LANL's environmental restoration program has conducted preliminary risk assessments that suggest that in some areas, contaminants are present at levels high enough to cause serious health or safety concerns under potential residential land use, but are barely significant under potential recreational use.

LANL's environmental restoration program intends to begin removal or remediation of soils that may pose health or safety concerns after the supply of HE-contaminated water has been cut off.

## 3.3 CLIMATE AND AIR QUALITY

The Los Alamos climate is a semi-arid, temperate mountain type. Annual precipitation averages 19 in (47 cm). Thirty-six percent of the annual precipitation falls during July and August. Winter precipitation usually drops as snow, totaling approximately 59 in (150 cm) annually (LANL 1993a).

The LANL region boasts clean air that is typical of lightly populated, arid areas of the southwestern United States. Median visibility ranges between 66 and 100 mi (106 and 161 km). Air quality usually meets all applicable standards.

The prevailing winds are southwesterly to northwesterly; however, the irregular terrain of the Pajarito Plateau creates localized wind gusts that may not follow the average wind patterns. Although the prevailing winds may carry airborne contaminants from LANL toward the communities of Los Alamos and White Rock, erratic local winds generally dilute contaminants more effectively than winds over uniform terrain.

Air emissions from burning HE waste and slurry to remove safety hazards do not require a permit under the State of New Mexico Air Quality Control Regulations (AQCR 301). Flashing and solvent burning are permitted under AQCR 301, Regulation to Control Open Burning. The open burn units in the proposed project area also operate under interim status granted by the EPA. They are subject to the operating conditions set forth in LANL's RCRA Hazardous Waste Part B Permit Application (Rev 4.1, 1988). All emissions from the open burn units are currently within regulatory limits.

## 3.4 WATER RESOURCES

Water occurs in the LANL area as surface water, shallow groundwater in alluvial fill, and deep ground water in the main aquifer. The main aquifer lies 600 to 1200 ft (180 to 360 m) below dry tuff and volcanic sediments. Shallow ground water exists in perched zones. No connections between shallow ground water and the underlying deep aquifer have been identified. Water from the proposed project area does not contribute to recharging the aquifer, which is recharged by subsurface water flowing from the Jemez Mountains north and west of the proposed project area. Water discharged from HE outfalls is not a source of drinking water for human populations. Water discharges from the outfalls are governed by State of New Mexico Standards for Interstate and Intrastate Streams (Section 3-101.k) for Livestock and Wildlife Watering.

LANL routinely monitors the underlying aquifer—the source of municipal drinking water for LANL and Los Alamos townsite. The water currently meets all applicable federal and state drinking water standards. Several ephemeral surface streams, which run during spring snowmelt and after intense summer rainstorms, flow off DOE property toward the Rio Grande. Spring snow melt and summer rainstorms also recharge the thin, perched aquifer confined to the alluvium in the canyons adjacent to the proposed project area.

The four canyon systems in the proposed project area receive water from several sources: snowmelt and rainfall runoff from the headwaters of the canyons, stormwater runoff from LANL facilities in the proposed project area, and discharge from LANL facilities at permitted and unpermitted outfalls. In addition Pajarito Canyon is fed by four natural springs. Homestead Spring issues on the south side of Pajarito Canyon. Three other springs spill into a small tributary of Pajarito Canyon approximately 800 ft (243 m) north of the proposed TA-9 treatment facility site (LANL 1993a). Cañon de Valle also appears to receive some spring water. The volume of water that springs supply is unknown.

Water supplying some facilities at TA-16, principally the TA-16 steam plant, comes from a horizontal infiltration well located in upper Water Canyon, where a collection system catches the water from a shaft 30 ft (9 m) deep into tuff. The shaft supplied 9,300,000 gal. (35,000,000 L) of water in 1990, all of it used for industrial purposes. In general, this water is redischarged into Cañon de Valle after use in industrial processes.

Some of LANL's wastewater discharges in the proposed project area reach major canyons, but most sink beneath the ground surface only a short distance from the outfall.

## 3.5 SENSITIVE ENVIRONMENTS AND BIOTA

Vegetation typical of middle elevations 6,900-7,500 ft (2,102-2,286 m) on the Pajarito Plateau dominate the proposed project area (Table 3-1). Most vegetation in the proposed project area has been disturbed by LANL activities, as well as by previous ranching and logging operations and by forest fires. The mesa tops in the proposed project area are predominantly a mixture of ponderosa pine-piñon/juniper forests mixed with old agricultural field vegetation and shrubby new growth promoted by the 1977 La Mesa fire. The canyon areas contain both elements of ponderosa pine-mixed conifer forests and small areas of wetland habitat (Usner and Bennett 1994).

**Table 3-1. Typical vegetation in the proposed project area**

| Zone | Vegetation | Scientific name |
|---|---|---|
| mesas | Ponderosa pine | *Pinus ponderosa* Laws var. *scopularum* Engelm. |
| | Gambel oak | *Quercus gambelii* Nutt. |
| | One-seeded juniper | *Juniperus monosperma* [Engelm.] Sarg. |
| | Aspen | *Populus tremuloides* Michx. var. *aurea*[Tides.] Daniels |
| | native grasses | |
| canyons | Douglas fir | *Pseudotsuga menziesii* [Mirb.] Franco var. *glauca* [Biessner] Franco |
| | New Mexico locust | *Robinia neomexicana* Gray |
| | willows | *Salix* spp. |
| | Ponderosa pine | *Pinus ponderosa* Laws var. *scopularum* Engelm. |
| | cattails | *Typha spp.* |

### 3.5.1 Wetlands

Wetlands are defined as any area wet enough to support vegetative or aquatic life requiring saturated soil conditions (Executive Order 11990). LANL biologists have investigated all outfalls within the proposed project area and have identified 14 man-induced wetlands that support hydrophytic vegetation - nine associated with Category 05A outfalls, totaling 4.34 acres, and five with other industrial flows, amounting to 0.59 acres (Usner and Bennett 1994). The wetlands associated with HE outfalls range from 0.002 to 1.1 acres (.0008 to 4 ha).

Man-induced wetlands are areas that develop characteristics of naturally occurring wetlands due to human activities (COE 1987). Wetlands associated with HE outfalls are fed by intermittent and near-continuous discharges from the outfalls, supplemented to an unknown extent by natural discharge from storms and springs. Wetlands in the proposed project area are typically linear and consist of small patches of hydrophytic vegetation connected by short stretches of running water. Vegetation ranges from grasses and rushes typical of wet meadows to stands of cattails. One wetland area supports a small stand of willows.

Formation of wetlands is a function of water volume and flow duration, channel profile, soils, vegetation, and geology. Although all the wetlands discussed in this EA are associated with HE outfalls, other sources (including other outfalls and springs) may contribute water to a specific wetland. Discharged water may sink beneath the surface to emerge some distance downstream. The wetland at the existing treatment facility, for example, may be fed in part by the HE outfall (05A-54) from Building 340, which discharges upstream from the treatment facility. Discharged water may also evaporate before reaching a suitable area or may flow through rocky channels without creating wetland conditions. Some outfall-caused surface flow disperses on the mesa top or the upper portions of the canyons; and some reaches the primary stream channels of Water Canyon and Cañon de Valle. Table 3-2 shows the flow of wastewater and wetland acreage in each canyon in the proposed project area.

Until 1992 a sanitary wastewater treatment facility discharged about 13 million gallons (of treated water into a tributary of Water Canyon upstream from the outfalls at TA-11 (05A-69, 96, and 97). This sanitary wastewater discharge may have been the primary water source for the 1.1 acre wetland at TA-11. This wetland is currently showing signs of vegetation die-off. One other wetland area shows signs of vegetation die-off. The cause of the die-off is unknown.

Water Canyon and Cañon de Valle contain some spring-associated wetlands upstream from the proposed project area; they may also contain some small riparian areas within the proposed project area that meet wetland criteria. LANL has systematically surveyed for wetlands that are associated with outfalls in the proposed project area but not for those associated with springs or other natural sources. Figure 3-1 shows the wetlands associated with HE outfalls and some wetlands that were identified by the US Fish and Wildlife Service (USFWS) in accordance with the National Wetlands Inventory (NWI) standards. The NWI method employs a hierarchical classification system based solely on aerial photography that may not detect small wetlands or those in deep canyons.

**Table 3-2. Wetland areas by canyon**

| Canyon | Wetland Area Associated with Category 05A Outfalls(acres) | Flow from Category 05A outfalls (gal/yr) | Wetland Area Associated with Other Industrial Outfalls (acres) | Flow from Other industrial outfalls (gal/yr)[1] |
|---|---|---|---|---|
| Pajarito Canyon | 0.16 | 5,853,722 | 0.0 | 4,512 |
| Two-Mile Canyon | 0.04 | 2,300 | 0.0 | 1,800 |
| Water Canyon | 2.48 | 5,501,700 | 0.36 | 1,157,594 |
| Cañon de Valle | 1.66 | 6,205,451 | 0.23 | 3,150,816 |
| Total | 4.34 | 17,563,173 | 0.59 | 4,314,722 |

[1]Other industrial flows consist of boiler blowdown, treated cooling water, non-contact cooling water, and photo processing waste

3.5.2 Threatened, Endangered, and Sensitive Species

LANL's threatened, endangered, and sensitive (TES) species database and consultations with state and federal agencies indicate that habitat in the proposed project area generally matches the needs of several listed plant and wildlife species. Table 3-3 lists all threatened, endangered, and sensitive species that could occur in the habitats of the proposed project area. After evaluating the habitat in greater detail, LANL biologists concluded that there is a moderate to high potential for six species to occur in the proposed project area: Mexican spotted owl, Southwestern willow flycatcher, northern goshawk, spotted bat, Jemez Mountains salamander, and meadow jumping mouse (Usner and Bennett 1994). One outfall supports a wetland that contains a small area of willows that could marginally serve as habitat for Southwestern willow flycatchers. Nesting characteristics, however,

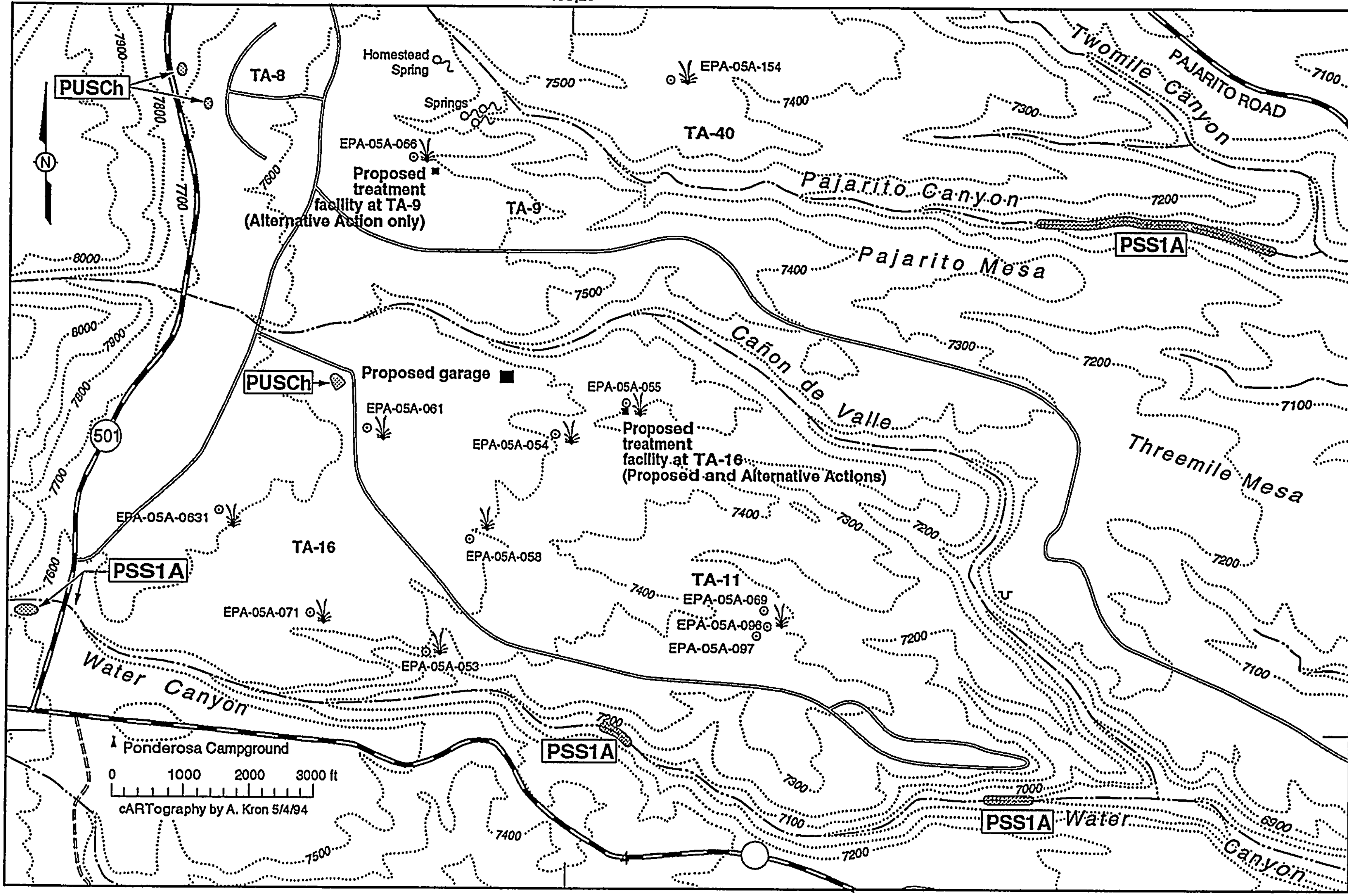


**Figure 3-1. Springs, National Wetlands Inventory, and LANL-defined wetlands associated with active HE outfalls**

= Wetland vegetation = Spring

**National Wetland Inventory data:**
PSS1A = Palustrine, shrub-scrub, broadleaf deciduous, temporarily flooded
PUSCh = Palustrine, unconsolidated shore, seasonally flooded, diked/empounded

**Table 3-3 Threatened, Endangered, and Sensitive (TES) Species for which Habitat Occurs in the Study Area**

| SCIENTIFIC NAME | COMMON NAME | STATUS* |
|---|---|---|
| Wildlife | | |
| *Accipiter gentilis* | Northern goshawk | FCC2 |
| *Buteogallus anthracinus* | Common black hawk | SPG2 |
| *Cynanthus latirostris* | Broad-billed hummingbird | SPG2 |
| *Empidonax trailii* | Willow flycatcher | FPE; SPG2 |
| *Euderma maculatum* | Spotted bat | FCC2; SPG2 |
| *Falco peregrinus* | Peregrine falcon | FE; SPG1 |
| *Haliaeetus leucocephalus* | Bald eagle | FE; SPG2 |
| *Ictinia mississippiensis* | Mississippi kite | SPG2 |
| *Martes americana* | Pine marten | SPG2 |
| *Lymnaea captera* | Say's pond snail | SPG1 |
| *Plethodon neomexicanus* | Jemez Mountains salamander | FCC2: SPG2 |
| *Strix occidentalis lucida* | Mexican spotted owl | FT |
| *Zapus hudsonius* | Meadow jumping mouse | FCC2; SPG2 |
| Plants | | |
| *Fritillaria atropurpurea* | Checker lily | SS |
| *Heuchera pulchella* | Sandia alumroot | SS |
| *Lilium philadelphicum* var. *andium* | Wood lily | SE3 |
| *Phlox caryophylla* | Pagosa phlox | SS |

*CODES FOR LEGAL STATUS
FE = Federally endangered
FPE = Federally proposed as endangered
FT = Federally threatened
FPT = Federally proposed as threatened
FCC2 = Federal candidate
SE1 = State protected and listed as threatened or endangered under the Federal Endangered Species Act
SE2 = State protected, rare across its entire range; with its limited distribution and population size, unregulated collection could jeopardize its survival in New Mexico
SE3 = State protected, widespread in or adjacent to New Mexico, but its numbers are being significantly reduced to such a degree that its survival within New Mexico is jeopardized
SPG1 = State protected as a Group 1 species (endangered)
SPG2 = State protected as a Group 2 species (threatened)
SS = State sensitive

are not present. The proposed site for construction of the HEWTF does not have appropriate habitat for any of the listed species. Although the proposed construction site does not have the appropriate nesting or roosting habitat characteristics for Mexican spotted owl, a small patch of roosting habitat occurs within 0.25 miles (0.4 km) of the proposed construction site and some nesting habitat is found within 0.6 miles (1.0 km) of the proposed HEWTF. In the summer of 1995, a pair of Mexican spotted owls was observed nesting between 1.0 and 1.5 miles (1.6-2.4 km) of the proposed HEWTF construction site at TA-16. None of the studies or surveys completed to date has revealed the presence of any listed plant or wildlife species within 0.25 miles (0.4 km) of the proposed HEWTF. Because of poor habitat compatibility, the probability of finding any of the other TES species within the proposed construction area is very low.

### 3.5.3 Other Protected Species

A great horned owl nest has been located about 1.5 mi (2.4 km) from the proposed project area. In addition, red-tailed hawks, Cooper's hawks, American kestrels, and flammulated owls probably frequent the vicinity of the proposed project area and may nest there. These species are not threatened or endangered but the Migratory Bird Treaty Act (16 USC 1531 et. seq.) prohibits harassing or collecting them. Excessive activity or noise, especially near canyon rims during the mating and nesting period of May through October, may disturb these species.

### 3.5.4 Wildlife

*Small mammals and their predators.* The proposed project area, like other Southwestern habitats with permanent water sources, supports a variety of wildlife species. LANL biologists have demonstrated that small mammals (such as woodrats, deer mice, squirrels, rabbits and harvest mice) have the highest species diversity and density in the vicinity of outfalls (Raymer and Biggs 1994). The dense understory typical of medium and large outfalls provides suitable habitat for these species. Fox, bobcat, coyotes, and raptors, which feed on these small mammals, may frequent these wetland areas more than other parts of their range. Bobcats have been sighted at TA-16.

*Birds and fish.* In addition to the Southwestern willow flycatcher, which is a TES species, and other protected birds identified in Section 3.5.3, the wetland habitat could support song sparrows and red-winged blackbirds. None of the outfall flows support fish.

*Large mammals and their predators.* Elk and deer are also present in the proposed project area. Elk apparently use the area for watering, temperature regulation, foraging, and bedding. The highest concentrations of elk at LANL have historically been in and near the proposed project area. Studies of mule deer movements at LANL between 1975 and 1978 indicated that deer tended to concentrate in the southern and southwestern portions of LANL (that is, in and near the proposed project area) year-round. Because of their year-round occupancy, deer would be expected to use the proposed project area for breeding, fawning, bedding, watering, and foraging. Elk were reintroduced into the Jemez area between 1948 and 1965 after being eradicated around the turn of the century. From this base of 86 animals, the Jemez elk herds have increased to approximately 1800-2000 individuals. Studies of elk distribution in the Jemez area between 1977 and 1979 showed that most elk use was to the west and southwest of LANL with some evidence of use along the southern boundary of the proposed project area where human activity was minimal (White 1981). Recent LANL observations (1991-1993) suggest that elk have spread north and northeast of their previous use areas and have now extended their range into the proposed project area and into the central areas of LANL. Factors responsible for this increase in local elk herds probably include the lack of predators, lack of hunting pressure at LANL and at Bandelier National Monument, and the creation of 15,000 acres (6,073 ha) of winter range as a result of the 1977 La Mesa fire and subsequent reseeding. Winter forage is generally the principal limiting factor in elk population growth (White and Lissoway 1980) and expansion of winter range immediately south of the proposed project area has probably contributed to increased numbers of elk using the proposed project area. There has been no systematic elk research at LANL or in surrounding lands since 1980. Therefore, little is known of current patterns of habitat use, travel corridors, herd health and reproduction, or specifics of population growth.

Studies of elk in the Rocky Mountain region (Christensen and Unsworth 1993, Grover and Thompson 1985, Frank and McNaughton 1992) indicate that availability of water for drinking and for temperature regulation (especially in summer) is a critical factor in elk distribution. Elk tend to prefer areas within 0.33-0.5 miles (0.5-0.8km) of permanent water. Beyond 0.5 miles (0.8 km), elk activity drops significantly. In mid-summer, 80% of elk activity occurs within 0.25 mi (0.4 km) of permanent water. Lactating elk cows also have a seasonal dependence on water. Deer distributions also show a relationship to the location of water sources, with animals generally being located within 1.25 mi (2 km) of water. Deer at LANL that were tracked in the late 1970s had average home ranges of 35 sq mi ± 13 sq mi (13.7 sq km ± 5 sq km) (Eberhardt and White 1979).

The distribution of large predators, such as mountain lions, is highly dependent on the distribution of prey species, such as deer and elk. Occurrences of large predators would be expected to be more frequent where prey are concentrated. Large predators have not been documented in the proposed project area but have been observed north of LANL.

*Use of wetland habitats in the proposed project area.* In 1991 LANL's Biological Resource Evaluation Team (BRET) surveyed wildlife use of NPDES outfalls. Of the 21 active HE wastewater outfalls, animals were observed at three that had a continuous water supply. At another nine that had intermittent flow (LANL 1992), there was other evidence of use (tracks, game trails, bedding areas, spoor, and browsing signs). The biologists concluded that large animals such as deer, elk, squirrels, raccoons, coyotes, and rabbits, many other smaller mammals, birds, amphibians, reptiles, and invertebrates used outfalls for watering and other uses. Species with limited ranges may be dependent on these water sources; larger species with extended ranges may have access to other sources and other wetland habitats. Wildlife usage of wetlands habitats and habitat conditions in 1994 are listed in Table 3-4. Representatives of the U.S. Forest Service and the New Mexico Department of Game and Fish visited some of the existing wetlands in the proposed project area in June 1995. Their conclusions (see Appendix D) supported these findings.

