

United States Government

Department of Energy

memorandum

Albuquerque Operations Office
Los Alamos Area Office
Los Alamos, New Mexico 87544

DATE: February 13, 1990
REPLY TO:
ATTN OF:
SUBJECT: EESH:PBS:pbs21390-2
RCRA Closure Plan Approval for TA-16 Surface Impoundment
TO: John Puckett, HSE-DO, MS K490

The referenced documents are provided for your action. According to the EID's cover letter, DOE's effective date from the New Mexico Environmental Improvement Division to begin implementing this plan is February 12.

I would appreciate meeting with your staff as soon as possible to discuss several outstanding issues with our ongoing RCRA closures, and to prepare together with you to meet with the EID soon to resolve them. These have important implications for ER and WM activities, and our ability to assign resources for full compliance with HSWA permit provisions.

I can be reached at 667-5288 if you have any questions. Thank you for your assistance with this regulatory compliance effort.

J.A. Phoenix
James A. Phoenix
Chief, ES&H Branch

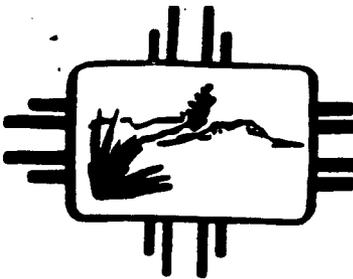
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New Mexico Health and Environment Department

GARREY CARRUTHE
Governor

DENNIS BOYD
Secretary

MICHAEL J. BURKHA
Deputy Secretary

RICHARD MITZELFE
Director

February 2, 1990

Mr. James R. Anderson
U.S. Department of Energy
Los Alamos Area Office
Los Alamos, NM 87544

RE: NM0890010515
TA-16 SURFACE IMPOUNDMENT CLOSURE PLAN APPROVAL

Dear Mr. Anderson:

Enclosed is the final closure plan approved by the New Mexico Environmental Improvement Division (EID) for the Los Alamos National Laboratory (LANL) TA-16 Surface Impoundment. This plan consists of the plan submitted by LANL February 6, 1989, as modified by EID, February 2, 1990. These modifications are contained in the closure plan and a copy of the reasons for these modifications is included. EID approves this closure plan in accordance with the New Mexico Hazardous Waste Management Regulations (HWMR-5, as amended 1989), Part VI, 40CFR section 265.112 (d)(4), with an effective date of Monday, February 12, 1990. This date will become the starting date for the final closure schedule in Section 5.1.9. of the closure plan.

If you should have any further questions, please call Dr. A. Elizabeth Gordon on my staff at (505) 827-2929.

Sincerely,


Jack Ellvinger, Chief
Hazardous Waste Bureau

JE/gb

cc:Lynn Prince, USEPA-Region VI, (6H-HS)

**STATEMENT OF REASONS FOR MODIFYING THE
LANL TECH AREA 16 SURFACE IMPOUNDMENT CLOSURE PLAN**

The information presented in the following paragraphs is a supplement prepared for the LANL TA-16 surface impoundment closure plan, as revised February 6, 1989. The following is a statement of the reasons for the modifications made by the New Mexico Environmental Improvement Division (EID) to the closure plan pursuant to the New Mexico Hazardous Waste Management Regulations [HWMR-5, as amended 1989, Part VI, 40CFR section 265.112(d)(4)].

A. Section 1.0, Introduction

1. Elimination of extraneous material. For the purposes of brevity and clarity, only sections of the revised closure plan of February 6, 1989 directly related to the closure proceedings have been retained in the final plan. Sections which do not pertain directly to the closure process have been eliminated or included only by referring to documents already in the administrative record, such as the Supplemental Report of November 18, 1988. Section 5.1.4.2, Groundwater Investigation Plan (see modification E.7) and Sections 5.2, 5.4, 5.5, 5.6, 5.7 and 5.8 related to liability and financial assurance (exempted for federal facilities) have been removed completely.
2. "This closure plan is submitted ...interim status standards." This paragraph has been changed to reflect the correct reference to the present New Mexico Hazardous Waste Management Regulations. Subsequent regulatory citations in the body of the plan have also been updated as necessary.

B. Section 2.0, Unit Description

1. "A description of...Appendix A." has been deleted.
2. "Construction diagrams...Appendix B." has been deleted.