## 3.6 NOISE

The proposed project area is used for HE processing and testing. Periodically, explosives are detonated within and adjacent to the proposed project area. These tests are preceeded by warning signals. Both noise from the signals and from the tests can be heard within the proposed project area and at varying distances from the test sites. The sounds are loud, and may exceed 115 decibels (dBA), but are of short duration. Other standard industrial noise occurs in the proposed project area: vehicles, generators, pumps, machine tools, etc. Workers who might be exposed to sounds above recommended threshold limit values (ACGIH 1992) use hearing protectors and other engineering controls to prevent hearing damage. At State Road 4 and near the entrance to

Table 3-4. Wildlife Use and Habitat Conditions at Category 05A Outfalls in Proposed Project Area

| Water Source | | | | | | |
|---|---|---|---|---|---|---|
| TA-Bldg | Category 05A Outfall | Size (acres) | Vegetative Conditions | Observed Wildlife Use | Category[1] | Relationship to Canyon Systems |
| 16-410 | 053 | 0.60 | willow wetland | deer, porcupine, lizard | 1 | enters Water Canyon but not watercourse |
| 16-340 | 054 | 0.59 | large cattail/rush wetland, significant pools; good water quality indicators | deer, elk, porcupine, squirrel | 2 | aerating cascade present; enters Cañon del Valle watercourse |
| 16 Treatment Facility | 055 | 1.03 | cattail wetland | game trail, squirrel, lizard | 2 | enters Cañon de Valle but not watercourse |
| 16-260 | 056 | 0.00 | ponderosa pine, oak, surface water present | deer, elk, snake, squirrel | 2 | enters Cañon del Valle but not watercourse |
| 16-300-series | 058 | 0.43 | disturbed, large stand of cattail wetland; good water quality indicators | deer, elk, rabbit | 1 | enters Water Canyon but not watercourse |
| 16-280 | 061 | 0.04 | cattail/rush wetland | deer, elk | 2 | possibly enters Cañon del Valle |
| 16-342 | 062 | 0.00 | oak, pine, aspen; surface water present | deer, rabbit, squirrel, lizard | 3 | dissipates on slope of Cañon del Valle |
| 16-400 | 063 | 0.00 | ponderosa pine, grass; surface water present | deer, elk, skunk, raccoon shrimp | 3 | dissipates on mesa top |
| 9-21 + 5 others | 066 | 0.16 | rush wetland | deer, elk, squirrel | 2 | enters Pajarito Canyon watercourse |
| 9-34 + 7 others | 067 | 0.00 | ponderosa pine, grass, surface water present | elk, coyote | 2 | enters Pajarito Canyon watercourse |
| 9-48 | 068 | 0.00 | ponderosa pine, grass, surface water present | elk game trails, lizard | 2 | intermittent pools; enters Pajarito Canyon watercourse |
| 11-50, 51, 52 | 069, 096, 097 | 1.10 | disturbed cattail/rush wetland; good water quality indicators | deer, elk, bear, coyote, squirrel | 2 | all enter Water Canyon watercourse |
| 16-430 | 071 | 0.35 | disturbed willow, cattail, and rush wetlands | deer, elk, shrew, lizard | 2 | standing water; enters Water Canyon but not watercourse |
| 40-41 | 154 | 0.04 | sedge and rush wetland | none | 3 | enters Two Mile Canyon but not watercourse |

[1]Category 1 - definite use by wildlife; 2- potential or probable use; 3- no significant use Source: Raymer 1993, LANL 1992

Bandelier National Monument, peak noise from explosives testing has been measured at 60-70 dBA (DOE 1995).

## 3.7 SOCIOECONOMIC RESOURCES

LANL is the largest employer in northern New Mexico, with about 7450 full- and part-time regular employees and an additional 4,800 subcontract personnel. The communitities associated with LANL include Los Alamos, Santa Fe, and Rio Arriba counties in north-central New Mexico. The predominant population in the region is white caucasian with 50.1 percent having Hispanic ethnic background. Native Americans in this region account for 5 percent of the population. Los Alamos County has the highest median household income of the surrounding communities. Detailed socioeconomic information is contained in the Draft Environmental Impact Statement (DEIS) for the Dual Axis Radiographic Hydrodynamic Test (DARHT) Facility (DOE 1995).

## 3.8 ENVIRONMENTAL JUSTICE

Under Executive Order 12898, federal agencies are responsible for identifying and addressing the possibility of disproportionately high and adverse health and environmental effects of programs and activities on minority (all people of color, exclusive of white non-Hispanics) and low-income (household incomes less than $15,000/yr) populations. Within a 10-mile (16 km) radius of the TA-16 site, about 14% of the population is of minority status. Within a 50-mi (80-km) radius, about 54% of the population is of minority status. In terms of low-income populations, 8% of the households within a 10-mi radius had incomes below $15,000. Within a 50-mi radius of the site, 24% of the households had incomes below $15,000.

## 3.9 TRANSPORTATION

LANL is surrounded by state highways, county roads, and DOE roads. All roads internal to LANL, such as the TA-9/16 network, are regulated by DOE Orders, etc. External roads, such as state highway and county roads, are regulated by requirements of the Department of Transportation (DOT). Los Alamos County reports a yearly average of 280 accidents (LAC 1992) and the State of New Mexico reports that the accident rate in Los Alamos County is 1.83 accidents per 100 million miles (NMHTD 1992).

## 3.10 HUMAN HEALTH

Under normal operations, workers may be exposed to two principal sources of health and safety concerns: HE hazards and solvent exposures. Currently workers are exposed to HE hazards in transporting HE wastewater, flashing HE-contaminated material, burning HE slurry solids, and changing HE-contaminated carbon filters. Hazards to workers from these activities are minimized by keeping HE and HE-contaminated materials wet during transport and handling and by performing all burning activities as unmanned, remote operations. As part of normal procedures, workers use protective glasses and safety shoes in HE areas and wear respirators when changing carbon filters.

Workers may be exposed to solvents during activities such as collection and transport of HE wastewater or during solvent recovery. In current solvent recovery operations, workers are required to wear respirators. No other protective equipment is required for other aspects of HE wastewater management.

# 4. ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES

This EA addresses all potentially non-trivial effects. The three potentially significant effects for each alternative are to air quality, water quality, and wildlife habitat.

## *4.1* ENVIRONMENTAL EFFECTS OF THE *NO ACTION ALTERNATIVE*

### 4.1.1 Air Quality

HE wastewater management at LANL produces emissions from four separate sources: evaporation of volatile organic compounds (VOCs), burning of HE wastewater slurries and waste HE, burning of carbon filters and other filtration media, and burning of solvents (Table 4-1). Particulates and vehicle exhaust emissions would also be produced during construction. Air emissions[1] from these sources are regulated under New Mexico ambient air quality standards. HE slurry and waste HE burning must meet ambient air standards for carbon monoxide (CO), various oxides of nitrogen ($NO_x$), particulate matter (PM), non-methane hydrocarbons, and VOCs. Currently air emissions meet all applicable standards.

The *No Action Alternative* would not change emissions. Table 2-1 lists substances that may be present in LANL HE wastewater. This list includes all contaminants regardless of quantity or frequency of use. The inerts, binders, plasticizers, and most HE compounds are not volatile and would remain dissolved or suspended in the water or would settle out of solution. In considering air emissions, this EA assumes that solvents would evaporate. Dissolved HE compounds released from the sump outfalls or from the treatment facility outfalls may volatilize or they may accumulate in water or soil. Both possibilities are considered below.

#### *4.1.1.1 Air Emissions during Construction*

Since there would be no construction under this alternative, there are no associated air emissions.

#### *4.1.1.2 Emissions of Volatile Organic Compounds*

A maximum of 70 gallons/yr of solvent (482 lb/218.8 kg) is discharged to the sumps, and from there to the outfalls. The solvent would either evaporate or would migrate into wetlands, soils, or possibly, the shallow perched groundwater. Evaporation of 482 lb of solvents into the atmosphere throughout the year would produce 0.055 lb/hr (0.02 kg/hr) of VOCs. If dissolved HE at the processing facility outfalls (approximately 62 lbs or 28 kg) were to volatilize, it would yield an additional 0.007 lb/hr (0.003 kg/hr) of VOCs annually.

HE wastewater collected in the input tank to the treatment facility has an average chemical oxygen demand (COD)[2] of 90 mg/L or 12 kg/yr (27 lb/yr). This analysis assumes that dissolved HE is responsible for the entire COD. The average COD of the wastewater at discharge is 22 mg/L (or 6.6 lb/yr) of dissolved HE. Dissolved HE components are photo-chemically active and for

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[1]Carbon monoxide, various oxides of nitrogen ($NO_x$), particulate matter (PM), non-methane hydrocarbons, VOCs, Hazardous Air Pollutants (HAP) (butylacetate, cyclohexane) and air toxics (for example, hydrofluoric and hydrochloric acids)

[2]COD is a measure of organic pollutant load (in the case of HE wastewater, COD measures the amount of dissolved HE and solvents).

**Table 4-1. Air emissions**

| Regulated Constituent and Source | No Action (lb/yr) | Proposed Action (lb/yr) | Alternative Action (lb/yr) |
|---|---|---|---|
| **VOCs/HAPs** | | | |
| Evaporation[1] | 482 | 28 | 161-321 |
| Solvent Burning | 14 | 15 | 14 |
| Carbon Filter Burning | 1 | < 1 | 7-15 |
| Slurry/Waste HE Burning | 24 | 24 | 24 |
| Total VOCs/HAPs | 521 | 68 | 206-474 |
| **Particulate Matter** | | | |
| Solvent Burning | 23 | 26 | 23 |
| Carbon Filter Burning | 1 | < 1 | 9-18 |
| Slurry/Waste HE Burning | 1270 | 1270 | 1270 |
| Total PM | 1294 | 1298 | 1302-1311 |
| **Carbon Monoxide** | | | |
| Solvent Burning | 5 | 5 | 5 |
| Carbon Filter Burning | < 1 | < 1 | 3 |
| Slurry/Waste HE Burning | 243 | 243 | 243 |
| Total CO | 249 | 249 | 251 |
| $NO_x$ | 632 | 632 | 632 |
| HF | 249 | 249 | 249 |
| HCl | 139 | 139 | 139 |
| BaO | 59 | 59 | 59 |
| $PO_4$ | 36 | 36 | 36 |
| Construction | none | low - dust controlled by standard techniques; no effect from diesel fuel emissions under current regulations | slightly higher than Proposed Action - dust controlled by standard techniques; no effect from diesel fuel emissions under current regulations |

[1] Solvent evaporation from the existing solvent recovery system is not analyzed in this EA; dissolved HE is unlikely to volatilize and is not included in the VOC evaporation calculations

purposes of air quality regulations are considered to be VOCs. If all the dissolved HE that was released were to volatilize, the emissions would be 0.0008 lb/hr (0.0003 kg/hr) of VOCs. Sampling has shown that HE released over the life of the processing facilities has accumulated in the soils below the outfalls. If the HE components were appreciably volatile, there would be little or no accumulation in the soils. Therefore, VOC emissions from dissolved HE are **not** included in Table 4-1.

#### *4.1.1.3 Carbon Filter Burning*

An average of 68 mg/L (COD) of organic contaminants (9 kg/yr, 20.4 lb/yr) is adsorbed by carbon filters. Emissions from burning the HE adsorbed by the filters are included in Table 4-1. Emissions from burning the carbon filters themselves are not included because the temperatures and duration of burning are not sufficient to combust the carbon.

#### *4.1.1.4 HE Slurry/Waste HE Burning*

Slurry containing particulate HE (shavings, dust, chunks), inerts, plasticizers, and binders is dried on top of the sand filters and ignited. Burning occurs monthly and lasts approximately one hour. Burning of waste HE and HE slurry is required to eliminate safety concerns that accompany conventional transportation and burial and does not require permitting under New Mexico's Air Quality Control Regulations. Approximately 10,000 lb (4,536 kg) of HE waste is combusted annually. Emissions from HE burning are included in Table 4-1. HE slurry and waste HE burning is the single largest source of air emissions under any alternative. Concentrations of air contaminants at the nearest off-site location (State Road 4 bordering Bandelier National Monument, 6,004 ft (1,830 m) to south-southwest) are less than the concentrations allowed under ambient air quality standards (Appendix B).

#### *4.1.1.5 Solvent Burning*

The dilute solvents generated by HE processing are, on average, a mix of 30% methanol, 25% water, 20% acetonitrile, 20% tetrahydrofuran, and 5% of any of the solvents shown in Table 2-2. Trace amounts of HE may be present. LANL's permit under NM AQCR 301 (Open Burning) allows 50 burns each year consisting of no more than 50 gal (189 L) each. Emissions from burning 630 gal (2,385 L) of solvents from existing recovery processes in the processing facilities are shown in Table 4-1.

### 4.1.2 Water Quality

LANL would continue to discharge HE-contaminated water at 16 Category 05A outfalls. The quality of HE wastewater effluents would remain the same as existing conditions if the *No Action Alternative* were chosen. Because daily operations vary substantially, wastewater occasionally would contain contaminants in sufficient quantity to exceed NPDES limits. Violations could be expected to increase as permit standards became more rigorous.

HE process water collected in the sumps contains approximately 88 lb (40 kg) of dissolved HE and solvents [3] annually. Approximately 26 lb (12 kg) of dissolved HE[4] is captured with the slurry and passed through the carbon filters at the treatment facility. The remainder of the dissolved HE

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[3](20mg/L(HE) x 529,600 gal (water) x 3.785 L/gal (gal to liter conversion))/1,000,000 mg/kg= 40.1 kg

[4] (90 mg/L [COD at the treatment facility collection tank] x 36,000 gal (water) x 3.785 gal/L)/1,000,000 mg/kg = 12 kg

(62 lb; 28 kg) is assumed to be discharged with the sump water. The effectiveness of carbon adsorption of dissolved HE is a function of water volume, flow rate, contaminant concentration, mass of carbon and similar factors. The carbon filters remove approximately 20 lbs (9 kg) of dissolved HE and release water containing dissolved HE (about 6.6 lb (3 kg)) with a COD of approximately 22 mg/L annually. This dissolved HE is released to the wetland at the treatment facility outfall, where microorganisms may biodegrade some of it or where it may be diluted by natural runoff as it migrates downstream, into the soil, or possibly into shallow alluvial groundwater bodies. Alternatively, the disssolved HE could, but is unlikely to, volatilize.

Most of the organic contaminants (all the solvent (482 lb;219 kg) and 61 lb (28 kg) of dissolved HE annually), however, are discharged through the processing facility outfalls.

The volume of HE-contaminated water would remain at 17,563,173 gal/yr (66,483,830 L/yr) (including contaminated non-HE industrial water and stormwater). The volume of treated wastewater would remain at 36,000 gal/yr (136,260 L/yr).

### 4.1.3 Water Use

Water use would remain at the current projected level of 16,035,000 gal/yr (60,699,067 L/yr).

### 4.1.4 Soils

#### *4.1.4.1 Construction Effects*

The *No Action Alternative* entails no construction; therefore, no soils would be disturbed by this alternative.

#### *4.1.4.2 Operational Effects*

Under this alternative, HE and solvents would be expected to continue to accumulate in the sediments and some would be expected to migrate downstream with seasonal runoff. Specific contamination levels for each of the outfalls have not been determined. Although pooling of water and sediments in wetland areas would be expected to retard the dispersion of contaminants, continued release of contaminated water could eventually lead to increased movement of contaminants downstream. LANL's environmental restoration program would not remediate these soils as long as contaminated water was released from the outfalls. Future remediation would be addressed in a separate NEPA analysis.

### 4.1.5 Wetlands

The *No Action Alternative* would not alter the size of wetlands. It would continue to degrade water quality in the wetlands through release of contaminants. Although wetland vegetation and microbial activity may breakdown the HE compounds to some extent, the present of HE contaminants in soil samples suggests that this process cannot consistently keep pace with the discharge of HE to the environment.

### 4.1.6 Threatened, Endangered, and Sensitive Species

No TES species have been identified in the effect area. The *No Action Alternative* would have no effect on TES species.

### 4.1.7 Vegetation and Wildlife

*Habitat.* There would be no removal of vegetation under this alternative. Hydrophytic vegetation would continue to grow at most HE wastewater outfalls. Water released from the sumps would contain contaminants (dissolved HE, solvents, and occasionally oil) and would be expected to exceed discharge permit requirements on occasion. The wetlands may trap contaminants and retard their movement downgradient; however, contaminants released in HE wastewater, especially solvents, could damage vegetation at or downstream from the outfall. Since there would be no construction, there would be no disturbance of mesa-top habitat.

*Effects on wildlife.* Wildlife would continue to use effluents from the outfalls as water sources. Animals that use outfall areas as water and forage sources could be expected to ingest small quantities of contaminants released with the HE wastewater. There have been no studies of the effects of ingestion of HE contaminants on the health of animal populations. Water releases from HE outfalls would be expected to meet standards for wildlife habitat specified by New Mexico Standards for Interstate and Intrastate Streams (Section 3-101.k - Livestock and Wildlife Watering).

### 4.1.8 Socio-economic Effects

The *No Action Alternative* is not expected to have an effect on the regional socioeconomics since there would be no change from current operations.

### 4.1.9 Environmental Justice Concerns

No disproportionate environmental effects to minority or low-income populations have been identified with the continued operation of the TA-16 HE wastewater treatment facility. There have been no studies on the accumulation of contaminants from HE wastewater in game species that might be consumed by members of the public. A study of radionuclide concentrations in elk at LANL concluded that there were no significant doses to the public from consuming meat from elk that forage at LANL (Fresquez et al. 1995). No observations have been made of hazardous chemical contamination of large game at LANL.

### 4.1.10 Transportation

Personnel currently transport HE slurry from HE facilities at TAs 9, 11, 16, and 40 to the TA-16 sand filters, for a maximum distance of 5 miles per trip. About 72 trips of 500 gallons (1,893 L) each are taken per year, for about 350 miles (563 km) on LANL roads each year. Twelve times per year, a mixture of ash and sand resulting from burning slurry at the TA-16 sand filters is taken via West Jemez Road and Pajarito Road to TA-54 for disposal; about 5,000 pounds (2,268 kg) of ash/sand mixture is transported per year. The round-trip distance is 15 miles (24 km) or about 180 mi/yr (290 km) on publicly accessible roads. Transportation associated with the *No Action Alternative* involves about 530 mi/yr (853 km) or about 15,900 mi (25,588 km) over the next 30 years. At the rate of 1.83 accidents per 100 million miles driven, it is unlikely that there would be an accident involving HE waste transport.

### 4.1.11 Human Health Effects

Hazards from HE handling have been analyzed for several scenarios involving fire and explosion of HE materials (Appendix C). Any scenario in which a member of the public (located at the LANL boundary nearest the proposed project area or farther off-site), a co-located worker (a worker not involved in HE wastewater management but in an adjacent work area), or a worker could receive a disabling injury or long-term health effects is analyzed in Section 4.5.1. No other fire or explosion scenario would result in anything more than irritation or discomfort to a member of the public or a co-located worker or a minor injury (without disability) to a worker. The probability of such low-consequence events occurring is less than once in 10 years of operation.

Solvent exposures to workers during HE wastewater management would occur during outdoor operations at the discharges from the sump outfalls. The following assumptions reflect the case where a worker has a full day's exposure to solvent vapors from an outfall and where the solvent vapors concentrate in the air the worker breathes:

- The solvent mixture contains 5% butylacetate which has the lowest threshold limit value (TLV) of any of the possible solvents used.
- There is a 1 $m^3$ breathing zone in which all solvent vapors accumulate.
- Wind speed is 2 mi/hr (3.2 km/hr), which represents minimal dispersion of vapors.

The steady-state ambient concentration under these conditions would be 18 ppm, which is less than the TLV for the solvent mixture (96.7 ppm). Therefore, no occupational exposures would occur to workers. Since there are no health effects expected for workers, there would also be no anticipated health effects for co-located workers or members of the public.

## 4.2 ENVIRONMENTAL EFFECTS OF THE *PROPOSED ACTION*

### 4.2.1 Air Quality

Emissions of carbon monoxide and particulate matter under the *Proposed Action* would differ only slightly from those of the *No Action Alternative* because the quantities of material burned or volatilized would change little from one alternative to another. Emissions of VOCs/HAPs would be substantially less than current emissions. All emissions would be expected to be below regulatory limits.

#### *4.2.1.1 Air Emissions from Construction*

Personnel would operate heavy equipment during about four months of construction activities. Construction activities would generate dust and thus increase the level of particulates in the air. Standard dust controls, such as watering the area, would be used to minimize dust. Heavy equipment would also create fuel emissions. Diesel emissions, although visible on cold mornings, would present no adverse Effect under current environmental, safety, and health regulations. Air movement would quickly dissipate the fumes.

#### *4.2.1.2 Emissions of Volatilized Organics*

Currently about 630 gal/yr (2,385 L/yr) of solvent are recovered from HE wastewater at the processing facilities and burned at the TA-16 burn grounds. Another 70 gal/yr (265 L/yr) of solvents pass into the sumps and out the outfalls. Waste minimization measures inherent to the *Proposed Action* would eliminate the 70 gal/yr (265 L/yr) of solvents from HE wastewater by modifying the solvent vacuum pumps to segregate the waste solvents from the HE process wastewater. The only solvents that could occur in the HE wastewater would be small quantities that accidentally mix with facility washdown water. This segregation would essentially eliminate the volatilization of solvents during management of wastewaters. This represents an improvement over current operations, where solvents may volatilize during sump collection or are discharged to the environment with sump wastewater. However, about 5% of the additional recovered solvent (3.5 gal/yr; 13.2 L/yr) may volatilize during recovery of solvents from vacuum pumps. The remaining 66.5 gal/yr (253 L/yr) of solvents would be recovered and burned at the solvent burn tray at TA-16. Even if all 700 gal/yr (2,650 L/yr) of solvents evaporated, VOC emissions would be no more than 5% of the AQCR's most conservative limit for these solvents (10 lb/hr). Most solvent, however, is expected to be captured and burned at the solvent burn tray.

#### *4.2.1.3 Carbon Filter Burning*

Under the *Proposed Action*, carbon filters in the treatment facility would receive about 22 lb/yr (10 kg/yr) of dissolved HE [5] in the influent wastewater. The adsorption of dissolved HE and solvents is a function of water volume, flow rate, contaminant concentration, mass of carbon, and similar factors. The proposed facility would be designed and operated in such a way that the filters would adsorb 90-95% of the dissolved HE (about 20 lb/yr (9 kg/yr)). Emissions from flashing HE in the spent carbon filters are included in Table 4-1. Emissions from burning the carbon filter itself are not included because the duration and temperature of burns are not sufficient to combust the carbon.

#### *4.2.1.4 HE Slurry/Waste HE Burning*

Because HE equipment filters would capture most HE, the concentration of HE in wastewater is expected to be less than 20 mg/L and the mass of slurry should not exceed about 24 lb/yr (11 kg/yr). Emissions from burning these materials would be much lower than those produced under current conditions. However, HE from filtering air and recycled water would bring the total mass up to the quantity currently burned—5,000-10,000 lb/yr (2272-4545 kg/yr). Emissions from burning HE solids are included in Table 4-1. Burning filter media would produce a slight amount of additional emissions.

#### *4.2.1.5 Solvent Burning*

Currently about 630 gal/yr of solvent are recovered from HE wastewater at the processing facilities and burned at the TA-16 burn grounds. Another 70 gal/yr (265 L/yr) of solvents pass into the sumps and out of the outfalls. Under the *Proposed Action*, all of the solvent (approximately 700 gal/yr (2,650 L/yr)) would be recovered and burned at TA-16, increasing emissions from combustion byproducts from those operations by about 10%. Calculations of emissions from burning solvents assume that there would be a 5% loss to volatilization during solvent recovery (Table 4-1).

### 4.2.2 Water Quality

The *Proposed Action* would eliminate HE-contaminated flows from 15 outfalls. The total amount of dissolved HE entering the wastewater would be reduced to approximately 22 lb/yr (10 kg/yr). Solvent contamination would be reduced to zero under normal conditions. There would be no permit violations expected under this alternative.

The total volume of HE-contaminated water would decrease to 130,500 gal/yr (493,996 L/yr), or less, and all of it would be treated to remove HE and solvents (not expected under normal operating conditions) before release. The wastewater would be expected to have an average COD of 20 mg/L when it reached the treatment facility. The adsorption of dissolved HE is a function of water volume, flow rate, contaminant concentration, mass of carbon and similar factors. The new facility would be designed to extract 90-95% of the dissolved HE. The average COD after treatment would be expected to be approximately 2 mg/L, all of it resulting from dissolved HE. That concentration would be further diluted by natural runoff and stormwater discharge as it was flushed downstream. All discharged water would be expected to meet or exceed NPDES permit requirements. Treated wastewater would be discharged at the remaining Category 05A outfall. Downstream water quality in the affected area would improve.

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[5](20 mg/L (HE) x 130,500 gal/yr (water) x 3.785 L/gal)/1,000,000 mg/kg = 9.9 kg/yr

The net discharge from the TA-16 treatment facility would increase from 36,000 gal/yr (136,275 L/yr) to a maximum of 130,500 gal.yr (493,966 L/yr).

### 4.2.3 Water Use

The *Proposed Action* would reduce water use for HE operations at LANL from 10,942,200 gal/yr (44,420,725 L/yr) to 130,500 gal/yr (494,000 L/yr). It would also eliminate use of 5,093,000 gal/yr of non-HE industrial water.

### 4.2.4 Soils

#### *4.2.4.1 Construction Effects*

Construction of the new treatment facility and the garage in the *Proposed Action* would disturb about 1 ac (0.4 ha.) of soils. Construction would not require a stormwater discharge permit under NPDES or a Pollution Prevention Plan.

#### *4.2.4.2 Operational Effects*

Under this alternative, soil contamination at the processing facility outfalls from previously released HE would remain constant until soils were remediated or removed as part of LANL environmental restoration activities. No new contaminants would be added. Discharge from the treatment facility outfall would contain approximately 2 mg/L of dissolved HE which could accumulate and add to the current load of HE in the soil at that outfall (existing level of contamination has not yet been determined). Except for discharge at Outfall 05A-055, which would increase, discharge at other outfalls would cease and contaminants would be less likely to be washed downstream. Increased discharge from the treatment facility from 36,000 gal/yr (136,275 L/yr) to 130,500 gal/yr (493,966 L/yr) could increase the likelihood of small-scale local erosion. As outfalls are discontinued, LANL's environmental restoration program would evaluate any necessary soil remediation. Remediation and removal of contaminated soil associated with the HE outfalls is addressed in the RCRA Facility Investigation (RFI) Workplan for Operable Unit 1082 (LANL 1993b). Remediation activities would be the subject of a separate NEPA review.

### 4.2.5 Wetlands

This alternative would eliminate the flow of 15,999,200 gal/yr (60,563,549 L/yr) from 15 wastewater outfalls, leaving 1,527,973 gal/yr (5,784,006 L/yr) of stormwater that would discharge at six outfalls through decontaminated outfall piping (Table 4-2). Discharge at the remaining outfall would increase from 36,000 gal/yr to 130,500 gal/yr (136,275 L/yr to 493,966 L/yr).

Elimination of water flow at nine to ten outfalls and reduction of flow at five others (Table 4-2) would probably dry up some man-induced wetland areas and could reduce the size of others. A Wetlands Assessment is included as Appendix D.

LANL biologists estimate that a maximum of 3.31 of the 4.34 acres (1.34 ha of the 1.76 ha) of wetlands associated with the Category 05A outfalls could be lost in this process. At the same time, a four-fold increase in effluent volume at the treatment facility could expand wetland area there (currently 1.03 acres). The exact effects of changes in water flow cannot be predicted with certainty. The volume of water discharged is a critical indicator of wetland viability--without a consistent water supply, the wetland will dry up. Water volume alone, however, is not sufficient to predict the amount a wetland would grow or the location of a new wetland. Channel profile, slope,

**Table 4-2. Outfall reductions in each canyon system by alternative**

| | *No Action Alternative* | *Proposed Action* | | *Alternative Action* | |
|---|---|---|---|---|---|
| Canyon | Discharge Volume (gal/yr)[1] | Discharge Volume (gal/yr)[1] | Percentage of Current Discharge | Discharge Volume (gal/yr)[1] | Percentage of Current Discharge |
| Pajarito Canyon | 5,853,722 | 1,131,422 | 19.3% | 5,853,722 | 100% |
| Two Mile Canyon | 2300 | 0 | 0% | 0 | 0% |
| Water Canyon | 5,506,300 | 330,700 | 6.0% | 330,700 | 6.0% |
| Cañon de Valle | 6,200,851 | 196,351 | 3.2% | 6,285,751 | 101.4%[2] |

[1] Process water + stormwater

[2] Exceeds current discharge due to redirection of water from Water Canyon and Two-Mile Canyon outfalls to treatment facility

soil and vegetation conditions, geology, and other available water sources affect the ponding of the water and the development of saturated soil conditions that are needed for wetland development. The role of wetland vegetation and microbial activity in breaking down HE compounds existing in soils would be reduced as wetlands dry up.

### 4.2.6 Threatened and Endangered Species

One outfall supports a wetland populated with willows that could marginally serve as habitat for the Southwestern willow flycatcher. Flycatchers could use these willows during migration, but other habitat characteristics necessary for nesting are not present. The flow at this outfall would decrease from 124,000 to 103,000 gal/yr, (469,391 L/yr to 289,897 L/yr) a decrease of only about 17%. It is likely that the proposed decrease in flow would not substantially affect the viability or size of the wetland and, therefore, would not adversely affect the willow flycatcher.

The site proposed for the HEWFT is within 1.0 to 1.5 miles (1.6 km to 2.4 km) of a pair of nesting Mexican spotted owls. If the nest were located within 0.25 miles (0.4 km) of the proposed construction site, increased noise levels during the construction phase of the HEWTF could have an adverse effect on owls during the breeding or nesting season (March through August). Currently, surveys have found no owls nesting within 0.25 miles (0.4 km) of the proposed construction activity. Construction would not cause loss of nesting or roosting habitat. Annual monitoring and surveys according to USFWS accepted protocols would be required each year until construction of the HEWTF was completed. If owls are found nesting within 0.25 mi (0.4 km) of the proposed construction site (or if owls were found within the nesting or roosting habitat, but the nest could not be located), construction would be delayed until after the nesting season (March through August). Because restrictions would be imposed on construction and operations, if necessary, (see Appendix E for standard protective measures) and because neither construction nor operation of the HEWTF would cause direct habitat loss, Mexican spotted owls would not be likely to be adversely affected by either construction or operation of the HEWTF.

### 4.2.7 Vegetation and Wildlife

*Habitat.* Complete elimination of flow at nine outfalls would probably eliminate wetland plants and reduce riparian vegetation at nine areas; restriction of flows at another five to stormwater only would be expected to reduce wetland and riparian vegetation at these areas as well.[6] Construction would be expected to disturb approximately 1 acre (0.4 ha) of mesa top vegetation, most of which has already been disturbed by previous activities (ranching and logging and LANL construction). All areas disturbed by construction would be reseeded with native grasses.

*Effects on wildlife.*

Contaminants in discharged water would be eliminated or reduced to trace levels; therefore, wildlife that use the remaining outfall areas for water or forage would potentially ingest fewer contaminants.

*Birds, small mammals, and their predators.* Reduction of riparian and wetland habitats, which provide nesting, foraging, perching, and cover habitats for a variety of birds, mammals, amphibians, and other wildlife, could adversely affect wildlife species. Reductions in water flow at critical times in the breeding and nesting season could eliminate habitat and could cause birds in the vicinity of some outfalls to abandon their nests. Changes in water availability could displace animals who use outfalls as water sources and could locally reduce populations of some species. Populations of some predator species could decline as prey populations decline. Reduction in total population size would be most pronounced in species with small home ranges and dependence on wetlands for water and hydrophytic vegetation. Local biodiversity would be expected to decrease.

*Large mammals.* Depending on the amount of other water available nearby and other factors, large mammals may shift their pattern of seasonal movement and may concentrate their foraging in other canyon systems or other portions of these canyons. Since elk and deer tend to locate within 0.5 to 1.25 mi (0.8 to 2 km) of water sources, closure of the 15 outfalls would be expected to cause these species to shift out of the areas where water sources have been discontinued and into neighboring areas where water is still available and accessible. Elk, because they tend to congregrate closer to water sources than do deer, may show greater displacement than deer. Because the relationships of the factors that affect elk movement are not well understood, it is impossible to predict exactly how elk may respond. Changes in seasonal and daily distributional patterns could occur. This may result in what are currently low to moderate elk use areas becoming high use areas. However, changes in deer and elk movement are expected to be within the range of normal year-to-year variation. Habitat degradation could result from concentrating elk and deer use in fewer areas. Negative effects could include overbrowsing and damage to young trees. Adverse effects to deer or elk herd well-being are expected to be minimal.

### 4.2.8 Socio-Economic Effects

Over a seven month period, about 100 workers from the nearby region would be employed. Socioeconomic effects from the employment of these workers is not expected to affect the region.

### 4.2.9 Environmental Justice Concerns

No disproportionate adverse environmental effects to minority or low-income populations are identified with the construction of the new TA-16 HE wastewater treatment facility. There have

[6]At one outfall, flow would remain unchanged at 65,851 gal/yr and would not be expected to alter the current conditions.

been no studies on the accumulation of contaminants from HE wastewater in game species that might be consumed by members of the public. A study of radionuclide concentrations in elk at LANL concluded that there were no significant doses to the public from consuming meat from elk that forage at LANL (Fresquez et al. 1995). No observations have been made of hazardous chemical contamination of large game at LANL. The *Proposed Action* would reduce contaminants in treated HE wastewater to very low levels. Consequently, fauna hunted or collected by members of the public would ingest fewer contaminants from HE wastewater, and the likelihood of contaminants migrating downstream to public use areas would also decrease.

#### 4.2.10 Transportation

Under the *Proposed Action*, personnel would transport HE slurry from HE facilities at TA 9, 11, 16, and 40 to the TA-16 sand filters, for a maximum total distance of 5 miles per trip. About 130 trips of 1000 gallons (3,785 L) each would be taken per year, amounting to 650 miles/yr (390 km/yr) on LANL-controlled roads. Twelve times per year, ash from material burned at the TA-16 sand filters and the burning grounds would be taken to TA-54 for disposal; total distance per trip would be 15 miles (24 km) on West Jemez and Pajarito Roads. One trip would include transporting about 24 pounds (10.8 kg) of ash/sand mixture. The other trips would consist of transporting 5000 pounds (2,268 kg) per year of ash. About 1,480 (2,382 km) miles would be traveled per year. Over the 30 year life of the facility, transportation involved in HE wastewater management would amount to approximately 63,900 miles (102,837 km). At the current rate of accidents in Los Alamos County (1.83 accidents per 100 million miles driven), it is unlikely that there would be an accident involving HE waste transport.

#### 4.2.11 Human Health Effects

Hazards from HE handling have been analyzed for several scenarios involving fire and explosion of HE materials (Appendix C). Any scenario in which a member of the public (located at the LANL boundary nearest the proposed project area or farther off-site), a co-located worker (a worker not involved in HE wastewater management but in an adjacent work area), or a worker could receive a disabling injury or long-term health effects is analyzed in Section 4.5.1. No other fire or explosion scenario would result in anything more than irritation or discomfort to a member of the public or a co-located worker or a minor injury (without disability) to a worker. The probability of such low-consequence events occurring is less than once in 10 years of operation.

Under the *Proposed Action*, workers would be exposed to solvent vapors during recovery of solvents from the vacuum pumps. The solvent recovery system for the vacuum pumps is a batch process in which a maximum of 5 gal (19 L) of solvent is recovered from 40 gal (151 L) of water. The calculation of worker exposures is based on the following assumptions:

- 5% of the 5 gal (18.9 L) of solvent mixture is volatilized over an 8 hr period in the room where the process occurs
- the room dimensions are 18 x 20 x 40 ft (14,400 $ft^3$; 407,520 L)
- there are 4 air changes/hr (27,168 L/min)

Under these conditions, which represent conditions in the room where solvents would be recovered, a worker could be exposed to volatilized solvents at a concentration of 32.2 ppm. This concentration is one-third the TLV for the solvent mixture (96.7 ppm) at which health effects could be expected. Therefore, no health effects on workers would be expected. The hourly emission rate is 0.3% or less of the AQCR allowable emission rate for air toxic contaminants. Since ACQR limits are health-based standards, the emissions due to normal operations would not be expected to cause health effects to co-located workers or members of the public.

## 4.3 ENVIRONMENTAL EFFECTS OF THE *ALTERNATIVE ACTION*

### 4.3.1 Air Quality

The amount of wastewater treated under this alternative would increase from 36,000 gal/yr to 10,942,200 gal/yr (136,275 L/yr to 41,420,725 L/yr); emissions of carbon monoxide and particulate matter would increase slightly over current emissions. Emissions of VOCs/HAPs would be less than current emissions. All emissions are expected to be below regulatory limits.

#### *4.3.1.1 Air Emissions from Construction*

Personnel would operate heavy equipment for about nine months during construction of the buildings and piping systems. The operation of this equipment would generate dust and fuel emissions. Standard dust control measures would be used. Air movement would dissipate diesel fumes. Diesel emissions, although visible on cold mornings, would present no adverse effect under current environmental, safety, and health regulations.

#### *4.3.1.2 Emissions of Volatile Organic Compounds*

Approximately 630 gal/yr of solvents would be recovered by condenser units at the processing facility (same as both the *No Action* and *Proposed Action* alternatives). The approximately 70 gal/yr (482 lb/219 kg) of solvents that are mixed with vacuum pump sealant water would pass through the carbon filters in the treatment facilities. The carbon filters are expected to remove 33-67% of dissolved solvents; approximately 23-46 gal/yr (161-322 lb/73-146 kg) would be released after adsorption. If all the released solvent volatilized at the outfall, emissions of approximately 0.02-0.04 lb/hr would be expected. The filters would also remove 90-95% of dissolved HE (79-84 lbs/36-38 kg) and release 4-9 lb (2-4 kg). If the dissolved HE were to volatilize, it would produce emissions of 0.0001-0.0005 lb/hr. Emissions of VOCs would be substantially below the most conservative AQRC limit for these solvents (10 lb/hr).

#### *4.3.1.3 Carbon Filter Burning*

Approximately 88 lbs/yr (40 kg/yr) of dissolved HE (currently discharged at the sump outfalls) would pass through the carbon filters in the treatment facilities. At 90-95% removal, approximately 79-84 lb/yr (36 –38 kg/yr) would be adsorbed by the carbon filters. The filters would also adsorb approximately 161-322 lb/yr (73-146 kg/yr) of solvents. Burning carbon filters would therefore increase VOC emissions from their current negligible levels (less than 1 lb/yr each VOC) to 7 lb/yr. Carbon monoxide emissions would increase from less than 1 lb/yr to 3 lbs/yr (0.45 kg/yr to 1.4 kg/yr), and particulate emissions would increase from less than 1 lb/yr to 9 lb/yr (0.45 kg/yr to 4 kg/yr).

#### *4.3.1.4 HE Slurry/Waste HE Burning*

Although there could be a slight increase in the mass of HE slurry burned due to recovery of suspended HE which currently may be discharged to the environment at the sumps, there is no reason to expect that the mass of waste HE or HE slurry to be burned would exceed 10,000 lb/yr (4,536 kg/yr). Therefore, air emissions from burning the HE would not be expected to vary from those of the *No Action Alternative*.

#### *4.3.1.5 Solvent Burning*

Emissions from burning solvents under this alternative would not increase over those of the *No Action Alternative*.

### 4.3.2 Water Quality

This alternative would eliminate HE-contaminated flow at 14 wastewater outfalls. The mass of dissolved HE and solvents entering the HE wastewater would be the same as current levels, approximately 571 lb (259 kg) annually. All discharged water is expected to meet or exceed NPDES permit requirements.

The total organic content of the water received at the treatment facilities, however, is expected to be higher than current levels at the treatment facility due to the capture of dissolved HE and solvents that are currently released untreated at the sumps. The treatment facilities would receive wastewater containing approximately 88 lb (40 kg) of dissolved HE and 482 lb (219 kg) of solvent annually. The adsorption of dissolved HE and solvent is a function of water volume, flow rate, contaminant concentration, mass of carbon and similar factors. At design carbon filter performance, treated wastewater would release approximately 161-321 lb/yr (73-146 kg/yr) of solvent and 4-9 lb/yr (2-4 kg/yr) of dissolved HE with an expected water volume of 10,942,200 gal/yr (41,420,725 L/yr). The concentration of dissolved organics (HE and solvent) would be expected to be less than 2-4 mg/L[7] (COD of 2-4 mg/L). This concentration would be further diluted by natural runoff and stormwater discharge as the contaminants were flushed downstream.

Discharged water volume at the two remaining Category 05A outfalls would be equivalent to the current HE process wastewater production 10,942,200 gal/mo (41,420,725 L/yr).

### 4.3.3 Water Use

Under this alternative, water use for HE operations would remain at the current level of about 10,942,200 gal/yr (41,420,725 L/yr) while overall water use would decrease by about 5 million gallons/yr because of the elimination of non-HE industrial water in Buildings 300-307 at TA-16.

### 4.3.4 Soils

#### *4.3.4.1 Construction Effects*

About. 7 ac (2.8 ha) would be disturbed by construction activities—1.6 ha. (4 ac) at TA-16 and 3 ac (1.2 ha) at TA-9. Construction would require a stormwater discharge permit under the NPDES and a pollution prevention plan would also have to be prepared.

#### *4.3.4.2 Operational Effects*

Soil contamination at the processing facility outfalls from previously released HE and solvent would remain constant under this alternative until soils were remediated or removed as part of LANL environmental restoration activities. Since all discharges at the processing facility outfalls would cease, no new contaminants would be added. Discharge from the treatment facilities would contain approximately 2-4 mg/L of dissolved HE and solvent which could accumulate in the soil and add to the current load of contaminants in the soil at those outfalls (current levels of contamination at those outfalls have not yet been determined). The large volume of water to be released, however, could flush existing and new contaminants downstream. Increased flow at the

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[7](75 kg (HE + solvents) x 1,000,000 mg/kg)/(10,942,200 gal (water) x 3.785 L/gal) = 1.8 mg/L

two outfalls associated with the treatment facilities could also result in increased soil erosion at the point of discharge and for some distance downstream.

Remediation and removal of contaminated soil associated with the HE outfalls is addressed in the RCRA Facility Investigation (RFI) Workplan for Operable Unit 1082 (LANL 1993b). Remediation activities, when finalized, would be the subject of a separate NEPA review.

### 4.3.5 Wetlands

In this alternative, connection of the new collection piping system would stop the flow from nine wastewater outfalls and restrict the flow at five others to stormwater only[8]. Some wetland and riparian vegetation would be expected to die off. This alternative could result in a loss of up to 3.15 acres of wetland/riparian vegetation at nine closed outfalls. At the same time, the increased discharge volume at the outfalls of the two proposed treatment plants could scour out the existing wetlands at the treatment plants but could possibly enhance or create new wetlands elsewhere in Cañon de Valle and Pajarito Canyon although this is not known with any certainty. As noted in the discussion of the *Proposed Action*, the volume of water alone is not sufficient to predict the size or location of new wetland areas. Some of the water would probably flow downstream, either as surface or subsurface flow, until it possibly encountered conditions that might be suitable for pooling and creating saturated soil conditions.

### 4.3.6 Threatened and Endangered Species

One outfall supports a wetland populated with a stand of willows that could serve as marginal habitat for the Southwestern willow flycatcher. Other habitat characteristics required for nesting are not present. The flow at this outfall would decrease from 124,000 to 103,000 gal/yr (469,391 to 389,897 L/yr), a decrease of only about 17%. It is likely that the proposed decrease in flow would not substantially affect the viability or size of the wetland and, therefore, would not adversely affect the willow flycatcher.

The sites proposed for the treatment facilities are within 1.0 to 1.5 miles of a Mexican spotted owl nest. Increased noise levels during the construction phase of the HEWTF could have an effect on breeding or nesting owls (March through August) within 0.25 miles of the construction activity. Currently no known owls are being supported within 0.25 miles of the proposed construction activity. Therefore, it is not likely that owls would be adversely affected.