C. Section 3.0, Process Information

1. "Fluids were periodically removed...concentrations." has been deleted.
2. "In 1987...concentration standard." The word "rendered" has been substituted for "potentially could render" to reflect the analytical results showing barium residues in the sludge

from the surface impoundment.

D. Section 4.0, Waste Description

1. "...at 100 mg/l and became regulated waste." was substituted for "(Table 4-1)" to show the specific condition of the waste and to eliminate Table 4-1 from the final plan.
2. "Additionally, traces...in the impoundment." was added to reflect the results of Table C-1, Appendix C of the modified Supplemental Report.

E. Section 5.0, Closure and Post-Closure Requirements

1. Section 5.1, Closure Standard

- a. "(HWMR-5, Pt. V, sec. 264.111) has been added to specify the standards necessary to demonstrate clean-closure of the surface impoundment. (Also see modification E.10.b).
- b. "1990" has been substituted for "1989."
- c. "These standards will...hazardous constituents." has been added to summarize the closure standards.

2. Section 5.1.1, Estimate of Maximum Liquid in Impoundment

- a. The reference to K047 waste was deleted.

3. Section 5.1.2.3, Hazard Protection

- a. "Personnel involved in sampling...permitted facility." This paragraph has been added to provide a requirement for typical worker safety standards and procedures for the analysis and disposition of the wash water. (Also see modification E.11).

4. Section 5.1.2.4, Equipment Decontamination

- a. "from the surface impoundment" has been replaced with "from Section 5.1.2.3" to assure adequate analysis and disposition of the decontamination liquid.
- b. "All equipment decontamination...TA-16-400 decontamination area." has been added to insure that decontamination procedures are carried out as close to the surface impoundment as feasible to minimize

secondary contamination.

5. Section 5.1.3. Liner Decontamination Procedures

- a. "The analytical methods...samples causes." has been added. Compositing samples can cause a dilution effect on the detection limits used for the method (10X in this case) resulting in inadequate detection limits for the individual samples when back calculations are made. The analytical method must be modified to lower detection limits to avoid this if those detection limits are critical to the results. Alternatively, the samples can be analyzed separately.
- b. "any hazardous waste compounds...modified closure plan" has been substituted for "listed RCRA compounds" to specify the required analytical standards necessary to confirm decontamination. As these analytical standards were set forth by LANL (Table 5-3) for soil decontamination and are standard RCRA test methods for the determination of hazardous constituents, EID believes that they will be adequate analytical parameters in lieu of requiring analysis for the entire HWMR-5, Pt. II, sec. 261, Appendix VIII constituent listing.
- c. "If the liner...with the liner." The remainder of the paragraph has been eliminated in order to add the following item.
- d. "If the liner cannot be certified...off site to a permitted incinerator." has been added in order to bring the plan into compliance with HWMR-5, Pt. VI, sec. 265.382 prohibiting the open burning of hazardous waste.
- e. "Section 5.1.3.1, Decontamination Verification...or background sample." has been added to provide a standard for decontamination verification.

6. Section 5.1.4.1. Soil Boring and Sampling Plan

- a. "These concentrations...of 100 mg/l." has been deleted.
- b. "The Laboratory intends...closure plan." The word "intends" has been replaced by "will" to specify demonstration of clean closure through soil analysis.

- c. "If the soil sample data show...sec. 265.112(c)." has been added as a plan for the disposal and verification of the soil cleanup if contamination has been found to be present.
7. Section 5.1.4.2. Groundwater Investigation Plan
- a. This section has been deleted as not necessary due to the proposed clean closure plan. If clean-closure cannot be made, as determined by the decontamination verification analysis, the post-closure permit will define the terms for groundwater monitoring.
8. Section 5.1.5. Sampling and Analysis Procedures
- a. "Clean chemically resistant gloves" has been added to the last precaution item as a specific safety point.
9. Section 5.1.5.2. Soil Sampling
- a. "...at points selected with random statistical procedures." has been added to preserve the requirement for sampling points selected at random locations within the surface to be sampled.
- b. "Composite the samples...container." has been deleted. Because the soil samples will be used to determine the clean closure verification, the sample parameter detection limits should be maintained. The dilution effect of compositing samples (detection limit is multiplied by the dilution) will result in inadequate detection limits. This was previously discussed in Item 5.a.
10. Section 5.1.5.1. Waste Liquid and Rinseate Sampling
- a. "The recommended model...closure system." was deleted.
- b. "Disposable COLIWASA...used." was added.
11. Section 5.1.6. Determination of the Presence of Contamination
- a. "F001-F005 RCRA regulated...remedial action." has been deleted.

- b. "HWMR-5, Pt. V, sec. 264, Appendix IX...health advisories." was added. The HWMR-5, Pt. V, sec. 264 provisions (sec. 264.228, 264.258) require that LANL "remove or decontaminate all waste residues, contaminated system components and contaminated soils." Using U.S. Environmental Protection Agency guidance, EID interprets the terms "remove" and "decontaminate" to mean "...removal of all wastes and liners, and removal of all leachate and materials contaminated with the waste or leachate (including ground water) that pose a substantial present or potential threat to human health or the environment" (Federal Register: 52 FR at 8706). To meet this standard, LANL must demonstrate that no Part V, sec. 264, Appendix IX constituents remain in the soils, vadose zone or groundwater above EID approved limits before certifying clean closure. These limits include water quality standards and criteria, health-based limits based on verified reference doses (RfDs) and carcinogenic potency factors, or site-specific EID approved health advisories. (Federal Register: March 19, 1987 at 8704 and March 28, 1988 at 9944).

12. Section 5.1.7. Decontamination

- a. "Personnel...clothing." was deleted as this issue was covered in Section 5.1.2.3.

13. Section 5.1.8. Decontamination Verification

- a. "If removal of contaminated soils...disposal" has been removed from the closure schedule section of the modified closure plan to place it in Section 5.1.8.
- b. "analysis...to be contaminated." was removed as not consistent with the closure verification requirements of Section 5.1.6.

14. Section 5.1.9. Closure Schedule

- a. "1990" has been substituted for "1989."
- b. All items on the closure schedule previously completed (November, 1986 through November, 1987) have been deleted.
- c. "an amendment...HWMR-5, Pt. VI, sec. 265.112(c)." has been added to provide a mechanism for amendment of the

plan if necessary.

15. Section 5.3. Notification in Deed to Property
 - a. "Los Alamos County Register of Deeds...NM 87544" has been added.
16. Section 5.4. Quality Assurance/Quality Control
 - a. This section has been added in order to assure that the requirements of Section 5.5 below can be adequately met.
17. Section 5.5. Final Closure Report
 - a. The final closure report supports the QA/QC adequacy and location of supporting documents pursuant to the certification requirements of HWMR-5, Pt. VI, sec. 265.115.

TECHNICAL AREA 16
SURFACE IMPOUNDMENT
CLOSURE PLAN

FACILITY ID NO.NM890010515
FACILITYLOS ALAMOS NATIONAL LABORATORY
LEGAL OWNER.....UNITED STATES DEPARTMENT OF ENERGY
LEGAL OPERATOR.....UNIVERSITY OF CALIFORNIA REGENTS
ADDRESS.....LOS ALAMOS AREA OFFICE
CITY, STATE.....LOS ALAMOS, NEW MEXICO 87544
CONTACT PERSON.....MR. JAMES R. ANDERSON, ACTING AREA
MANAGER
PHONE.....(505) 667-5105

1.0 INTRODUCTION

This Closure Plan is submitted in accordance with the requirements of the New Mexico Hazardous Waste Management Regulations, (HWMR-5, as amended 1989) Part VI, 40 CFR sections 265.110 through 116 and 265.228. The plan identifies all steps necessary to close the Technical Area 16 (TA-16) surface impoundment under interim status standards.

The Laboratory will close the TA-16 surface impoundment in accordance with the requirements of HWMR-5, Part VI, sec. 265.228(a) with regard to clean closure. To determine the level of activity necessary to meet clean closure requirements, the Laboratory has removed standing liquids, wastes, and waste residue from the impoundment, cleaned and removed the liner, and sampled underlying soils [details of actions performed to date are included in the modified Supplemental Report]. Although no soil contamination was detected, additional samples will be obtained and analyzed to lend further verification that the unit is clean closed. The details of this additional sampling and all subsequent actions, including filling, grading and revegetating the site now occupied by the unit, are described in this plan.