### 4.3.7 Vegetation and Wildlife

*Habitat.* Complete elimination of flow at eight outfalls would probably eliminate wetland plants and reduce riparian vegetation at eight areas; restriction of flows at another five to stormwater only would be expected to reduce wetland and riparian vegetation at these areas as well. Construction would disturb approximiately 4 acres of mesa top vegetation at TA-16 and approximately 3 acres at TA-9. The disturbed area at TA-16 where the treatment facility, garage, and piping system would be located is vegetated mainly by native grasses, ponderosa pine, and Gambel oak, while most of TA-9, including the proposed treatment facility site and pipeline system is open grassland. All disturbed areas would be reseeded with native grasses after construction activities were completed.

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[8] Another outfall would continue to discharge the same volume as it currently does (stormwater only).

Approximately two-thirds (10,942,200 gal/yr; 41,420,725 L/yr) of the water now discharged (17,563,173 gal/yr; 66,476,610 L/yr) would continue to be discharged but at different locations within the same canyon systems, preserving some wetland habitat and sources of water in both Cañon de Valle and Pajarito Canyon.

*Effects on wildlife.*

Contaminants in discharged water would be eliminated or reduced to trace levels; therefore, wildlife that use the remaining outfall areas for water or forage would potentially ingest fewer contaminants.

*Birds, small mammals, and their predators.* Reduction of riparian and wetland habitats, which provide nesting, foraging, perching, and cover habitats for a variety of birds, mammals, amphibians, and other wildlife, could also adversely affect wildlife. Reductions in water flow at critical times in the breeding and nesting season could eliminate habitat and could cause birds in the vicinity of some outfalls to abandon their nests. Changes in water availability could displace animals who use outfalls as water sources and could locally reduce populations of some species. Populations of some predator species could decline as prey populations decline. Reduction in total population size would be most pronounced in species with small home ranges and dependence on wetlands for water and hydrophytic vegetation. Local biodiversity would be expected to decrease.

*Large mammals.* Since elk prefer areas within 0.33 to 0.5 mi (0.53 to 0.80 km) of permanent water, closure of outfalls would probably lead to elk movement away from the discontinued outfalls to areas within 0.5 mi (0.80 km) of water sources. These areas could include both the outfalls from the two new treatment facilities, other LANL areas where water is still available, or areas outside LANL. As discussed in Section 4.3.7 (Environmental Effects of the *Proposed Action*), these changes are expected to be within the range of normal year-to-year variation. Adverse effects to herd well-being are expected to be minor.

### 4.3.8 Socio-Economic Effects

Over a nine month period, about 100 workers from the nearby region would be employed. Socioeconomic effects from the employment of these workers is not expected to significantly affect the region.

### 4.3.9 Environmental Justice

No disproportionate adverse environmental effects to minority or low-income populations are identified with the implementation of the *Alternative Action*. There have been no studies on the accumulation of contaminants from HE wastewater in game species that might be consumed by members of the public. A study of radionuclide concentrations in elk at LANL concluded that there were no significant doses to the public from consuming meat from elk that forage at LANL (Fresquez et al. 1995). No observations have been made of hazardous chemical contamination of large game at LANL. The The *Alternative Action* would reduce contaminants in treated HE wastewater to within permitted levels. Consequently, fauna hunted or collected by members of the public would probably ingest fewer contaminants from HE wastewater, and the likelihood of contaminants migrating downstream to public-use areas would also decrease.

### 4.3.10 Transportation

Under the *Alternative Action*, personnel would transport HE slurry from HE facilities in TAs 9, 11, 16, and 40 to the TA-16 sand filters, for a maximum total distance of five miles (8 km) per trip. About 126 trips of 1000 gallons (3,785 L) each would be taken per year, amounting to 630 mi/yr (1,104 km) on LANL-controlled roads. The ash and sand mixture from the sand filters and would be managed as described in the *No Action* alternative. About 1,540 miles (2,478 km) would be traveled per year. Over the 30 year life of the facilities, transportation involved in HE wastewater management would amount to approximately 65,100 miles (104,160 km) over the 30 yr life of the facilities. At the current rate of accidents in Los Alamos County (1.83 accidents per 100 million miles driven), it is unlikely that there would be an accident involving HE waste transport.

### 4.3.11 Human Health Effects

Hazards from HE handling have been analyzed for several scenarios involving fire and explosion of HE materials (Appendix C). Any scenario in which a member of the (located at the LANL boundary nearest the proposed project area or farther off-site), a co-located worker (a worker not involved in HE wastewater management but in an adjacent work area), or an involved worker could receive a disabling injury or long-term health effects is analyzed in Section 4.5.1. No other fire or explosion scenario would result in anything more than irritation or discomfort to a member of the public or a co-located worker or a minor injury (without disability) to a worker. The probability of such low-consequence events occurring is less than once in 10 years of operation.

Under the *Alternative Action*, workers would only be exposed to solvent vapors that volatilized from the dilute solvent-HE wastewater mixture after treatment at TA-16. Solvent exposures to workers during HE wastewater management would occur during outdoor operations near the discharges from the post-treatment tanks. The following assumptions represent reasonable, yet conservative, conditions in which a worker would be exposed to solvent vapors:

- The solvent mixture contains 5% butylactetate which has the lowest threshold limit value (TLV) of any of the possible solvents.
- There is a 1 $m^3$ (35.31 $ft^3$) breathing zone in which all solvent vapors accumulate.
- Wind speed is 2 mi/hr (3.2 km/hr), which represents minimal dispersion of vapors.

The steady-state ambient concentration under these conditions would be 18 ppm, which is less than the TLV for the solvent mixture (96.7 ppm). Therefore, there would be no occupational overexposures for workers. Since there are no health effects expected for involved workers, there would also be no anticipated health effects for non-involved workers or members of the public located at the nearest LANL boundary or farther off-site.

## 4.4 ENVIRONMENTAL CONSEQUENCES OF ACCIDENTS

This section considers the environmental effects of accidents that could happen during management of HE wastewater. Accidents considered in this section are likely occurrences (that is, they have a probability of occurring at least once in 10 years of operation) and any less likely occurrences that could cause a severe injury or disability to an involved worker or long-term health effects to an uninvolved worker or member of the public located at the nearest LANL boundary or farther off-site. Other accident scenarios are summarized in Appendix C, which is based on the Preliminary

Hazard Analysis for the proposed HEWTF. Accidents analyzed in this EA are summarized in Table 4-4.

**Table 4-4 Accidents Analyzed**

| Accident | Likelihood | Worst Consequence |
|---|---|---|
| discharge of untreated HE wastewater | 1 event or fewer in 10 years | Public - no significant off-site release<br>Non-involved worker - no significant effect<br>Involved worker - minor or no injury; no disability<br>Environment - minor or no contamination of immediate area; no offiste contamination |
| fire/explosion | 1 event or fewer in 10,000 years | Public - no significant off-site release<br>Non-involved worker - irritation/discomfort; no permanent injury<br>Involved worker - loss of life<br>Environment - significant contamination of immediate area; no off-site contamination |

4.4.1 Release of Untreated HE Wastewater

In the *Proposed Action,* untreated wastewater could be released to the environment by

- an overturned HE wastewater collection truck,
- pre-treatment or post-treatment tank leak, or
- holding tank leak or overflow.

In the *Alternative Action*, an unplanned discharge could result from

- a pipeline leak,
- a holding tank leak or overflow,
- pre-treatment or post-treatment tanks leak, or
- an overturned HE wastewater collection truck.

Under the *No Action Alternative,* a release of untreated wastewater could occur from

- an overturned HE wastewater collection truck, or
- a pre-treatment or post-treatment tank leak.

Under the *Proposed* and *Alternative Actions,* detectors would immediately alert personnel in the event of a leak. If the warning system failed and secondary containment also failed, untreated waste could flow out for a period of time before it was noticed. This analysis assumes that a leak would not be noticed for a week and that the entire contents of a tank would be released. The concentration of solvents is based on the assumption that all solvents are released with untreated wastewater[9] from TA-16-340. Table 4-5 summarizes the maximum releases that could be expected under those conditions.

[9]Annual discharge of 3,568,800 gal (13,561,440 L)of HE process water and 70 gal (266 L) of solvent

Three variants of an unplanned discharge of HE wastewater are considered: one with maximum solvent release, one with maximum release of dissolved HE, and one with maximum release of solid HE. The spill with the worst consequence would be one involving solvent releases. For the *No Action Alternative*, there is no accident that involves solvent releases; all solvents are released with the sump discharge. The consequences of this operational release exceed those that could occur in accidents involving spills or leaks. Therefore, it is examined as a bounding case for all unintentional releases of HE wastewater under the *No Action Alternative*. Under the *Proposed Action,* there is no potential accident that would release solvents with HE wastewater because waste solvents are segregated within the processing facilities. Under the *Alternative Action*, solvents could be released in a leaking or ruptured pipeline serving TA-16-340.

The maximum release of dissolved HE would occur as sump discharge in the *No Action Alternative*; although operational discharges are not accidents, they serve to bound the effects of other releases of dissolved HE in various accidental spills. Under the *Proposed Action,* the largest release of dissolved HE would be from the 3,000 gal (11,356 L) pre-treatment tank. Under the *Alternative Action,* the largest release would involve a ruptured pipe serving TA-16-260.

Under the *No Action Alternative,* the largest release of HE wastewater containing HE particulates would be from a leak or rupture of a sump. The largest release under the *Proposed Action* would be from an overturned collection truck. Under the *No Action Alternative,* the maximal release would occur if a holding tank leaked or ruptured.

In all cases, environmental damage would be confined to the immediate area of the spill or leak. Such a release would contaminate soil in the vicinity of the spill. Since most HE material (binders, inerts, plasticizers, etc) have low volatility, they would be expected to remain on the surface of the ground where they could be cleaned up and then burned. Safety hazards, such as an explosion, could occur if particulate HE were allowed to dry before the spill was removed. This possibility would be avoided by wetting down the spill area, if necessary. An explosive hazard is much less likely under the *Proposed Action* than under the other alternatives because slurry concentrations would be significantly reduced by waste minimization measures. For purposes of evaluating respiratory hazards, volatile organics released to the ground surface from tanks or trucks are assumed to evaporate into the atmosphere at a constant rate over a period of several hours. VOCs released from a ruptured buried pipe would be expected to volatilize more slowly or to migrate eventually to shallow alluvial groundwater bodies in the canyons or into the vadose zone. This analysis assumes that cleanup of spilled materials would be completed before any VOCs or other hazardous chemicals could migrate beyond the immediate site of the spill. Soil and other materials removed from a spill site would be flashed at TA-16 and disposed of at TA-54.

**Table 4-5 Potential Accidental Releases of Untreated HE Wastewater**

| Characteristics of Release | *No Action Alternative* | *Proposed Action* | *Alternative Action* |
|---|---|---|---|
| **Source** <br> Solvents | sump discharge of 572 gal/hr for 120 hrs (68,630 gal/wk) at TA 16 340 (highest solvent contamination - 36 mg/L) | none | flow of 572 gal/hr for 120 hrs (68,630 gal) from ruptured pipe from TA 16 340 (highest solvent contamination - 36 mg/L) |
| Dissolved HE | sump discharge of 406 gal/hr for 120 hrs (48,760 gal) from TA-16-260 (highest HE contamination - 20 mg/L) | 3000 gal pre-treatment tank at treatment facility | flow of 406 gal/hr for 120 hrs (48,760 gal) from ruptured pipe from TA-16-260 (for highest HE contamination - 20 mg/L) |
| Solid HE | sump discharge of 406 gal/hr for 120 hrs (48,760 gal) from TA-16-260[1] | 1000 gal truck with 2 wks accumulation of HE dissolved or suspended (2 kg)[2] | holding tank rupture with discharge of 406 gal/hr for 120 hrs (48,760 gal) from TA-16-260[1] |
| Dissolved HE contamination level | 20 mg/L x 184,405 L = 3688 grams (31 g/hr) | 20 mg/L x 10,355 L (3000 gal) = 207 grams | 20 mg/L x 184,405 L = 3688 grams (31 g/hr) |
| Contamination from typical solvent mixture (30% methanol, 20% tetrahydrofuran, 20% acetonitrile, 5% toluene) | 36 mg/L x 259,802 L= 9 kg (8 g/hr) | 0 | 36 mg/L x 259,802 L= 9 kg (8 g/hr) |
| Solid HE contamination | not likely to spread beyond immediate site of leak; relative easy to recover | 0.5 kg- relatively easy to recover | 87 kg (1 kg/hr); because pipes would be buried, not likely to spread beyond immediate rupture; relatively easy to recover |

[1] Assumes TA-16-260 produces 1/2 of total annual HE particulates (1/2 of 4540 kg) and that they accumulate for 2 wks (87 kg) before leak

[2] Assumes TA-16-260 produces 1/2 the expected annual HE particulate load (1/2 of 11 kg) and that it is discharged evenly throughout the year

The air concentration of solvents at the site of the spill was calculated using the following assumptions:

- 36 mg/L of a solvent mixture containing butylacetate, the chemical with the lowest TLV, is 100% volatilized from the wastewater
- solvent mixture evaporates into a 1 $m^3$ (35.31 $ft^3$)breathing zone (maximal concentration for inhalation)
- wind speed is 2 mi/hr (3.2 km/hr), representing minimal dispersion of vapors

The exposure that a worker involved in a spill cleanup would receive would be 18 ppm. This exposure is substantially lower than the solvent mixture's TLV (96.7 ppm); therefore, a worker who stood at the spill site for an entire eight hour day would not exceed permissible levels of exposure and would not be expected to experience any health effects. Because of dispersion of solvent vapors due to air movement, neither non-involved workers nor a member of the public located at the nearest LANL boundary (or farther off-site) would be expected to experience health effects from an HE wastewater spill. Damage to wildlife and vegetation would be minor and limited to a small area. The risks to human health under the *Alternative Action* would be the same as normal operations in the existing wastewater management process. The risks to human health under the *Proposed Action* would be less than normal operation in the existing wastewater management process.

4.4.2 Fire/Explosion in Waste Minimizaton Process Equipment

Fires or explosions could be caused by a variety of different factors. Under the *Proposed* Action, a fire or explosion could occur in the waste minimization systems (coolant recirculation systems, oil-sealed [dry] vacuum systems, solvent vacuum systems, or dry dust collection systems) within the HE facilities. Explosions or fire within the bag, cartridge, or carbon filters of these systems could be initiated if the filters were to dry out and ignition sources were present. This event is considered very unlikely (likelihood of the event is one in 10,000 to 1,000,000 years), but would result in worker loss-of-life, as well as damage to the machine bay adjacent bays. The event would cause significant contamination of the facility, as well as minor on-site contamination.

Interior contamination would be cleaned by washing with water or by collecting debris and disposing of it by flashing at the TA-16 burning grounds. Soil contamination outside the facility would be minor and would be managed as described above for an HE wastewater spill.

This event is very unlikely to occur due to the absence of ignition sources in bays designed for explosives operations. Explosives in filters would only be removed wetted. Standard operating procedures (SOPs) would be in place for changing filters prior to operation of the new waste minimization equipment.

Under all alternatives, fires or explosions could occur from a variety of other causes. These potential fires or explosions could involve:

- HE in open burn tray (remote, unmanned operation)
- HE slurry on sand filters (remote, unmanned operation)

- HE-contaminated carbon that loses wetting during change-out
- contact of HE/water mixture with electrical ignition sources
- lightning strikes at the treatment facilities
- natural or man-caused forest fire

With the exception of wildfires and lightning strikes, which could occur once in 10 years of operation, the likelihood of any of these events occuring is one event or fewer in 100 years of operation. The worst consequence of one of these events would be the death of an involved worker. This scenario could occur if HE in the waste minimization systems dried out and if ignition sources were present. The likelihood of this occurrence is one event or less in 10,000 years. The probability of one of these events occurring is reduced by engineering controls, such as eliminating potential sources of sparks, and SOPs for changing filters and maintaining them in a wetted condition. Non-involved workers could receive a minor injury with no disability. Off-site releases would be negligible and would not affect a member of the public located at the nearest LANL boundary or farther off-site.

Interior contamination would be cleaned by washing with water or by collecting debris and disposing of it by flashing at the TA-16 burning grounds. Soil contamination outside the facility would be minor and would be managed as described above for an HE wastewater spill.

## 4.5 CUMULATIVE EFFECTS

Cumulative effects take into account consequences of actions related to the alternatives of this assessment and reasonably foreseeable actions planned for the project area. In this case, the principal cumulative effect would be from the elimination of other outfalls in the project area. There is minimal potential for other cumulative effects to occur.

*Water and habitat issues.* The DOE is proposing to discontinue operation of the TA-16 steam plant which currently releases about 3,100,000 gal/yr (11,734,774 L/yr) into the upper reaches of Cañon de Valle. Water to the wetland associated with this outfall would be maintained until there is a NEPA analysis of the effects of discontinuing outfall discharge. Although no formal plans for permitted outfall closure have been developed, DOE may also consider eliminating most other industrial outfalls--boiler blow-down water, treated cooling water, non-contact cooling water, and photo-processing water--in the proposed project area. Table 4-6 summarizes the proposed closures in the proposed project area.

**Table 4-6 Proposed Outfall Closures in the Project Area**

| Canyon | Volume of Water (gal/yr) | Likelihood of Closure |
|---|---|---|
| Pajarito | 54,000 | moderate |
| Two-Mile | 0 | not applicable |
| Water Canyon | 1,124,258 | moderate to high |
| Cañon de Valle | 3,101,040 | low to moderate |
| Source: LANL 1995 estimates | | |

LANL also ceased discharging treated sanitary wastewater from an outfall in Cañon de Valle in 1992. This outfall released 13,000,000 gal (49,210,344 L) in its last year of operation. This outfall may have been the primary source for the 1.1 acre wetland associated with Outfalls 05A-069, 096, and 097. In addition LANL discontinued discharge from several unpermitted outfalls in 1994. The unpermitted discharges are generally negligible except those that discharged into Water Canyon. In total, these outfall eliminations can be expected to increase the loss of man-induced wetlands in the affected TAs (9, 11,16, and 40).

The net effect of the closures (those encompassed by the alternatives analyzed in this EA, those associated with projects that have been completed, and those that are proposed under future projects) would be to restrict the availability of water to maintain wetlands and to maintain wildlife habitat and biodiversity. Although some sources of water are constant under each alternative--natural runoff from upstream, water from natural seeps and springs, and stormwater discharge from other facilities in the project area, the volume of water they would supply is unknown. Table 4-7 summarizes the amount of water that was available from known sources in 1994. Table 4-8 compares the 1994 discharge with the volume of water available if all proposed closures are implemented. Outfalls to be eliminated under the *Proposed Action* provided 74% of the water available in the proposed project area in 1994. Other permitted outfalls contributed 18% and unpermitted outfalls 2%. Known stormwater discharges account for 6%.

**Table 4-7 1994 Discharges to Project Area**

| Canyon | Category 05A Outfalls (gal/yr)[1] | Stormwater at 05A outfalls (gal/yr) | Other outfalls (gal/yr) | Unpermitted discharge (gal/yr) | 1994 Net discharge (gal/yr) |
|---|---|---|---|---|---|
| Pajarito Canyon | 4,722,300 | 1,131,422 | 4,512 | 4,125 | 5,862,359 |
| Two-Mile Canyon | 2,300 | 0 | 900 | 0 | 3,200 |
| Water Canyon | 5,175,600 | 330,700 | 1,157,594 | 512,530 | 7,176,424 |
| Cañon de Valle | 6,135,000 | 65,851 | 3,150,816 | 2,600 | 9,354,267 |
| TOTAL | 16,035,200 | 1,527,973 | 4,313,822 | 519,255 | 22,396,250 |
| [1] excluding stormwater discharge | | | | | |

**Table 4-8 Water Available in the Project Area after Proposed Outfall Closures**

| Canyon | 1994 Discharges (gal/yr) | Discontinued Sources (gal/yr) | Volume of Water Available after Closures (gal/yr) |
|---|---|---|---|
| Pajarito | 5,862,359 | 4,730,937 | 1,131,422 |
| Two-Mile | 3,200 | 3,200 | 0 |
| Water Canyon | 7,176,424 | 6,385,724 | 790,700 |
| Cañon de Valle | 9,354,267 | 9,157,916 | 196,351 |
| TOTAL | 22,396,250 | 20,277,777 | 2,118,473 |

The major effect of these source reductions would be to increase the likelihood of wetland habitat loss and reduced biodiversity. An additional 0.59 ac (0.23 ha) of wetland could be lost due to other outfall closures in the proposed project area. On the other hand, termination of other outfall would probably decrease the likelihood that existing HE contaminants would be dispersed downstream.

DOE, as a long-range goal, may also consider eliminating as many sources of wastewater discharge at other locations as possible. Effects of these closures would be addressed in the Site-Wide Environmental Impact Statement, which DOE is currently preparing, or another NEPA document. Effects of outfall closures could include reduced biodiverity and increased likelihood that deer and elk would desert LANL areas in favor of other locations on its periphery. These areas could include portions of the Los Alamos townsite, White Rock, Bandelier National Monument, or areas of Santa Fe National Forest and private lands to the west.

*Other sources of HE wastewater.* The proposed decontamination and decommissioning of abandoned S-Site structures would produce about 10,000 gal (37,854 L) of HE-contaminated water that would be treated and discharged to the environment at the proposed HEWTF. This would be a one-time load of HE wastewater and would be within the capacity of the existing or proposed treatment facility.

*Other potential cumulative effects.* Continuing operations in the project area involve testing and development of HE. These operations produce waste HE and HE-contaminated equipment, filters, and similar material that would be burned or flashed at the TA-16 burn grounds. Emissions from these activities would not change appreciably under any of the alternatives considered in this EA. Emissions from HE burning meet all applicable air quality standards and would not pose a threat to the human environment.

A minor incremental and temporary increase in vehicular traffic would occur during construction activities. The construction period is estimated to be about 7 months. No increase in traffic accidents is expected as a result of the *Proposed Action* or its alternatives. Increases in vehicle emissions would be minimal and temporary.

## 4.6 SUMMARY OF EFFECTS

Table 4-9 summarizes the effects of the *Proposed Action*, *Alternative Action*, and *No Action Alternatives*, exclusive of cumulative effects.

**Table 4-9. Summary comparison of environmental consequences**

| Issue | *No Action Alternative* | *Proposed Action* | *Alternative Action* |
|---|---|---|---|
| Air Quality | see Table 4-1, meets all applicable air quality limits | VOC emissions much lower than current conditions; particulate matter negligibly higher; carbon monoxide and other pollutants same as *No Action Alternative;* meets all applicable air quality limits | VOCs about half of current emissions; particulate matter and carbon monoxide negligibly higher than *No Action* or *Proposed Action* alternatives; other pollutants same as *No Action Alternative*; meets all applicable air quality limits |
| Water Quality | occasional discharges fail to meet NPDES permit standards; average 90 mg/L COD without treatment and 22 mg/L COD after treatment | discharges meet all NPDES permit standards; average 2 mg/L COD after treatment | discharges meet all NPDES permit standards; average 2-4 mg/L COD after treatment |
| Water Use | 16,035,200 gal/yr | 130,500 gal/yr | 10,942,200 gal/yr |
| Soil | no new disturbance from construction; continued release of dissolved HE and solvents to soil at outfalls would contribute to existing historic contamination | construction disturbance of about 1 acre; historic contamination at 15 sump outfalls may be remediated under LANL's environmental restoration (ER) program; existing HE contamination at treatment facility outfall would be increased at a maximum rate of 1 kg/yr (2.2 lb/yr); increased releases at TA-16 treatment facility might spread contaminants downstream | construction disturbance of about 7 acres; historic contamination at 14 sump outfalls may be remediated under LANL's environmental restoration program; existing HE contamination at treatment facility outfalls would be increased at a maximum rate of 2-4 kg/yr (4-9 lb/yr); increased volume of released water might spread contaminants to soils downstream |
| Wetlands | continued supply of water to 4.24 acres; maintenance of wetland/riparian vegetation at current levels | potential loss of wetland/riparian vegetation (up to 3.31 acres); possible increase in wetland and riparian vegetation at or downstream from TA-16 treatment facility | potential loss of wetland/riparian vegetation (up to 3.15 acres); possible increase in wetland and riparian vegetation at or downstream from the two treatment facilities; possible scouring of existing wetlands at treatment facilities |
| Vegetation and wildlife | no loss or deterioration of habitat<br>wildlife using outfalls as water and forage areas would potentially continue to ingest small amounts of contaminants; contaminants would continue to be supplied by wastewater discharge<br>no changes in deer or elk distributions | potential loss or deterioration of up to 3.31 acres of wetland/riparian habitat; loss of about 1 acre of mesa top habitat; disturbed areas would be reseeded<br>potential ingestion of contaminants would be restricted to those already present in watering and foraging areas; low level of contaminants would be supplied by wastewater discharge at treatment facility<br>possible changes in daily and seasonal elk and deer distributions (estimated to be minor) | potential loss or deterioration of up to 3.15 acres of wetland/riparian habitat; loss of about 7 acres of mesa top habitat; disturbed areas would be reseeded)<br>potential ingestion of contaminants would be restricted to those already present in watering and foraging areas; low level of contaminants would be supplied by wastewater discharge<br>possible changes in daily and seasonal elk and deer distributions (estimated to be minor) |

| Issue | *No Action Alternative* | *Proposed Action* | *Alternative Action* |
|---|---|---|---|
| Threatened, Endangered, and Sensitive (TES) Species | no change; no known adverse effects to TES species | low probability of loss of marginal habitat for Southwestern willow flycatcher; annual surveys and monitoring required for Mexican spotted owl in nearby habitat until construction complete; construction could be delayed until breeding season is over if owls are present | same as *Proposed Action* |
| Socio-economic effects | none | minor, temporary increase in employment | minor, temporary increase in employment |
| Environmental justice | no disproportionate effects to minority or low income populations | no disproportionate effects to minority or low income populations | no disproportionate effects to minority or low income populations |
| Transportation | none; accident involving waste transport unlikely during 30 years of operation | increased emissions from construction traffic - minor and temporary; accident involving waste transport unlikely in 30 years of operation | increased emissions from construction traffic - minor and temporary; accident involving waste transport unlikely in 30 years of operation |
| Human health effects (normal operations) | none for involved or non-involved workers or for member of public | none for involved or non-involved workers or for member of public | none for involved or non-involved workers or for member of public |
| Accidents (worst consequence) | possible minor, non-disabling injury to a worker; no consequences to public; minor on-site contamination; likelihood - one event or fewer in 10 to 100 years of operation | possible loss of life to involved worker; no permanent injury to non-involved worker; no consequences to public; significant on-site contamination; no offsite contamination; likelihood - one event or fewer in 10,000 years of operation | possible minor, non-disabling injury to a worker; no consequences to public; minor on-site contamination; likelihood - one event or fewer in 10 to 100 years of operation |

## 5. LIST OF AGENCIES CONTACTED

Agency comments appear in Appendix F. The following summarizes the responses:

| Agency | Purpose of Contact | Agency Response |
|---|---|---|
| NM State Historic Preservation Officer<br>Office of Cultural Affairs<br>LaVilla Rivera<br>224 E. Palace Ave.<br>Santa Fe, NM 87501 | Notified of action and requested to concur on assessment of effect on cultural resources. | Agency concurred with Finding of No Effect. |
| Governor, San Ildefonso Pueblo<br>Rt. 5, Box 315A<br>Santa Fe, NM 87501 | Notified of DOE action with respect to cultural resources. | No response |
| Jennifer Fowler<br>US Fish and Wildlife Services<br>Ecological Services<br>2105 Osuna Rd. NE<br>Albuquerque, NM 87113 | 1. Notified of action and requested to concur on Biological Assessment of effects on Endangered/Threatened/Sensitive species and Floodplains and Wetlands. 2. Advised of presence of Mexican spotted owls within one mile of proposed project area. | 1. Agency responded that a finding of "Not Likely to Adversely Affect" would be appropriate provided that 1) surveys are periodically conducted and 2) the willow wetland at Outfall 05A-053 has adequate stormwater to maintain its function and wildlife values; agency also recommended that alternatives to a single discharge point be considered 2. Agency concurred with delineation of habitat and that proposed construction for HEWTF may affect but would not adversely affect spotted owl. |

| Agency | Purpose of Contact | Agency Response |
| --- | --- | --- |
| Jerry Marachini<br>NM Game and Fish<br>P.O. Box 25112<br>Santa Fe, NM 87504 | Biological assessment provided for information only.<br>Site visit and written comments. | Agency commented that effects of *Proposed Action* would be minimal and localized and would affect species with small home ranges more than birds or those with large home ranges such as deer and elk. Agency also commented that effects could be mitigated through construction of small-rock-header dams, tanks, or traps to provide catchments for run-off water. Agency also expressed concern over additional outfall closures in other areas of LANL. |
| Marry Orr<br>USDA<br>Forest Service<br>Zone Wildlife Biologist<br>P.O. Drawer R<br>Española, NM 87532 | Site visit - written comments | Agency commented that stormwater and runoff may be sufficient to maintain some wetland water sources after outfall closure and that reduction in water would be within the range of variation for Southwestern environments. Agency also commented that one or two no-maintenance basins could be used to retain water to benefit small mammals and birds. Adverse effects to deer and elk were not anticipated provided the proposed treatment facility outfall continued to support that wetland. |

# 6. REGULATORY COMPLIANCE

*Liquid Discharges*

All industrial discharges from point sources in the project area are regulated by LANL's National Pollutant Discharge Elimination System (NPDES) permit issued by the Environmental Protection Agency (EPA). The alternatives considered in this EA are intended to meet DOE's purpose and need to comply with EPA regulations and permit standards governing industrial discharges at LANL.

The *Proposed Action* would disturb approximately 1 acre in constructing a new treatment facility and garage. It would not require permitting under NPDES and would not require a stormwater pollution prevention plan for the construction activity. The *Alternative Action* would disturb approximately 7 acres (2.83 ha) in constructing two treatment facilities and a garage and installing pipelines to collect HE wastewater. If this alternative were selected, an NPDES permit to cover stormwater discharges from construction activity would be required; a stormwater pollution prevention plan would also be required.

*Air Emissions*

The New Mexico Environment Department (NMED) regulates non-radioactive air emissions under the New Mexico Air Quality Control Act. Air Quality Control Regulations (AQCR) require a permit for any new stationary source or for modifying any existing source that would emit more than 10 lb/hr (4.5 kr/hr) or 25 tons/yr (22,680 kg/yr) of any regulated air contaminant. Emissions from the proposed HEWTF are subject to NM ambient air quality standards and air toxic standards in AQCR 702. None of the alternatives considered in this EA would produce regulated air contaminants (VOCs, Hazardous Air Pollutants [HAPs] such as butylactetate, cyclohexane, or ethylacetate, or air toxics such as HCl or HF) at rates exceeding 10 lb/hr or 25 tons/yr (4.5 kr/hr or 22,680 kg/yr). Therefore, a permit would not be required.

LANL and DOE are permitted to burn up to 2500 gal (9,464 L) of dilute HE-contaminated solvents each year under an Open Burning permit (AQCR 301). None of the alternatives would cause LANL to exceed these levels.

AQCR 301 does not require permitting for open burning of waste HE or dried slurry to eliminate safety concerns that accompany transport and disposal by conventional means. Therefore, a permit is not required for this activity at TA-16. Flashing HE-contaminated equipment, etc., does require permitting under AQCR 301. Emissions from burning must comply with ambient air quality standards for CO, $NO_x$, particulate matter, non-methane hydrocarbons, and VOCs. None of the alternatives would result in emissions that exceeded these standards.

*Resource Conservation and Recovery Act (RCRA)*

HE operations produce wastes that may contain plasticizers, HE compounds, and solvents that are RCRA-listed and characteristic hazardous constituents. The HE slurry that accumulates on the sand filters may be a RCRA characteristic waste if barium is present above threshold levels; the carbon filters may be RCRA listed wastes. HE wastes listed in LANL's RCRA Part A permit application (Process Code T04) are authorized for treatment, including open burning at TA-16. The burn units are subject to the operating conditions set forth in LANL's Hazardous Waste Part B Permit Application, Rev. 4.1 (November 1988). LANL's RCRA Part B permit application for the TA-16 burning grounds is currently being revised and is due to be submitted to NMED in June 1995.

The sand filters would require closure under RCRA at the time of decommissioning. They would also be subject to RCRA closure if new replacement filters were constructed. New sand filters would require RCRA permitting.

## 7. GLOSSARY

*AQCR.* New Mexico Air Quality Control Regulations.

*Base hydrolysis.* The breakdown of a chemical substance using a base, such as sodium hydroxide.

*Biodegradation.* A treatment method that relies on natural processes to degrade a chemical. Various microorganisms, etc. breakdown the chemical to smaller, generally less harmful, constituents.

*BRET.* Biological Resource Evaluation Team at LANL.

*COD.* Chemical oxygen demand. A measure of oxygen equivalent of the organic matter content of a sample that is susceptible to oxidation by a strong oxidant; a measure of organic pollutant load; expressed as mg/L.

*DOE.* Department of Energy.

*DOT.* United States Department of Transportation.

*EA.* Environmental assessment; a public document prepared for any action that is not defined in 10 CFR 1021, Appendices A and B, as a categorical exclusion, or is defined in Appendix C. This document is used to evaluate whether a proposed action or alternatives to the proposed action would have significant adverse environmental impacts.

*EIS.* Environmental impact statement; a document required by the National Environmental Policy Act (NEPA) of 1969, as amended, for proposed major Federal actions involving potentially significant environmental impacts.

*EPA.* United States Environmental Protection Agency.

*Flashing.* A method of removing high explosives from materials; the material is briefly heated to a high temperature.

*FONSI.* Finding of no significant impact; a determination made by a federal agency that no significant adverse environmental effects would occur if a proposed action is implemented.

*HE wastewater.* Industrial process water containing HE in either dissolved form or particulate form.

*High explosives (HE).* Any chemical compound or mechanical mixture that, when subjected to heat, impact, friction, shock, or other suitable initiation stimulus, undergoes a very rapid chemical change with the evolution of large volumes of highly heated gases that exert pressures in the surrounding medium; the term applies to materials that detonate.

*Hydrophytic vegetation.* Plants that grow within moist areas.

*LANL.* Los Alamos National Laboratory.

*Micron.* A unit of length equal to one-millionth of a meter; one meter equals 3.2 feet.

*NEPA.* National Environmental Policy Act of 1969; requires that federal agencies consider the impact of their activities on the environment.

*NMED.* New Mexico Environment Department.

*NPDES.* National Pollutant Discharge Elimination System. A permit program under the Clean Water Act that addresses discharge of pollutants into surface waters of the United States.

*NWI.* National Wetlands Inventory.

*Outfall.* A place where liquid effluents enter the environment and are monitored.

*pH.* A measure of the acidity of a solution.

*ppm.* Parts per million. A unit measure of concentration equivalent to the weight/volume ratio expressed as mg/L.

*Photochemically active.* A substance is photochemically active when it undergoes a chemical reaction in the presense of light.

*R&D.* Research and development.

*RCRA.* Resource Conservation and Recovery Act of 1976; establishes a comprehensive "cradle-to-grave" approach to the regulation of hazardous waste. Also establishes a framework for instituting corrective action for releases of hazardous wastes.

*RFI.* RCRA facility investigation; characterizes the nature and extent of contamination at the site.

*Riparian.* Located on or living near a water source.

*SOPs.* Safe Operating Procedures; written and authorized procedure for conducting an activity.

*Sump.* An underground collection tank for high explosives wastewater. The sump has an outlet to the environment.

*SWSC Facility.* Sanitary Wastewater System Consolidation Facility; LANL's sanitary wastewater treatment facility.

*SWMUs.* Solid Waste Management Units; a designation under RCRA for any discernable unit that has had hazardous waste placed at any time.

*TES.* Threatened, endangered, and sensitive species.

*TLV.* Threshold limit value; refer to airborne concentrations of substances and represent conditions under which it is believed that nearly all workers may be repeatedly exposed day after day without adverse health effects.

*USFWS.* United States Fish and Wildlife Service.

*Wet oxidation.* The breakdown of a chemical through the process of oxidation; uses water or another chemical substance to create the oxidation conditions.

*Wetland.* An area characterized by hydric soils, hydrophytic vegetation, and hydrology where the area is inundated for sufficient time to cause anaerobic (no oxygen) conditions.

## 8. REFERENCES

ACGIH, 1992, *Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices*, American Conference of Governmental Industrial Hygienists, Cincinatti, Ohio.

Chavez-Grieves, 1994, *Title I Corrected 100% Submittal, Design Summary Report, High Explosives Wastewater Treatment Facility, TA-9, TA-11, TA-16, TA-40, Los Alamos National Laboratory, Los Alamos, New Mexico*, Chavez-Grieves Consulting Engineers, Inc., Albuquerque, New Mexico.

Christensen, A., L. Lyon, and J. Unsworth, 1993, *Elk management in the Northern Region: Considerations in forest plan updates or revisions*. Gen. Tech. Rep. INT-303. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station.

DOE, 1995, *Dual-Axis Radiographic Hydrotest Facility, Draft Environmental Impact Statement*, Department of Energy, Albuquerque Operations Office, Los Alamos Area Office, Albuquerque, New Mexico

Eberhardt, L., and G. White, 1979, *Movements of Mule Deer on the Los Alamos National Environmental Research Park*. Los Alamos National Laboratory Report LA-7742.

Frank, D., and S. McNaughton, 1992, *The Ecology of Plants, Large Mammalian Herbivores, and Drought in Yellowstone National Park*. Ecology. 73(6):2043-2058.

Grover, K., and M. Thompson, 1985, *Factors Influencing Spring Feeding Site Selection by Elk in the Elkhorn Mountains, Montana*. J. Wildl. Manage. 50(3):466-470.

LANL, 1992, *Potential Use of NPDES Outfalls for Wildlife Watering*, Los Alamos National Laboratory unpublished report.

LANL, 1993a, *Environmental Surveillance at Los Alamos During 1992*, LA-12764-ENV, UC-902, Los Alamos, New Mexico.

LANL, 1993b, *Resource Conservation and Recovery Act Facility Investigation Workplan for Operable Unit 1082*, Los Alamos National Laboratory report LAUR-93-1196

LAC, 1992, *Traffic Data for 1992*, Los Alamos County, Los Alamos, New Mexico.

NMHTD, 1992, *New Mexico Traffic Crash Data 1992*, New Mexico State Highway and Transportation Department, Transportation Planning Division, Traffic Safety Bureau, Santa Fe, New Mexico.

Raymer, D., 1993, *Biological and Flood Plain/Wetland Assessment for Environmental Restoration Program, Operable Unit 1082*, Los Alamos National Laboratory report LAUR-93-4182.

Raymer, D., and J. Biggs, 1994, *Comparisons of Small Mammal Species Diversity Near Wastewater Outfalls, Natural Springs, and Dry Canyons*, Los Alamos National Laboratory report LA-12725-MS.

U.S. Army Corps of Engineers, 1987, *Corps of Engineers Wetland Delineation Manual*, Department of Army, Technical Report Y-87-1.

U.S. Department of Labor, 1995, *Changing Character of Fatal Workplace Injuries for the 1993 Census*, United States Department of Labor Technical Information USDL-95-142.

Usner, D., and K. Bennett, 1994, *Biological Assessment for the High Explosives Waste Water Treatment Facility*, Los Alamos National Laboratory, Los Alamos, New Mexico.

White, G. and J. Lissoway, 1980, *Research Plan for Elk in the Eastern Jemez Mountains*. Los Alamos National Laboratory report LA-8079-MS.

White, G., 1981, *Biotelemetry Studies on Elk*. Los Alamos National Laboratory report LA-8529-MS.

## *APPENDIX A. WASTEWATER MINIMIZATION*

LANL would implement several changes in HE operations to reduce HE wastewater volume. Altogether, these process modifications would decrease the total flow of HE process wastewater to 130,500 gal./yr (494,000 L/yr), all of it consisting of equipment washdown water (see Table B-1).

### *Appendix A.1.1 Minimizing Water Use In He Processes*

LANL would reduce the volume of wastewater produced by HE processing operations nearly 11 million gallons/year by

- replacing water spray dust collectors 50,000 gal/yr (189,271 L),
- replacing water-sealed vacuum pumps 3,000,000 gal/yr (11,356,233 L),
- recirculating once through cooling water systems 18,000 gal/yr (68,173 L) .
- filtering and recirculating tempered water 875,600 gal/yr (3,314,506 L), and
- replacing water-sealed pumps in solvent recovery systems 7,000,000 gal/yr (26,497,878 L)
-

#### *Appendix A.1.1.1 Water-spray dust collectors*

In three processing buildings (TA-16 Buildings 260, 342, and 430), dust collectors that use water spray would be replaced by dry dust collection systems. Water-spray collectors use approximately 50,000 gal/yr (189,271 L/yr).

Each system would function like an extremely efficient vacuum cleaner, drawing air from HE operations through a micro-fine glass filter element followed by two paper filters. Differential pressure indicators would monitor pressure drop across the filter unit and gauge filter performance; when a pressure drop indicated a saturation of filter media, the filters would be replaced. The first stage would remove 99.0% of all particles 50 microns (μ) or larger in size, while the second would filter out 99.5% of particles 10μ or larger in size. The third filter would be a high-efficiency particulate air filter with a verified capture rate of 99.97% for particles 0.3μ in diameter. The triple filtration would remove virtually all (99.999998%) HE particulate without producing any contaminated water. The filtered air would be vented through an existing exhaust stack and dispersed in the atmosphere. In each of the three facilities, filters would require replacement no more than twice a year, creating 6 lb/yr (2.7 kg/yr) each of paper and micro-fine glass filter material to burn, or 18 lb/yr (8 kg/yr) )from the three facilities combined. LANL would flash (expose to high temperatures for a short period of time) these HE-contaminated filters at the TA-16 burn ground according to established procedures. After flashing, the filters would be transported to TA-54 for off-site treatment and disposal or for on-site disposal if treatment is not required.

#### *Appendix A 1.1.2 Liquid-Seal Vacuum Pumps*

Water-sealed vacuum pumps use approximately 6 gal/min (gpm) to achieve a vacuum seal. To minimize water use in machining operations, LANL would replace water-sealed vacuum pumps with oil-sealed pumps and install three stages of HE filtration. Unlike water-sealed pumps currently in use, these pumps would not discharge any HE-contaminated water or other effluents. The conversion would eliminate 3 million gal./yr (11,356,233 L/yr), of HE process wastewater. The new process would produce 9 lb/yr (4 kg/yr) of polyester fiber filter wastes. LANL would flash the filters at the TA-16 burn grounds according to established procedures and then transport

**TABLE A-1 Flow Reductions from Waste Minimization for the *Proposed Action* (gal/yr)**

| EPA Outfall Number | Facilities Feeding Outfall (TA-Building) | Current HE Process Flow | Proposed HE Process Flow | Current Flow at Outfall[1] | Proposed Flow at Outfall[2] |
|---|---|---|---|---|---|
| 05A-053 | 16-410 | 21,000 | 1,000 | 124 000 | 103,000 |
| 05A-054 | 16-340 | 3,568,800 | 18,900 | 3 568 800 | |
| 05A-056 | 16-260 | 2,525,600 | 36,800 | 2 525 600 | |
| 05A-058 | 16-300 to 307 | 26,400 | 26,400[3] | 5,320,700 | 227,700 |
| 05A-061 | 16-280 | 0 | 1,000[4] | 65,851 | 65,851 |
| 05A-062 | 16-342 | 4,600 | 900 | 4 600 | |
| 05A-063 | 16-400 | 4,600 | 4,600 | 4 600 | |
| 05A-066 | 9-21 + 5 others | 3,617,700 | 16,800 | 4 359 164 | 741,464 |
| 05A-067 | 9-34 + 7 others | 4,600 | 4,600 | 332 224 | 327,624 |
| 05A-068 | 9-48 | 1,100,000 | 3,400 | 1 162 334 | 62,334 |
| 05A-069 | 11-50 | 7,000 | 2,100 | 7 000 | |
| 05A-071 | 16-430 | 36,000 | 7,500 | 36 000 | |
| 05A-096 | 11-51 | 7,000 | 2,100 | 7 000 | |
| 05A-097 | 11-52 | 7,000 | 2,100 | 7 000 | |
| 05A-154 | 40-41 | 2,300 | 2,300 | 2 300 | |
| 05A-055 | Treatment facility | 9,600[5] | | 36,000 | |
| Total HE process flow | | 10,942,200 | 130,500 | | |
| Total volume treated | | 36,000 | 130,500 | | |
| Total volume discharged at Category 05A outfalls | | | | 17,563,173 | 1,658,473 |

[1]HE process flow + Non-HE industrial flow + stormwater discharged from outfall
[2]Stormwater and treated wastewater only
[3]HE process water not discharged to outfall (under current operations is collected in a holding tank and delivered to the treatment facility); contributes to treatment facility outfall volume
[4]Facility has not been in use for several years but is expected to begin HE packaging and shipment in 1995; flow is expected volume of washdown water from packaging operations
[5]Slurry - together with 5,000 gallons HE process water from TA-16-300-series buildings, constitutes 36,000 gallon discharge of treated wastewater from treatment facility

the filters to TA-54 for off-site treatment and disposal or for on-site disposal if treatment is not required.