2.0 UNIT DESCRIPTION

The TA-16 surface impoundment is located in a remote area in the eastern section of TA-16 and is approximately 2,400 square feet. The impoundment is situated just north of a small unnamed canyon (tributary to Valle Canyon) (Figure 2-1). An asphalt pad extends up to the north edge of the impoundment berm. The ground to the east and west of the impoundment is relatively undisturbed.

Surface dimensions of the impoundment are 60 feet long by 40 feet wide and eight feet deep from the top of the berm. The upper four feet of the impoundment sides are sloped at a ratio of two to one while the lower four feet are sloped at one to one. The bottom of the impoundment is 37 feet long and ten feet wide with a slight downward slope to the northeast corner. The structure was constructed with a field-seamed Hypalon liner. The field seams were welded with a minimum six inch overlap. Inflow to the impoundment occurred at two points, one in the northwest corner of the structure and one in the center of the eastside.

3.0 PROCESS INFORMATION

The TA-16 surface impoundment stored filtrate from treatment of a high explosive (HE) waste stream. Small particles of waste HE collected in the bottoms of sumps in various buildings at TA-16, forming sludges. These sludges are periodically removed from the sumps for treatment. Sludge treatment consists of placing sludge in a pressurized particle filter located south of Building TA-16-360 (i.e., structure numbers TA-16-401 and 406). Warm air is

blown through the filter at approximately two pounds per square inch until the sludge has dried. Liquid extracted from the filter process flowed to the TA-16 surface impoundment, and was the only source of material placed into the unit. Periodically, fluids from the impoundment were discharged to National Pollution Discharge Elimination System (NPDES) out fall identified as EPA No. 05A-055, under NPDES permit NM0028355 and NM0028576. Between discharges to the impoundment, evaporation of water from the impoundment caused contaminant concentrations to gradually increase.

In 1987, the Laboratory modified the composition of its HE formulations to eliminate barium, the constituent that rendered the sludge hazardous by exceeding the EP-toxic concentration standard. The elimination of barium greatly simplified the requirements for wastewater processing, and a coal-based activated carbon batch wastewater treatment system was installed to replace the surface impoundment. In September 1987, liquids and residues were removed from the surface impoundment because its use had been discontinued and further use was not planned. The total volume of liquids removed did not exceed 18,620 gallons, the maximum storage capacity of the surface impoundment. Approximately 100 to 150 gallons of sludge were removed. The modified Supplemental Report details these operations more fully.

4.0 WASTE DESCRIPTION

The surface impoundment was not originally intended to contain hazardous waste. However, during an extended period of accumulation and evaporation between August, 1985 and January, 1986, the barium concentration in the impoundment exceeded limits for EP Toxicity at 100 mg/l with the result that the wastewater and sludge became regulated wastes. The liquid in the impoundment was treated with a flocculent to remove barium. Precipitants and sediments from the one-time treatment were pumped through the pressure sand filters where they were then air-dried. These residues were then thermally treated in-place because of their HE content. The remaining ash was removed from the sand filters and sealed in DOT-approved hazardous waste steel drums. These drums are currently stored in the TA-54, Area L storage area. As described in Section 3.0, the liquids were filtered and then processed prior to discharge. Additionally, traces of regulated solvents have been detected in the impoundment.

5.0 CLOSURE AND POST-CLOSURE REQUIREMENTS

5.1 CLOSURE STANDARD

This closure plan for the TA-16 surface impoundment is designed to meet the following performance standards:

- . Protect human health and the environment,
- . Prevent the escape of hazardous waste, hazardous waste constituents, leachate, contaminated rainfall, or waste decomposition products to the ground, surface waters or atmosphere, and
- . Minimize future maintenance. (HWMR-5, Pt. V, sec. 264.111)

The Laboratory plans to complete closure activities for the impoundment in 1990. These standards will be met by removal of hazardous wastes and hazardous constituents.

5.1.1 Estimate of Maximum Liquid Impoundment

When the surface impoundment was in use, filtrate extracted from the explosive waste treatment vessels was transferred to the unit for temporary storage and subsequent discharge in accordance with the NPDES permit. The maximum filtrate stored in the surface impoundment for treatment at any one time was 70,439 liters (18,610 gallons).