### *Appendix A.1.1.3 Tempered water systems*

An additional 875,600 gal (3,314,000 L) of wastewater would be eliminated each year by modifying the tempered water systems at TA-16, Building 260, and TA-9, Building 48. The new systems, modeled after systems at DOE's Pantex Plant, would recirculate machine tool coolant water rather than discharging it to the environment.

The complete upgrade at LANL would involve installation of pre-filter and clean water storage vessels and portable ultrafine filtration units. Each pre-filter would consist of three filter compartments. The first compartment would trap at least 90% of the HE in coolant water in a 100 μ mesh cloth filter bag. The second compartment, divided into two bays, would capture another 9% of the incoming HE in a 10μ polypropylene filter medium. The third and final compartment in the pre-filter would catch most of the remaining 1% HE in three polypropylene filters. All mechanical connections and moving parts in the filtration units would meet explosives safety requirements; there would be no pinch joints, no metal-to-metal contact points, and all moving parts exposed to cooling water will be fabricated of non-sparking materials.

Coolant water would be sent through an ultrafine filter system as a final polishing step to eliminate HE from the water. A two-stage polypropylene bag filter would intercept some HE and then the water would pass through a polypropylene ultrafine filter—a replaceable cartridge containing fine-mesh polypropylene. Finally, the coolant would flow through a carbon filter bed to remove traces of organic material. At most, each of these filters and the carbon bed would need changing once per year.

The tempered water upgrades at TA-16, Building 260, and TA-9, Building 48 would capture well over 98% of the maximum of 10,000 lb/yr (4536 kg/yr) of HE found in wastewater produced by these buildings each year. In total, the system would produce 56 lb/yr (25 kg/yr) of cloth and 26 lb/yr (12 kg/yr) of polypropylene filter material, as well as 5 $ft^3$ (0.14 $m^3$) of spent carbon. The filters, with their burden, of HE would be burned at the TA-16 burn grounds in accordance with established procedures. Material remaining after flashing would be sent to TA-54 for off-site treatment and disposal or for on-site disposal.

### *Appendix A 1.1.4 Open loop cooling water*

Open loop (once-through) cooling water systems in HE pressing operations and water from air conditioning systems at TA-16, Building 410, contribute 18,500 gal (70,000 L) to HE wastewater flow. Although used with HE processing equipment, this is clean water; it is not exposed to HE. LANL would cool and recirculate this water rather than discharging it.

### *Appendix A.1.1.5 Washdown water*

Washdown water from the facilities would not pass through filtration systems. Washdown water is estimated to contain less than 20 parts per million [ppm] HE[10] (COD 20 mg/L). This water would be held in building holding tanks until it was collected and delivered to the new treatment facilty. Washdown water would contribute the approximately 130,500 gal/yr (493,996 L/yr) to be treated at the new treatment facility.

### *Appendix A.1.1.6 Eliminating Wastewater Contaminated with Solvents*

LANL would reduce hazardous chemicals in the wastewater and, at the same time, eliminate approximately 7,000,000 gal/yr (26,497,878 L/yr) of solvent-contaminated HE wastewater. Condensers on HE processing vessels already recover about 90% of process solvent from HE facilities (see Table A-2 for a listing of the types of solvent). A cooler water supply, new pre- and post-pump solvent recovery condensers, and a sealant recovery/overflow tank would ensure nearly complete removal of all solvents before they could enter HE wastewater.

Proposed oil-sealed vacuum pumps would eliminate 7,000,000 gal (26,497,085 L) of solvent-contaminated HE wastewater discharges. The mass of HE filters on vacuum pumps would be 9 lb/yr (4 kg/yr) and the teflon filter media would be 12 lb/yr (5.4 kg/yr). LANL would burn the

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[10]Because most HE would be captured by other waste minimization processes, washdown water is expected to contain only a small amount of HE. Based on the maximum concentration of HE found in the discharged sump wastewater, washdown water is not expected to contain more than 20 ppm of HE.

solvents at the TA-16 burn grounds in accordance with established procedures. The total volume of solvent burned each year would increase approximately 11%, from the present volume of 630 gal./yr (2,385 L/yr) to 700 gal./yr2,(650 L/yr).

*Appendix A 1.2 Eliminating Non-HE Industrial Water and Stormwater*

All HE-contaminated water 26,400 gal (99,935 L) from Buildings 300-307 at TA-16 is collected in a holding tank and hauled to the existing treatment facility. Outfall pipes that formerly discharged this water to the environment still discharge 5,093,000 gal/yr (19,279,099 L/yr) of non-HE industrial wastewater. Because this water is discharged through outfall piping contaminated with HE left from previous operations, the wastewater becomes contaminated with HE during discharge. To remove this source of HE-contaminated wastewater, LANL would replace liquid sealed vacuum pumps with oil-sealed vacuum pumps, reducing water use from more than 5 million gal/yr to virtually none. The only industrial wastewater expected after waste minimization would be from non-operational events, such as boiler leaks. By eliminating the sources of non-HE industrial water, LANL can discharge any wastewater from non-operational events to the sanitary sewage collection system. Contaminated piping would then be flushed and decontaminated as necessary.

At other facilities, outfall piping would be flushed and decontaminated after sumps are converted to holding tanks, preventing HE process water from entering the outfall piping. Stormwater would continue to be discharged to the environment through the decontaminated outfall piping.

## *APPENDIX B. AIR EMISSIONS MODELLING FOR AMBIENT AIR QUALITY STANDARDS*

Emissions from waste HE/HE slurry burning must meet ambient air standards for CO, $NO_x$, PM, non-methane hydrocarbons, and VOCs. The SCREEN 2 air emissions dispersion model, which EPA approves as a screening procedure for esimating air quality effects of stationary sources, was used to determine compliance with this standard.

**Table B-1. Air Quality Effects from HE Burning**

| Chemical | Ambient Air Quality Standard | | Air Concentration at Nearest Off-Site Location |
|---|---|---|---|
| Carbon monoxide | 8- hour average<br>1-hour average | 8.7 ppm<br>13.1 ppm | 0.036 ppm<br>0.052 ppm |
| $NO_x$ | 24-hour average<br>Annual arithmetic average | 0.1 ppm<br>0.05 ppm | 0.05 ppm<br>0.004 ppm |
| PM | 24-hour average<br>7-day average<br>30-day average<br>Annual geometric mean | 150 μg/m<br>110 μg/m<br>90 μg/m<br>60 μg/m | 108.3 $\mu g/m^3$<br>49.9 $\mu g/m^3$<br>7.2 $\mu g/m^3$<br>7.1 $\mu g/m^3$ |
| Non-methane hydrocarbons | 3-hour average | 0.19 ppm | 0.005 ppm |
| Photo chemical oxidant | 1-hour average | 0.06 ppm | 0.005 ppm |

## *APPENDIX C PRELIMINARY HAZARD ANALYSIS - HE WASTEWATER TREATMENT FACILITY AND WASTEWATER MINIMIZATION SYSTEMS*

**Consequence Likelihood Categories**

| | |
|---|---|
| I<br>(1 to 0.1) | **Normal Operations:** Frequency as often as once in 10 operating years or at least once in 10 similar facilities operated for 1 year. |
| II<br>(0.1 to .01) | **Anticipated Events:** Frequency between 1 in 100 years and 1 in 10 years or at least once in 100 similar operating facilities operated for 1 year. |
| III<br>($10^{-2}$ to $10^{-4}$) | **Unlikely:** Frequency between 1 in 100 years and 1 in 10,000 operating years or at least once in 10,000 similar facilities operated for 1 year. |
| IV<br>($10^{-4}$ to $10^{-6}$) | **Very Unlikely:** Frequency between 1 in 10,000 years and once in 1 million years or at least once in a million similar facilities operated for 1 year. |
| V | **Improbable:** Frequency of less than once in a million years. |

**Consequence Severity Categories**
Maximum Possible Consequences

| Category | Public | Co-located Worker | Worker | Environment |
|---|---|---|---|---|
| A | Immediate health effects | Immediate health effects | Loss of life | Significant off-site contamination |
| B | Long-term health effects. | Long-term health effects. | Severe injury or disability. | Moderate-to-significant onsite-only contamination and/or minor off-site contamination. |
| C | Irritation or discomfort but no permanent health effects. | Irritation or discomfort but no permanent health effects. | Lost-time injury but no disability. | Significant contamination of originating facility/activity, minor onsite contamination. No off-site contamination. |
| D | No significant off-site release. | No significant off-site effect. | Minor or no injury and no disability. | Minor or no contamination of originating facility/activity. No off-site contamination. |

**Off-site:** Public, private, or Indian lands that are not part of Laboratory property.
**Onsite:** Laboratory property but not necessarily the originating technical area.
**Facility:** Originating technical area of the Laboratory

**Risk Ranking Matrix**

| Severity of Consequence | Likelihood of Consequence | | | | |
|---|---|---|---|---|---|
| | I | II | III | IV | V |
| A | 1 | 1 | 2 | 3 | 3 |
| B | 1 | 2 | 2* | 3 | 4 |
| C | 2 | 3 | 3 | 4 | 4 |
| D | 3 | 4 | 4 | 4 | 4 |

*Assign risk rank of 3 if severity category rank of B is based upon worker injuries and off-site consequence severity is less than B.

| Risk Rank | Recommendation |
|---|---|
| 1 | **Unacceptable:** Should be mitigated to risk rank 3 or lower as soon as possible. |
| 2 | **Undesirable:** Should be mitigated to risk rank 3 or lower within a reasonable time period. |
| 3 | **Acceptable with Controls:** Verify that procedures, controls, and safeguards are in place. |
| 4 | **Acceptable as is:** No action necessary. |

**HAZARD SOURCES FOR HEWTF PROJECT PHA CHART**

| | |
|---|---|
| Electric Sources | -High voltage and current sources<br>-Static electricity<br>-Loss of electricity |
| Mechanical/ Motion Sources | -Pinch points associated with pump or blower impellers<br>-Pinch points associated with mechanical connections<br>-Drop heights associated with explosives<br>-Vehicle transportation of wastewater<br>-Manual handling of explosive materials |
| Chemical Sources | -Toxic materials<br>-Flammable materials |
| Heat Sources | -Electrical<br>-Sparks from metal-to-metal or other contact<br>-Friction<br>-HE dust/residue<br>-Natural or other fire |
| Cold Sources | -Freezing weather, ice |

| SYSTEM OR PROCESS DESCRIPTION | HAZARD TYPE | CAUSE/ INITIATING EVENT | CONSEQUENCES (Public, Co-Located Worker, Worker, Environment) | PROTECTIVE FEATURES | ACTION/ RESOLUTION | R-C-F Public Co-located worker Worker Environment |
|---|---|---|---|---|---|---|
| Treatment Facility | Explosion | Explosion of HE in open burn tray (structure 388) | Potential damage to the HEWTF; potential interruption of operations; (unmanned, remote operation) (D,D,D,D) | Quantity - distance (q-d) criteria applied to 388 burn tray per EV-6194. Existing SOP for burn tray operation. | N/A | 4 III D<br>4 III D<br>4 III D<br>4 III D |
| Treatment Facility | Explosion | Explosion of HE sludge on sand filters (structures 401 & 406) | Potential damage to the HEWTF; potential interruption of operations; (unmanned, remote operation) (D,D,D,D) | Quantity - distance (q-d) criteria applied to structures 401 & 406 per EV-6194. Existing SOP for sand filters. | N/A | 4 III D<br>4 III D<br>4 III D<br>4 III D |
| Treatment Facility | Fire | HE contaminated cartridges/carbon filters lose wetting during change-out, dry-out and catch fire. | Potential worker injury; (D,D,C,D) | Follow change-out SOP. Fire/spark initiation sources eliminated per EV-6194. HE/carbon mixture non-explosive per lab tests. FP system. | Inspect cartridges to ensure wetting is maintained after change-out. Filters designed to always hold water. | 4 III D<br>4 III D<br>3 III C<br>4 III D |
| Treatment Facility | Fire | HE contaminated carbon/cartridges lose wetting during transportation, dry-out and catch fire. | Potential worker injury; potential interruption of operations (D,D,C,D) | Follow disposal SOP to transport material to HE burn pad, 1000 ft. away. No off-site transportation. HE/carbon mixture non-explosive per tests. FP system. | Inspect cartridges to ensure wetting is maintained during transportation for disposal to 387 flash pad. | 4 III D<br>4 III D<br>3 III C<br>4 III D |
| Treatment Facility | Fire/ Explosion | HE/water mixture comes in contact with electrical ignition sources. | Potential facility damage from fire/explosion; potential worker injury (D,D,C,D) | Watertight electrical fixtures are used in the facility per EV-6194. Amount of HE in water is minimal. FP system. | Verify installation of NEMA 4 type fixtures prior to facility operation | 4 III D<br>4 III D<br>3 III C<br>4 III D |

| SYSTEM OR PROCESS DESCRIPTION | HAZARD TYPE | CAUSE/ INITIATING EVENT | CONSEQUENCES (Public, Co-Located Worker, Worker, Environment) | PROTECTIVE FEATURES | ACTION/ RESOLUTION | R-C-F Public Co-located worker Worker Environment |
|---|---|---|---|---|---|---|
| Treatment Facility | Fire | Lightning strikes the facility | Potential facility damage from fire/explosion; potential worker injury. (D,D,D,D) | NFPA 78 lightening installed on the facility per EV 6194. Area evacuated during thunderstorm. Wetted HE in facility is non-combustible. FP system. | Verify installation of NFPA 78, LPI 780 lightning protection | 4 II D<br>4 II D<br>4 II D<br>4 II D |
| Treatment Facility | Fire/ Explosion | Loss of constant water supply to filter vessels due to: (1) break in pipe; (2) check valve failure; HE contaminated filters dry out. | Minimal amount of HE in water. Potential minor facility damage from fire/explosion and potential minor worker injury (D,D,C,D) | Leak detection; FP system. Initiation sources eliminated. Tanks have inlets and outlets at the top. SOPs exist for safe disassembly, even if dry. | Preventative maintenance and inspection, verify tank and filter installation for inlets and outlets at top of tank upon completion | 4 III D<br>4 III D<br>3 III C<br>4 III D |
| Treatment Facility (Pre-treatment Tank) | Spill/leak of HE waste-water | Tank freezes & develops leak due to tank heater failure or improper insulation. | Release of HE contaminated water to the environment (D,D,D,C), minimal amount of HE/pollutants in water. | Containment around tank; tank leak detection; SPCC Plan. | Preventative maintenance/ inspection of tank heater | 4 II D<br>4 II D<br>4 II D<br>3 II C |
| Treatment Facility (Pre-treatment Tank) | Spill/leak of HE waste-water | Tank mixer fails, tank contents freeze & leak occurs. | Release of HE contaminated water to the environment (D,D,D,C), minimal amount of HE/pollutants in water. | Containment around tank; tank leak detection; SPCC Plan. | Periodic inspection/ maintenance of the tank mixer | 4 II D<br>4 II D<br>4 II D<br>3 II C |
| Treatment Facility (Post-treatment Tanks) | Spill/leak of treated wastewater | Tank freezes & develops leak due to tank heater failure or proper insulation. | Release of HE contaminated water to the environment (D,D,D,C), minimal amount of HE/pollutants in water. | Containment around tank; tank leak detection; SPCC Plan. | Preventative maintenance/ inspection of tank heater | 4 II D<br>4 II D<br>4 II D<br>3 II C |
| Treatment Facility (Post-treatment Tanks) | Spill/leak of treated wastewater. | Tank mixer fails, tank contents freeze & leak occurs. | Release of HE contaminated water to the environment (D,D,D,C), minimal amount of HE/pollutants in water. | Containment around tank; tank leak detection; SPCC Plan. | Periodic inspection/ maintenance of the tank mixer | 4 II D<br>4 II D<br>4 II D<br>3 II C |

| SYSTEM OR PROCESS DESCRIPTION | HAZARD TYPE | CAUSE/ INITIATING EVENT | CONSEQUENCES (Public, Co-Located Worker, Worker, Environment) | PROTECTIVE FEATURES | ACTION/ RESOLUTION | R-C-F Public Co-located Worker Worker Environment |
|---|---|---|---|---|---|---|
| Treatment Facility | Destruction or damage to facility due to externally caused fire. | Natural or man-caused forest fire. | Release of untreated water to environment. (D,D,D,C) | Vegetation control around facility per EV 6194. Area evacuated if natural fire in area. | N/A | 4 II D<br>4 II D<br>4 II D<br>3 II C |
| Treatment Facility | Release of fire suppression sprinkler water or fire truck water. | Internally caused fire due to any of the previous circumstances. | Release of fire suppression and untreated water to environment. Minimal HE in untreated water. (D,D,D,C) | All fire initiation sources eliminated. Secondary containment will be provided for fire suppression water | Verify secondary containment after construction. | 4 III D<br>4 III D<br>4 III D<br>3 III C |
| Treatment Facility (HE Transport Truck) | Spill/leak of untreated HE wastewater. | Tank truck rolls over in route to the HEWTF. | Release of untreated HE wastewater to the environment; potential injury to driver and workers. Minimal HE in wastewater. (D,D,D,C) | Driver trained/ licensed to operate transport truck. No travel on public roads. Existing SOPs for trucks. 25 mph maximum speed limit. | N/A | 4 II D<br>4 II D<br>4 II D<br>3 II C |
| Treatment Facility (HE Transport Truck) | Spill/leak of untreated HE wastewater in garage. | Leaking valve or leak in truck tank. | Release of untreated HE wastewater to the environment<br>Minimal HE in wastewater. (D,D,D,C) | Double walled tanks will be provided for the trucks. Secondary containment provided in garage. | Verify secondary containment size and truck tank construction. | 4 II D<br>4 II D<br>4 II D<br>3 II C |
| Treatment Facility/<br>-Coolant Recirculation Systems<br>-Oil-Sealed Vacuum Systems<br>-Solvent Vacuum Systems<br>-Dry Dust Collection Systems | Fire/ Explosion | Screw threads contact HE or HE wastewater during assembly or disassembly. | Potential facility/equipment damage from fire/explosion; potential worker injury. (D,D,C,D) | Screw threads not used where contact with HE or HE wastewater could occur per EV 6194. SOPs exist for disassembling HE equipment. | Verify that no screw threads are installed where HE contact could occur. Ensure that SOPs are followed for disassembly. | 4 III D<br>4 III D<br>3 III C<br>4 III D |

| SYSTEM OR PROCESS DESCRIPTION | HAZARD TYPE | CAUSE/ INITIATING EVENT | CONSEQUENCES (Public, Co-Located Worker, Worker, Environment) | PROTECTIVE FEATURES | ACTION/ RESOLUTION | R-C-F Public Co-located Worker Worker Environment |
|---|---|---|---|---|---|---|
| Treatment Facility/<br><br>-Coolant Recirculation Systems<br>-Oil-Sealed Vacuum Systems<br>-Solvent Vacuum Systems<br>-Dry Dust Collection Systems | Fire/ Explosion | Pinching of HE in piping, pumps, or blowers. | Potential facility/equipment damage from fire/explosion; potential worker injury (D,D,C,D) | Pinch points in pumps and other moving equipment will be eliminated per EV 6194. Non-sparking materials and non metal-to-metal connections will be installed on removable parts. | Verify installation of proposed equipment prior to operation | 4 III D<br>4 III D<br>3 III C<br>4 III D |
| -Coolant Recirculation Systems | Leakage from recirculation system. | Hose leak, bad pump seal, filter vessel leak. | Leakage of HE laden coolant water in machining bay. (D,D,D,D) | Bay rated for explosives operations, HE is wetted, no initiation sources, existing secondary containment to sumps. | N/A | 4 II D<br>4 II D<br>4 II D<br>4 II D |
| -Coolant Recirculation Systems | Fire/Explosion | Loss of coolant delivery to HE machine tool due to coolant system malfunction and failure of interlock systems. | Initiation of explosives being machined if machine tool coolant interlocks fail. Damage to machine bay, and minor damage to adjacent bays. (D,D,C,C) | Bay constructed to withstand blast. operations; all machine tools have coolant interlocks. Machining is done remotely behind barriers; CCTV cameras monitor operation/coolant flow. Existing strict administrative controls and SOPs. for adjacent operations. | N/A | 4 III D<br>4 III D<br>3 III C<br>3 III C |

| SYSTEM OR PROCESS DESCRIPTION | HAZARD TYPE | CAUSE/ INITIATING EVENT | CONSEQUENCES (Public, Co-Located Worker, Worker, Environment) | PROTECTIVE FEATURES | ACTION/ RESOLUTION | R-C-F Public Co-located Worker Worker Environment |
|---|---|---|---|---|---|---|
| -Coolant Recirculation Systems<br>-Oil-Sealed (Dry) Vacuum Systems<br>-Solvent Vacuum Systems<br>-Dry Dust Collection Systems | Fire/Explosion | Initiation of explosives in bag, cartridge, or carbon filters if filters dry out and initiation sources are present. | Personnel injury, damage to machine bay, and minor damage to adjacent bays. (D,C,A,C) | Initiation sources are eliminated as existing bays are designed for explosives operations. Explosives in filters will only be removed wetted. SOPs for handling explosives per EV-6194 are in place for current operations. | Ensure completion of specific SOPs for changing filters prior to operation. | 4 IV D<br>4 IV C<br>3 IV A<br>4 IV C |
| -Oil-Sealed (Dry) Vacuum Systems<br>-Solvent Vacuum Systems<br>-Dry Dust Collection Systems | Fire/Explosion | Initiation of explosives in filter vessels from electrical source during normal operation. | Personnel injury, damage to equipment and damage to adjacent rooms. (D,D,D,C) | Filter vessels will be placed in unoccupied locations. Filters have DP gages to monitor performance and will be placed on strict PM program. Vessels will be grounded and bonded to eliminate electrical or static sources. Minimal amount of HE in filters due to several upstream traps. | Install PM procedures in existing PM database to monitor filter operation. | 4 III D<br>4 III D<br>4 III D<br>3 III C |
| | | | | | | |

| SYSTEM OR PROCESS DESCRIPTION | HAZARD TYPE | CAUSE/ INITIATING EVENT | CONSEQUENCES (Public, Co-Located Worker, Worker, Environment) | PROTECTIVE FEATURES | ACTION/ RESOLUTION | R-C-F Public Co-located worker Worker Environment |
|---|---|---|---|---|---|---|
| -Oil-Sealed (Dry) Vacuum Systems<br>-Solvent Vacuum Systems | Sealant fluid leakage. (Oil or water contaminated with solvents) | Leakage from vacuum pump or sealant piping. | Minor onsite spill. (D,D,D,C) | Secondary containment will be provided. Fluid loss interlocks will be installed. | Ensure that secondary containment and interlocks meet specifications prior to operation. | 4 II D<br>4 II D<br>4 II D<br>3 II C |
| -Oil-Sealed (Dry) Vacuum Systems | Fire/Explosion | Vacuum pump failure allowing HE workpiece to fall off of vacuum chuck on machine tool. | Minimal potential of initiation at max. drop height at machine tool; damage to equipment, damage to adjacent rooms, personnel injury. (D,C,C,C) | Redundant vacuum loss sensors and vacuum receiver (storage) tank to provide vacuum after interlocks warn of loss condition. | Redundant interlocks and receiver tank exist. No action required. | 4 IV D<br>4 IV C<br>4 IV C<br>4 IV C |
| -Solvent Vacuum Systems | Vacuum loss to HE formulation operation. | Vacuum pump failure | No consequences. (D,D,D,D) | N/A | N/A. | 4 II D<br>4 II D<br>4 II D<br>4 II D |
| -Solvent Vacuum Systems | Fire/ Explosion | Leakage and initiation of solvent vapors from vacuum system during normal operation. | Personnel injury, off-site consequence. (D,D,B,D) | | Verify that equipment and systems are installed per design specifications | 4 III D<br>4 III D<br>3 III B<br>4 III D |

| SYSTEM OR PROCESS DESCRIPTION | HAZARD TYPE | CAUSE/ INITIATING EVENT | CONSEQUENCES (Public, Co-Located Worker, Worker, Environment) | PROTECTIVE FEATURES | ACTION/ RESOLUTION | R-C-F Public Co-located worker Worker Environment |
|---|---|---|---|---|---|---|
| -Solvent Vacuum Systems | Fire/ Explosion | Leakage and initiation of solvent vapors from vacuum system while removing condensed solvents from system. | Personnel injury, no off-site consequence. (D,D,B,D) | Vacuum systems will be located in explosion-proof bays rated for solvent usage per EV-6194, eliminating initiation sources. Solvent "sniffers" will be installed to alert personnel. | Verify that equipment and systems are installed per design specifications. | 4 III D<br>4 III D<br>3 III B<br>4 III D |
| -Solvent Vacuum Systems | Inhalation of solvent vapors. | Leakage of solvent vapors from vacuum system and failure of protective apparel while removing condensed solvents from system. | Personnel injury. (D,D,B,D) | Vacuum systems will be located in explosion-proof bays rated for solvent usage per EV-6194, eliminating initiation sources. Solvent "sniffers" will be installed to alert personnel. Respirators will be used per existing SOPs for handling solvents. | Verify that equipment and systems are installed per design specifications. Develop specific SOPs for protective apparel required for removing solvents | 4 III D<br>4 III D<br>3 III B<br>4 III D |

| SYSTEM OR PROCESS DESCRIPTION | HAZARD TYPE | CAUSE/ INITIATING EVENT | CONSEQUENCES (Public, Co-Located Worker, Worker, Environment) | PROTECTIVE FEATURES | ACTION/ RESOLUTION | R-C-F Public Co-located worker Worker Environment |
|---|---|---|---|---|---|---|
| -Dry Dust Collector | Fire/ Explosion | Initiation of explosives in filter collection vessel due to breakthrough of 2 HEPA filters and initiation by electrical or electrostatic spark. | Damage to unoccupied room or bay containing dust collector if located away from process. Minor damage to operating bay if located in same bay with shielding. Potential minor injury to personnel. Potential facility/equipment damage. (D,D,C,C) | Dust collectors will be located in unoccupied areas rated for explosive operations or will have shielding to protect personnel in located in same bay. System will be grounded and bonded per EV-6194 to eliminate electrical spark or electrostatic potential. Non-sparking components will be used for blower and all moving components. SOPs monitoring filter checkout to ensure HEPA filter integrity will be followed before each use. Units will be inspected and cleaned on PM program. | Verify installation to specifications before operation. Verify that operational SOPs and PM programs are in place before operation. | 3 II C<br>3 II C<br>4 II D<br>4 II D |
| Plugged HE Sumps With High Level Alarms | Discharge of Wastewater to environment. | Internal failure of high level alarm. | Discharge of HE wastewater around HE sump. No off-site release or personnel injury. (D,D,D,C) | Self-checking, "fail-safe" level sensors with electronic warning of malfunction will be used. Level alarms will be put on periodic test program | Verify installation of specified alarms. Install test program prior to operation of sumps with level alarms. | 4 II D<br>4 II D<br>4 II D<br>3 II C |

| SYSTEM OR PROCESS DESCRIPTION | HAZARD TYPE | CAUSE/ INITIATING EVENT | CONSEQUENCES (Public, Co-Located Worker, Worker, Environment) | PROTECTIVE FEATURES | ACTION/ RESOLUTION | R-C-F Public<br>Co-located worker<br>Worker<br>Environment |
|---|---|---|---|---|---|---|
| Plugged HE Sumps With High Level Alarms | Discharge of Wastewater to environment. | Failure of high level alarm due to power loss. | Minor or no release of HE wastewater around HE sump. No off-site release or personnel injury. (D,D,D,D) | Power loss to facility and level alarms would result in termination of manual operations generating wastewater. Sumps will have 25% excess capacity. | N/A | 3 I D<br>3 I D<br>3 I D<br>3 I C |

## *APPENDIX D - WETLANDS ASSESSMENT*

Floodplain/Wetland Assessment

High Explosives Wastewater Treatment Facility

## I. PROJECT DESCRIPTION

In accordance with procedural regulations of the Department of Energy, 10 CFR 1022, Compliance with Floodplain/Wetland Environmental Review Requirements a floodplain/wetland assessment was completed for those areas that would be affected by the proposed High Explosives Wastewater Treatment Facility.

Los Alamos National Laboratory (LANL) proposes to improve its management of wastewater from high explosives (HE) research and development activities. The proposed High Explosives Wastewater Treatment Facility (HEWTF) project would entail extensive process modifications, including new equipment installations and existing systems improvements. These modifications would prevent most hazardous chemicals and HE from entering wastewater streams and greatly reduce the amount of wastewater needing treatment. HE wastewater volume would decrease by 99%, resulting in an overall reduction in flow by 90 %, from the current level of 5,539,715 L/mo (1,463,600 gal./mo) to 523,110 L/mo (138,206 gal/mo). Plans include the use of two vacuum trucks to transport wastewater from HE processing facilities to a new treatment building.

One treatment plant would be built to handle all HE wastewater. The proposed location of the treatment plant is on a mesa top in Technical Area (TA) 16 at the existing burn yard (Fig. 1). The treated wastewater would be discharged into an existing NPDES (National Pollution

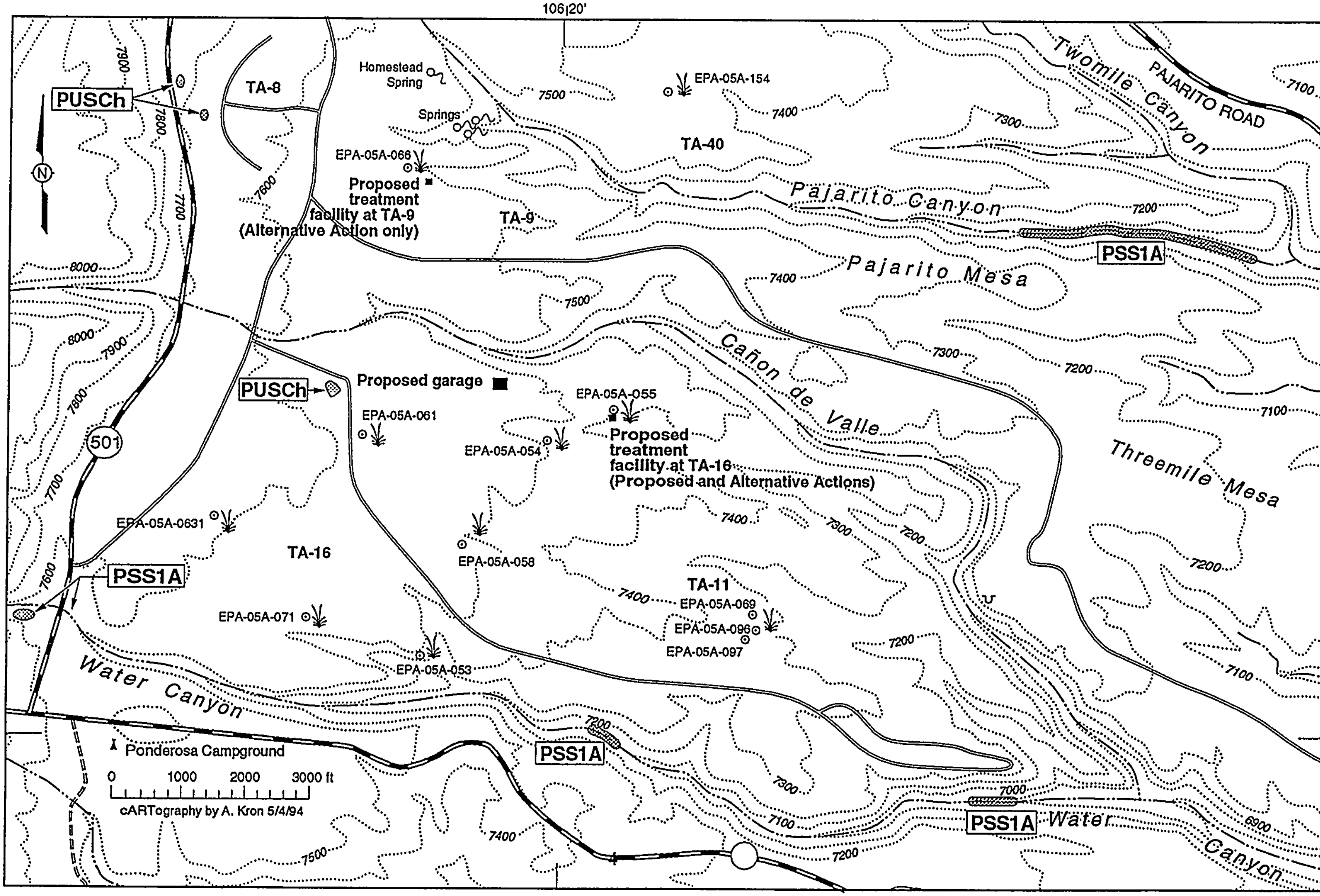


**Figure 1. Springs, National Wetlands Inventory, and LANL-defined wetlands associated with active HE outfalls**

National Wetland Inventory data:
PSS1A = Palustrine, shrub-scrub, broadleaf deciduous, temporarily flooded
PUSCh = Palustrine, unconsolidated shore, seasonally flooded, diked/empounded

Discharge Elimination System) outfall at TA-16. The number of NPDES outfalls for HE contaminated wastewater would be reduced from 16 to 1. All effluents would meet or exceed effluent quality standards in the recently revised NPDES permit, which took effect on August 1, 1994.

## II. WETLAND/FLOODPLAIN EFFECTS

A floodplain is defined as any area determined to have one percent or greater chance of flood in any year (Executive Order 11988). A wetland is any area wet enough to support vegetative or aquatic life requiring saturated soil conditions (Executive Order 11990).

In 1990, the US Fish and Wildlife Service (USFWS) mapped wetlands at LANL using the methodology outlined by Cowardin (1979) in accordance with the National Wetlands Inventory standards. The USFWS survey identified one wetland area in the project area. This is an artificial pond in TA-16 behind Building 90 and is classified as a "palustrine, unconsolidated shore, seasonally flooded, and diked/impounded (PUSCh) wetland area" (Raymer 1993). The pond received liquid waste sometime between the 1940s and 1980s, it now receives only seasonal rain and snowfall and generally dries up for approximately four weeks each year (Raymer 1993).

In addition to the USFWS-described wetland, in 1994 there were 27 NPDES outfalls within the area, 16 of which contain high explosives. Of these, eight (05A-053, 05A-054, 05A-055, 05A-058, 05A-061, 05A-066, 05A-069, 05A-071, 05A-072 and 05A-154) support hydrophytic vegetation, which is indicative of man-induced wetlands (Raymer 1993; Unser and Bennett, 1994). A man-induced wetland is an area that has developed characteristics of naturally occurring wetlands due to human activities (COE 1987).

Table 1 lists all the HE NPDES outfalls and describes the vegetative conditions, wildlife use and wetland size. Figure 1 shows HE outfalls and any associated wetlands in Technical Areas (TA) 16, 11, and 9.

Construction of the new HEWTF is not within the boundary of any wetlands. As much as 3.31 acres of the 4.34 acres (1.34 ha of the 1.76 ha) of wetlands associated with HE outfalls could be lost due to outfall elimination. However, stormwater releases and other sources of natural water may reduce these projected wetland losses. Six former HE NPDES outfalls would continue to release stormwater. Increased flow at the existing TA-16 treatment facility outfall would most likely increase wetland habitat there.

Plant community structure would most likely change at the eliminated HE NPDES outfalls, going from a wetland community to an upland community. Species associated with wetland communities may be displaced and replaced with upland associated species.

Cañon del Valle and Water Canyon, both affected by HE wastewater outfalls, contain small floodplains. McLin (1992) mapped floodplains in Los Alamos County using the U.S. Army Corps of Engineer's (COE) computer-based Flood Hydrograph Package to define the 100-year, 6-hour design storm events. None of the proposed HEWTF outfalls fall within this floodplain.

Table 1: Environmental Conditions at the HE NPDES Outfalls

| Outfall Source (TA- Bldg) | EPA Permit | Size in Acres | Vegetative Conditions | Observed Wildlife Use | Category* | Other Notes |
|---|---|---|---|---|---|---|
| 16-410 | 053 | 0.60 | Wouldow , rush and sedge wetland | Deer, porcupine, lizard | 1 | Enters Water Canyon but not watercourse |
| 16-340 | 054 | 0.59 | Large cattail/rush wetland, significant pools<br>Good water quality indicators present | Deer, elk, porcupine, squirrel | 2 | Aerating cascade present<br>Enters Cañon del Valle watercourse |
| 16-401-406 (via 363) | 055 | 1.03 | Cattail wetland | Game trail, squirrel, lizard | 2 | Treatment facility outfall<br>Enters Cañon del Valle but not watercourse |
| 16-260 | 056 | 0.00 | Ponderosa pine, oak<br>Water present | Deer, elk, snake, squirrel | 2 | Enters Cañon del Valle but not watercourse |
| 16-300-307 | 058 | 0.43 | Disturbed, large stand of cattail wetland<br>Good water quality indicators present | Deer, elk, rabbit | 1 | Enters Water Canyon but not watercourse |
| 16-280 | 061 | 0.04 | Cattail/rush wetland | Deer, elk | 2 | Entrance to Cañon del Valle possible |
| 16-342 | 062 | 0.00 | Oak - Pine - Aspen<br>Water present | Deer, rabbit, squirrel, lizard | 3 | Dissipates on slope of Cañon del Valle |
| 16-400 | 063 | 0.00 | Ponderosa pine, grass<br>Water present | Deer, elk, skunk, shrimp, raccoon | 3 | Dissipates on mesa top |
| 9-21 | 066 | 0.16 | Rush wetland | Deer, elk, squirrel | 2 | Enters Pajarito Canyon watercourse |
| 9-43 | 067 | 0.00 | Ponderosa pine, grass<br>Water present | Elk, coyote | 2 | Enters Pajarito Canyon watercourse |
| 9-48 | 068 | 0.00 | Ponderosa pine, grass<br>Water present | Elk game trails, lizard | 2 | Intermittent pools<br>Enters Pajarito Canyon |
| 11-50, 51, & 52 | 069, 096, 097 | 1.10 | Disturbed cattail/rush wetland<br>Good water quality indicators present | Deer, elk, bear, coyote, squirrel | 2 | All enter Water Canyon watercourse |
| 16-430 | 071 | 0.35 | Disturbed wouldow, cattail, & rush wetlands | Deer, elk, shrew, lizard | 2 | Standing water<br>Enters Water Canyon but not watercourse |
| 40-41 | 154 | 0.04 | Sedge and rush wetland | None | 3 | Enters Twomile Canyon but not watercourse |

*Category 1-Definite use by wildlife; 2-Potential or probable use; 3-No significant use. Sources: Raymer 1993; Edeskuty, Foxx and Raymer 1992.

## III. ALTERNATIVES

### No Action

Currently, 16 HE NPDES outfalls discharge wastewater to the environment and support 4.34 acres of wetland area. Under the "no action" alternative, flow to the HE NPDES outfalls would not change and there would be no loss of wetland areas.

### Alternative Action

The alternative action requires the construction of two HE treatment facilities, one at the burn yard at TA-16, the second at TA-9 (Fig. 1). The number of HE NPDES outfalls would be reduced from 16 to 2. The outfall associated with the TA-16 treatment facility would discharge into Canon del Valle. Total outfall flow for this outfall (including wastewater and stormwater) is estimated at 2,086,939 L/mo (551,371 gal/mo). The treatment facility at TA-9 would discharge into Pajarito Canyon at the rate of 1,846,361 L/mo (487,810 gal/mo) (includes wastewater and stormwater). Neither the TA-16 or the TA-9 treatment facility are within the boundary of any wetlands. As much as 3.15 acres of the 4.34 acres (1.28 ha of the 1.76 ha) of wetlands associated with HE outfalls could be lost due to outfall elimination. However, stormwater releases and other sources of natural water may reduce these projected wetland losses. Increased flow at the TA-16 and TA-9 treatment facilities would likely increase wetland habitat in those areas. In areas of eliminated HE outfall discharge, plant community structure is likely to change, going from wetland to upland community. Species associated with wetland communities may be displaced and replaced with upland associated species.

See Chapter 4 of this Environmental Assessment for more information concerning effects of alternatives.

## V. REFERENCES


Corps of Engineers, "Corps of Engineers Wetlands Delineation Manual," Department of the Army, Technical Report Y-87-1 (1987).

Cowardin, L. V. Carter, F. C. Glet, and E.T. LaRoe, "Classification of Wetlands and Deepwater Habitats of the United States," U.S. Fish and Wildlife Service, Washington, D.C. FWS/OBS-79/31 (1979).

Edeskuty, B., Foxx, T.S., and Raymer, D.F., "Potential Use of NPDES Outfall for Wildlife Watering", draft internal report, Los Alamos National Laboratory (1992).

Executive Order 11988, "Floodplain Management", (1977).

Executive Order 11990, "Protection of Wetlands", 3 CFR 121 (1978) as amended by Executive Order 12608, 52 Federal Register 34617 (1987).

McLin, S. G., "Determination of 100-Year Floodplain at Los Alamos National Laboratory," Los Alamos National Laboratory, LA-12195-MS (1992).

Raymer, D. F., "Biological and Floodplain/Wetland Assessment for Environmental Restoration Program Operable Unit 1082, TAs 11, 13, 16, 24, 25, 38 and 37, Los Alamos National Laboratory, Los Alamos, New Mexico," Biological Resources Evaluation Team, Environmental Protection Group (EM-8), LA-UR-93-4182 (1993).

Unser, D., and Bennett, K., "Biological Assessment for the High Explosives Wastewater Treatment Facility," Los Alamos National Laboratory, LA-UR-94-582 (1994).

## *APPENDIX E- MEASURES TO PROTECT MEXICAN SPOTTED OWL AND HABITAT*

The following protective measures would be incorporated into the construction and operational protocols for the proposed HEWTF:

- LANL's Ecological Studies team would conduct annual surveys and monitoring to determine the presence of spotted owls prior to any construction activity.
- If an active nesting site is within 0.25 miles of proposed construction, construction would be delayed till after the breeding season (March 1 - August 31). Construction would also be delayed if a nest site cannot be located but owls are found in either the roosting or nesting habitat.
- LANL's Ecological Studies team would inspect each mature tree (live or snag) that is proposed for removal. If there is a likelihood of adverse effect to nesting owls, tree removal would be postponed till after the breeding season.
- Habitat disturbance would not be permitted within 0.25 miles of a known nest site or, if the nest site is not found, within 0.25 mi. of roosting or nesting habitat where owls are found.
- During the breeding season, nighttime construction lighting would be shielded or directed away from the canyons.
- Construction, and other equipment, such as electrical generators, would be kept as quiet as possible during the breeding season and any noise would be directed away from canyon habitat to the extent possible.
- Equipment associated with construction would remain at least 25 ft from surrounding canyon rims during the breeding season.
- Construction personnel would not be allowed beyond the edges of canyons.
- Native trees would be planted along roads, disturbed edges, and edges of parking lots, as appropriate.