5.1.2 Liquid and Residue Removal Procedures

The procedures discussed below describe the process by which standing liquids, wastes, and waste residue were removed from the surface impoundment. Detailed procedures and analytical results are included in the modified Supplemental Report.

5.1.2.1 Liquids Removal

On January 26, 1987, the liquids in the surface impoundments were sampled using a composite liquid waste sampler (COLIWASA) and following the procedures outlined in Section 5.1.5. Two liquid waste samples, one spiked sample, and three duplicate split spoon samples were collected and preserved. The liquids were analyzed for metals characteristic of EP toxicity and the following organic compound groups: volatiles, base/neutral extractables, acid extractables, and nitroaromatics. The results, presented in the modified Supplemental Report, showed small amounts of trinitrotoluene (TNT) in some samples, and concentrations of 1,1,1-trichloroethane and toluene that exceed detection limits. In addition, the impoundment fluids exceeded the EP toxicity limit for barium on several occasions.

Following sampling, the liquids were pumped out of the impoundment, using a small capacity portable, gasoline-powered, hydraulically-actuated, diaphragm pump, into pressure sand filters (Structure Numbers TA-16-401 and 406). The filters were used to remove any HE contaminated residues from the liquid. The filtered liquid was then pumped to the NPDES wastewater treatment

unit for reduction of chemical oxygen demand (COD) to below permit limits prior to discharge through Outfall 055, which is located just south of the surface impoundment. The wastewater treatment unit employs four coal-based activated carbon canisters in a series-parallel configuration to provide more than the minimum residence time for thorough COD removal.

5.1.2.2 Residue Removal

Prior to the removal of the impoundment liquids, sludges were sampled to determine appropriate treatment or disposal methods. Two samples of the residue were collected: one from the lowest point in the impoundment (northeast corner) and the other directly beneath an influent location.

The samples were stored in appropriate containers and preserved as specified in Section 5.1.5. The residues were analyzed for the same constituents as the liquid samples (Section 5.1.2.1).

The residues were then pumped using a septic tank vacuum truck designated for other TA-16 area HE sump cleaning procedures. Approximately 100 to 150 gallons of sludge was removed and placed in the same sand filter previously used to filter the liquids. After hot-air drying for several days, the sludge was thermally treated in place, and the resulting ash was transferred to sealed metal 55-gallon drums. The drums are currently stored at TA-54 Area L and awaiting on-site treatment.

5.1.2.3 Hazardous Protection

Personnel involved with sampling, removing liquids and residues from the impoundment, and liner cleaning are required to use proper protective clothing. The Laboratory's safety group (HSE-5) is responsible for assessing hazards and determining protective clothing requirements.

Personnel involved in sampling and decontamination will wear rubber gloves, safety glasses, and coveralls. Personnel involved in dust-generating activities, such as digging and filling drums, will wear dust masks to prevent inhalation of contaminated dust. The Laboratory's Industrial Hygiene Group, HSE-5, will review the site survey analytical data and recommend additional protective clothing. Protective clothing, coveralls, face shields, and boots worn during the wash down will be rinsed in clean water while the items are within the curbed area. Following internal and external decontamination, the equipment will be considered free from regulated wastes. Protective clothing will be worn by personnel disassembling the equipment. The protective clothing and tools used during disassembling will be washed with detergent and water. If the wash water contains hazardous constituents (tested for the analytical parameters of Section 5.1.2.1), it will be treated on site or transported off site to a permitted

disposal facility. If the wash water is determined not to contain hazardous constituents, it will be discharged to the industrial wastewater sewer. Mops and rags used for cleanup will be placed in drums for transport to TA-54, Area L, for off-site disposal at a permitted facility.

5.1.2.4 Equipment Decontamination

All equipment used in sampling and removal of liquids, residues and soils, in addition to any equipment used in further soil sampling or removal, is required to be scraped and brushed to remove residue. The residue collected must be placed in drums for treatment or disposal as specified in Section 5.1.2.2. Equipment must be decontaminated by washing with surfactants such as Alconox or steam cleaning. Rinseate is collected and handled in the same manner as the wash water from Section 5.1.2.3. Protective clothing must be disposed of on- or off-site as hazardous waste. All equipment decontamination shall occur at TA-16-400 decontamination area.