*APPENDIX F - AGENCY RESPONSES*

Department of Energy
Field Office, Albuquerque
Los Alamos Area Office
Los Alamos, New Mexico 87544

NOV 2 9 1994

Mr. Michael Romero Taylor
State Historic Preservation Officer
Office of Cultural Affairs
La Villa Rivera, Room 101
224 E. Palace Ave.
Santa Fe, NM 87501

45570

Dear Mr. Taylor:

The Department of Energy (DOE) proposes to construct and operate a new High Explosives Wastewater Treatment Facility, with associated piping and collection systems, at Technical Areas 9 and 16 of the Los Alamos National Laboratory. Enclosed, please find a copy of the cultural resource survey report for our assessment of the proposed project locations entitled *High Explosives Wastewater Treatment Facility (HEWTF) Cultural Resource Survey Report No. 48* for your review and concurrence with a finding of no effect for this project.

The survey area, methods, and recommendations are contained in the enclosed report. Proposed project activities include the pre-construction, construction, and operation activities associated with the new facility and its piping and collection systems. No archaeological sites are located within the surveyed project area.

Please direct any questions or comments on this undertaking to Diana Webb, Office of Environment and Projects, at (505) 665-6353.

Sincerely,

Larry D. Kirkman, P.E.
Acting Area Manager

LAAMEP:7DW-142

Enclosure

cc w/o enclosure:
The Honorable Elmer Torres
Governor
San Ildefonso Pueblo
Route 5, Box 315-A
Santa Fe, NM 87501
D. Webb, AAMEP, LAAO
[illegible], Scientech, LAAO
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THIS UNDERTAKING WILL HAVE NO IMPACT ON HISTORIC PROPERTIES

for MICHAEL ROMERO TAYLOR
STATE HISTORIC PRESERVATION OFFICER

U.S. FISH & WILDLIFE SERVICE

UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
*NEW MEXICO ECOLOGICAL SERVICES STATE OFFICE*
*2105 OSUNA NE*
*ALBUQUERQUE, NEW MEXICO 87113*
Telephone: (505) 761-4525 Fax Number: (505) 761-4542

January 18, 1995

Cons. #2-22-95-I-128

Mr. Larry D. Kirkman
Acting Area Manager
Los Alamos National Laboratory
Los Alamos, New Mexico 87544

Dear Mr. Kirkman:

The U. S. Fish and Wildlife Service (Service) has reviewed the Biological Assessment (BA) for the proposed High Explosives Waste Water Treatment Facility at Los Alamos National Laboratory (LANL). The proposed facility would be located on LANL Operable Unit 1082, Technical Area 16, Section 29, Township 29 North, Range 6 East, NMPM, Los Alamos County, New Mexico. The proposed action is the construction of a system to treat wastewater generated during the fabrication and machining of high-energy explosives. The BA details how the proposed action will reduce total wastewater volume from 1,786,000 gallons per month at 17 discharge locations to 11,000 gallons per month at 1 discharge location. The BA also details the location, status, and potential impacts to threatened or endangered species in the vicinity. Finally, the BA states that wetlands created at the existing 17 discharge locations will be mitigated by the redirection of stormwater runoff and enhancement of a single wetland below the proposed singular discharge location.

*Threatened and Endangered Species*

The Service concurs with the BA's finding that the proposed action is not expected to affect the endangered American peregrine falcon, bald eagle, or the threatened Mexican spotted owl because these species and their suitable habitats have been surveyed and were not found in the vicinity of the proposed facility (BA, page 10). Proposed critical habitat for the proposed endangered southwestern willow flycatcher (flycatcher) does not occur in Los Alamos County. However, suitable habitat could occur in the 0.6 acre wetland at the outfall discharge (EPA 053) from TA Building 16-410. This willow-dominated wetland has been and will continue to be surveyed for flycatchers by trained LANL personnel. The Service concurs with the finding that suitable habitat for the proposed endangered flycatcher would likely be destroyed or altered by the actions proposed in the BA (page 23). However, the Service believes that if surveys are periodically conducted (regardless of whether flycatchers are found) and the wetland is supplemented with adequate stormwater to maintain its function and wildlife values, then a finding of "not likely to adversely affect" would be appropriate. Please keep the Service informed of the survey and mitigation results.

*Wetland Mitigation*

Alternative mitigation measures need to be better addressed by the BA. What is the quantity and quality of the discharged wastewater to any particular wetland currently? Is the proposed redirected stormwater runoff of sufficient quantity and quality to maintain the functions of a particular wetland? For example, if we assume the average annual precipitation is 18.7 inches (1.55 feet), and the size of the stormwater catchment around building 1A-16-410 is roughly 10 acres (435,600 square feet), and assuming the soil infiltration and evapotranspiration removes about 25 percent of the total precipitation (i.e., 1.17 ft/yr), then the amount of runoff would be:

$$
\begin{aligned}
\text{Runoff} &= \text{Precipitation/year X area} \\
&= 1.17 \text{ ft/yr X } 435{,}600 \text{ ft}^2 \\
&= 509{,}108 \text{ ft}^3\text{/yr.} \\
&= 5{,}671 \text{ gallons/month.}
\end{aligned}
$$

Is this amount of runoff possible, and is it equivalent to the volume of wastewater discharged previously at this location? Will the newly created wetland at the single outfall, or those wetlands that will now depend on stormwater runoff, have the soil conditions (hydric and uncontaminated), and upland characteristics (proximity to buildings, along established wildlife movement corridors, upland cover conditions), necessary to replace one-to-one the total wetland functions and values that currently exist at the 17 outfall locations? We would recommend that alternatives to a singular outfall wetland with its functions and values to wildlife be considered and compared to enhancing other nearby wetlands (perhaps those at outfalls 054 and 058 if there is no contamination problems) in addition to the creation of a wetland through an outfall discharge perhaps in Cañon de Valle.

*General Comments*

It is the responsibility of all Federal agencies to employ best management practices so as not to adversely affect the environment (BA, page 25). Fuel, oil, hydraulic fluid, and other substances of this nature should not be stored in an area that may drain into a wetland and should have a secondary containment system to prevent spills if the primary storage container leaks. Sediment retaining fences or bales of hay should be deployed in a manner as to decrease erosion into stream channels and wetlands. Since a variety of raptors nest in the vicinity, the extension of an existing 13.2 kV transmission line with a transformer should employ measures that protect raptors from electrocution. Such measures can include: (1) design and modification of poles, crossarms, and conductor placement to achieve adequate separation of energized parts; (2) insulation of wires and rubberized boots to shield the transformer insulators where separation is not feasible; and, (3) management of raptor perching. Poles with transformers require special consideration. We have enclosed an information pamphlet for your consideration.

Thank you for the opportunity to comment on this Biological Assessment. If you have any questions about our comments, please contact Joel D. Lusk at (505) 761-4525.

Sincerely,

Brian Hanson

for Jennifer Fowler-Propst
State Supervisor

Enclosure

cc:
Director, New Mexico Department of Game and Fish, Santa Fe, New Mexico
Bureau Chief, Surface Water Quality Bureau, New Mexico Environment Department, Santa Fe, New Mexico
Section Leader, Water Quality and Hydrology Section, Environmental Protection Group, Los Alamos National Laboratory, Los Alamos, New Mexico

# United States Department of the Interior

FISH AND WILDLIFE SERVICE
New Mexico Ecological Services State Office
2105 Osuna NE
Albuquerque, New Mexico 87113
Phone: (505) 761-4525 Fax: (505) 761-4542


September 13, 1995

Cons. #2-22-93-I-251

Mr. Larry Kirkman, P.E.
Department of Energy
Los Alamos Area Office
Los Alamos, New Mexico 87554

Dear Mr. Kirkman:

This responds to a letter dated August 16, 1995, requesting re-affirmation of our concurrence with the Department of Energy's (DOE) determination that construction and operation of the proposed High Explosives Wastewater Treatment Facility (HEWTF) may affect, but is not likely to adversely affect, the Mexican spotted owl (owl). New information from surveys of the Los Alamos National Laboratory indicate that an owl nest is located within 1.2 miles of the facility. An updated version of the biological assessment for HEWTF indicates the area proposed for construction has been previously disturbed, and that a small spur of roosting habitat occurs approximately 1,200 feet from the proposed site. The closest potential nesting habitat is located approximately .5 miles from the site.

To ensure that no adverse impacts would occur to owls during the construction and operation of the HEWTF, DOE proposes to: conduct annual surveys to determine use of habitat and owl nest sites; prohibit any habitat disturbance within .25 mile of known owl nesting habitat; review any proposed removal of mature trees to determine if impact to owls could occur from the removal; protect the canyon habitat from stray light; use plantings of native species to enhance existing habitat; and restrict construction noise and use of canyon ledges by equipment.

Because the above measures would avoid any adverse impact to owls utilizing the habitat in the vicinity of the proposed HEWTF, any impacts sustained by the species would likely be discountable and insignificant. We thereby concur with DOE's determination that the proposed action may affect, but is not likely to adversely affect the owl.

If you have any questions regarding the above concurrence, please contact Ms. Karen Cathey at 505/761-4525.

Sincerely,

Jennifer Fowler-Propst
State Supervisor

cc:
NEPA Coordinator, Department of Energy, Albuquerque Area Office, Albuquerque, New Mexico

GOVERNOR
Gary E. Johnson

STATE OF NEW MEXICO
# DEPARTMENT OF GAME & FISH

Villagra Building
PO Box 25112
Santa Fe, N.M. 87504

DIRECTOR AND SECRETARY
TO THE COMMISSION
Gerald A. Maracchini

June 13, 1995

Mr. Mark Sifuentes
Environmental Protection Division
Albuquerque Operations Office, DOE
P.O. Box 5400
Albuquerque, New Mexico 87115

Dear Mr. Sifuentes:

Thank you for providing the Department of Game and Fish (Department) the opportunity to comment on the proposal to reduce or eliminate the volume of wastewater discharged into created wetlands on Los Alamos National Laboratory's lands. The reduction of wastewater will result from improved management of wastewater from high explosives research and development activities. This reduction of wastewater will affect 15 wetland sites combining to total approximately 3.3 acres, and affecting approximately 10 square miles of land.

After touring the site, it seems evident that the amount of water discharged into these areas will be reduced, but not eliminated completely due to naturally occurring springs and seeps, and storm runoff. We believe that the effects of this reduction will be minimal and localized as it relates to wildlife and wildlife habitats. The effects on large game species, such as deer and elk, should not be of consequence since sources of water will still exist within the project area, and other water sources are available well within the home ranges of these species. The greatest effect will be to those species with very localized home ranges, such as reptiles and amphibians. Avian species in the area should not be greatly affected.

Any effects resulting from this action can likely be mitigated through the construction of small-rock-header dams, tanks, or traps to provide catchments for runoff water.

The Department's greatest concern regarding this proposal is the cumulative effects of any expansion of this action to a greater area. We understand that this may occur. We would appreciate continued involvement with your agency as these proposals are considered. Thank you for the opportunity to meet with you and personnel from the Lab to discuss this project. If you have any questions please feel free to contact Lisa Fisher in Albuquerque at (505) 841-8888 ext. 723.

Sincerely,

Jerry A. Maracchini
Director

JAM/LF/ia

xc: Jennifer Propst (Ecological Services Sup., USFWS)
Jim Piatt (Surface Water Quality Bureau Chief, NMED)
Dan Pursley (Northwest Area Operations Chief, NMDGF)
Andrew Sandoval (Cons. Servs. Div. Chief, NMDGF)
Jim Bailey (Cons. Servs. Div. Asst. Chief, NMDGF)
Lief Ahlm (District Supervisor, NMDGF)
R. J. Kirkpatrick (Jemez District Officer, NMDGF)
John Pittenger (Endangered Species Biologist, NMDGF)
Mary Orr (Espanola Ranger District, USFS)

United States Department of Agriculture | Forest Service | Espanola Ranger District | P.O. Drawer R Espanola, NM 87532

Caring for the Land and Serving People

Reply To: 2610

Date: June 6, 1995

Mr. Mark Sifuentes
Environmental Protection Division
Albuquerque Operations Office - DOE
PO Box 5400
Albuquerque, New Mexico 87185

Dear Mr. Sifuentes:

On June 2, 1995 I participated in a field visit to facilities in Los Alamos which have small associated wetlands. The proposed action being to reduce the flow of outfall to these wetlands, and increase it in one case by creating a High Explosives Wastewater Treatment Facility.

The wetlands now provide distributed water sources for small and large animals. Some of this will continue from storm water runoff after the artificial outfall is stopped. Reduction of the outfall is within the range of variation for the southwest and should not present any problem. The presence of the water does encourage diversity of species. Efforts to retain the remaining outfall due to storm runoff would be beneficial especially for small mammals and birds. This could be done by building one or two small no maintenance basin structures.

Elk and deer should not be effected as they are very mobil and can travel to other sources of water. The area of expected increased outfall should meet their needs.

Thank you for the opportunity to comment on this proposal.

Sincerely,

MARY V. ORR
Zone Wildlife Biologist

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# Department of Energy
# Finding of No Significant Impact and Floodplain Statement of Findings for the High Explosives Wastewater Treatment Facility

## Los Alamos National Laboratory

U. S. Department of Energy
Los Alamos Area Office
528 35th Street
Los Alamos, NM 87544

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**DEPARTMENT OF ENERGY**
**FINDING OF NO SIGNIFICANT IMPACT AND**
**FLOODPLAIN STATEMENT OF FINDINGS FOR THE**
**HIGH EXPLOSIVES WASTEWATER TREATMENT FACILITY**
**LOS ALAMOS NATIONAL LABORATORY**

**PROPOSED ACTION:** The Environmental Assessment (EA) for the construction of the High Explosives Wastewater Treatment Facility (HEWTF), Los Alamos National Laboratory (LANL), Los Alamos, New Mexico (DOE/EA-1100), September 1995, analyzes the Department of Energy (DOE) proposal to construct and operate the HEWTF and to modify certain High Explosives (HE) operations to reduce their wastewater discharges. The new wastewater treatment facility would replace an existing temporary structure. It would be constructed along with a supporting garage facility within Technical Area (TA) 16 at LANL. HE operations would be modified in several TAs including 9, 11, 16 and 40. Modifications to HE operations would reduce the amount of water used in HE processing by approximately 99 percent and would reduce the total volume of wastewater from approximately 17 million gallons per year to 130,500 gallons per year requiring treatment. These modifications would include the installation of new equipment that filters and recycles water and the replacement of water sealed vacuum pumps and wet HE collection systems with systems that do not use water. Sources of non-HE wastewater would also be eliminated. Existing outfall piping would be decontaminated and stormwater would be discharged through the decontaminated piping. The total number of wastewater outfalls would be reduced from 16 to 1. Trucks will transport HE wastewaters to the treatment facility. Sand filters and activated carbon filters would be used to treat HE wastes by removing particulates and organic solvents and dissolved HE. Organic solvents and waste HE would be flashed or burned at TA-16 and any residual ash would be disposed of at TA-54.

The EA compares the impacts of the proposed action with those of continuing to operate the existing temporary wastewater treatment facility without making any modifications to HE operations or reducing HE wastewater discharges (the "no action" alternative). Under this alternative, it is anticipated that HE wastewater discharges would periodically violate existing and future EPA discharge standards.

In addition, DOE evaluated an Alternative Action that would not reduce the amount of wastewater or contaminants produced by the HE processing facilities, but would eliminate the non-HE industrial wastewater from the effluent and allow stormwater to be discharged through decontaminated piping. Approximately 12 million gallons per year of HE wastewater would still require treatment. Two new treatment facilities would be required (one in TA-16 and one in TA-9), as well as a support garage and approximately 7,700 additional feet of connecting pipelines. The number of permitted wastewater outfalls would be reduced from 16 to 2.

DOE considered, but dismissed as unreasonable, alternatives for upgrading the existing temporary facility, treating wastewaters at their point of generation in each facility and locating the proposed treatment facility at another location at LANL. These alternatives were not analyzed in the EA.

**ENVIRONMENTAL EFFECTS:** The EA indicates that the environmental effects from constructing and operating the new HEWTF and from modifying certain HE operations (proposed action) would be minimal. The new HEWTF and a support garage would be constructed adjacent to the existing temporary facility and would require the disturbance of approximately one acre of land. This proposal would reduce by 99 percent the amount of HE-contaminated wastewater being discharged to the environment while continuing to allow for the discharge of uncontaminated stormwater run-off. The potential for exceedences of the LANL National Pollutant Discharge Elimination System (NPDES) permit from the 15 eliminated outfalls would no longer exist. The reduction in wastewater discharges would affect small man-induced wetlands associated with the HE outfalls. As much as 3.31 acres of wetlands associated with the eliminated outfalls could dry up; however, stormwater discharges would continue through decontaminated outfall piping. Also, the volume of wastewater discharged from the one remaining permitted outfall would increase from 36,000 gallons per year to 130,500 gallons per year under the proposed action. This increased discharge could result in the creation of additional wetland acreage at the treatment facility. Small floodplains are present in the proposed project area, but neither the proposed action nor any of the alternatives would place treatment or collection facilities on or near a floodplain.

Air Quality could be affected by minor amounts of dust and vehicle emissions during the construction phase; however, volatile organic compound emissions from discharged wastewaters would be reduced by approximately 70 gallons per year under the proposed action. The proposed action would continue to require the burning of HE wastes and solvents in amounts similar to those generated under existing conditions and would generate some demolition waste from the removal of the temporary wastewater treatment facility. Culturally sensitive areas, transportation, human health and socio-economic factors are not expected to be affected by activities associated with the proposed action. The HEWTF does not generate any mixed or radioactive wastes. Abnormal events or accidents could include the unplanned discharge of untreated HE wastewater or a fire or explosion from modifications to facility operations. An unplanned discharge would not adversely affect workers or the public but would require clean-up of the spilled materials. A fire or explosion could result in injury to or death of the affected worker but would not adversely affect non-involved workers, the public or the environment. The consequences of an accident would be more severe for the affected worker under the proposed action than under either of the alternatives.

No additional environmental permits would be required under the proposed action. The State Historic Preservation Officer concurred with the DOE finding of "No Effect" on historic or cultural resources. Based upon consultations with the U. S. Fish and Wildlife Service, the U. S. Forest Service and the State of

New Mexico Department of Game and Fish, the potential loss of 3.31 acres of wetlands is not expected to adversely affect wildlife resources at LANL or on adjacent lands. In addition, the U. S. Fish and Wildlife Service concurred with the DOE determination that the proposed action may affect, but is not likely to adversely affect the Mexican spotted owl.

## FLOODPLAIN STATEMENT OF FINDINGS

This is a Floodplain Statement of Findings prepared in accordance with 10 CFR Part 1022. A Notice of Floodplain and Wetlands Involvement was published in the Federal Register on August 24, 1995, and a floodplain and wetlands assessment was incorporated into the EA under Appendix D. A description of the proposed action, its affects on floodplains and wetlands, and alternatives to the proposed action are described above and in more detail in the HEWTF EA. The proposed action conforms to applicable Federal, State and local floodplain and wetland protection standards. Under the proposed action, a total of 15 HE-contaminated wastewater outfalls would be eliminated and would no longer release contaminants into the affected wetlands. Uncontaminated stormwater discharges would continue to occur. No additional measures would be taken to supplement the reduction in the amount of wastewater discharged or to maintain wetland areas that could be reduced or eliminated under the proposed action.

On August 25, 1995, DOE invited review and comment on the preapproval EA from the State of New Mexico and the four Accord tribes: Cochiti, Jemez, Santa Clara and San Ildefonso Pueblos. In addition, DOE made the preapproval EA available to the Los Alamos County and the general public at the same time it was provided to the State and tribes by placing it in the LANL Community Reading Room and the DOE Albuquerque Public Reading Room. No comments were received from either the State or any of the four Accord tribes.

**FURTHER INFORMATION:** For further information on this proposal, this FONSI, or the DOE's National Environmental Policy Act (NEPA) review program concerning proposals at LANL, please contact:

Elizabeth Withers, Acting NEPA Compliance Officer
Los Alamos Area Office
U.S. Department of Energy
528 35th Street
Los Alamos NM 87544
(505) 667-8690

Copies of the EA and this FONSI will be made available for public review at the LANL Community Reading Room, 1450 Central Ave., Suite 101, Los Alamos, New Mexico, 87544, at (505) 665-2127 or (800) 543-2342. A copy will also be available at the DOE Albuquerque Public Reading Room located in the National Atomic Museum, Building 2034, Wyoming Boulevard, Kirkland Air Force Base, Albuquerque, New Mexico, 87185, at (505) 845-6670.

**FINDING:** The United States Department of Energy (DOE) finds that there would be no significant impact on the human environment from proceeding with its proposal to construct and operate the HEWTF at TA-16 at the Los Alamos National Laboratory, Los Alamos, New Mexico. DOE makes this Finding of No Significant Impact pursuant to the National Environmental Policy Act of 1969 [42 U.S.C. 4321 et seq.], the Council on Environmental Quality (CEQ) regulations [40 CFR 1500], the DOE NEPA regulations [10 CFR 1021] and the DOE Floodplain/Wetland Environmental Review Requirements [10 CFR 1022]. Based on the analysis of the proposed action contained in the HEWTF EA, the proposed action does not constitute a major federal action which would significantly affect the human environment within the meaning of NEPA. Therefore, no environmental impact statement is required for this proposal.

Signed in Los Alamos, New Mexico this 27th day of September, 1995.

Larry Kirkman, P.E.
Acting Area Manager
Los Alamos Area Office