5.1.3 Liner Decontamination Procedures

The Laboratory intends to remove HE and other contaminants, if present, from the surface impoundment liner. The liner was washed and flushed with clean tap water during the week of October 26-30, 1987 (prior to its removal). The rinseate was contained in the impoundment initially, then pumped through the sand filters and waste water treatment unit prior to discharge. The washing process was repeated several times to insure that the liner, transfer pump, and hose were completely cleaned. The liner was then carefully removed and stacked on the ground next to the excavation.

Remaining actions with regard to the liner include further testing and analysis to confirm the absence of hazardous residues. The testing will be performed by WX-12 and HSE-8 staff. At least ten samples will be obtained by rinsing small sections of the liner and collecting and preserving the rinseate; these samples will be composited into a single sample for detailed analysis. This procedure will be conducted on portions of the liner that were in contact with the waste previously in storage, and repeated on portions above the maximum waste surface elevation. This will provide a separate composite background sample against which to account for any organic compounds that may be contributed to the rinseate by the liner or cleaning utensils. A sample of the rinse fluid will also be collected prior to obtaining the composite liner samples. The analytical methods used for this procedure will be modified as necessary to correct for the detection limit dilution which compositing samples causes.

The liner will be either disposed of as solid waste or reused to contain non-hazardous waste only if:

1. WX-3 personnel can verify that the liner is free of HE residues.
2. That, using the test methods specified in Table 5-3 of the modified closure plan, each of the hazardous waste compounds is below the detection limit of the applicable method.

If the liner cannot be certified as free of HE residues or hazardous constituents after the first sampling, the sampling and decontamination procedures will be repeated. If the second effort is not successful, a third effort may be made to decontaminate the liner. If the liner cannot be certified as free of HE and hazardous constituents after the second or third decontamination effort, it will be stored at TA-54 Area L until a permit is obtained from the Environmental Improvement Division Air Quality Bureau to burn the contaminated liner. If a permit is not granted, the liner will be either cut into pieces which can be accommodated by the Laboratory's permitted incinerator or shipped off site to a permitted incinerator.

5.1.3.1 Decontamination Verification

Dirty washdown solutions will be analyzed for the constituents listed in Table 5-3. Analytical procedures will conform to methods found in SW-846. Equipment will be considered to be contaminated if the used wash solutions show a significant increase in the listed constituents over the clean wash solution.

The constituents listed in Table 5-3 include regulated constituents normally handled at TA-16 and additional metals that may have been inadvertently included in treated solutions. A scan for volatile and semivolatile organics is performed to ensure that solvents commonly used within the Laboratory have not contaminated the equipment.

Successful decontamination is defined as:

1. No detectable hazardous constituents in the final sample, or
2. Detectable hazardous constituents in the final sample are equal to or less than, at the 0.01 confidence level, their concentration in the unused washwater or background sample.

5.1.4 Soil Sampling and Ground-Water Investigation Plans

Soils were sampled and investigated to determine whether wastes from the surface impoundment resulted in the contamination of

underlying and surrounding areas. The following sections described the actions previously undertaken and those that remain to be completed with regard to sampling. All analytical data obtained to date can be found in the modified Supplemental Report.

5.1.4.1 Soil Boring and Sampling Plan

On February 11, 1987, three sediment samples were obtained from the ephemeral stream channel below the outfall through which the surface impoundment intermittently discharged. A background sample consisted of a 3.5-inch-diameter by 4.0-inch-long surface soil core plug. All EP-toxic metals were analyzed (results are presented in the modified Supplemental Report). Barium was the only metal found to exceed the background concentration of 0.80 mg/l. The concentrations of barium found in the stream channel samples were 26.0, 6.6 and 2.7 mg/l at 3, 10, and 40 feet downstream, respectively.

On November 2, 1987, five soil samples were obtained from below the surface impoundment liner, to a depth of twelve inches. Two background surface samples were collected about 500 feet to the east and west of the unit. No volatile organics in any sample exceeded detection limits and, of the EP toxic metals, analysis of one of the samples (from the northeast corner of unit.) showed a cadmium concentration of 0.18 mg/l. This concentration is within the range of what can be expected based on recorded background concentrations of this naturally occurring metal. Thirty-six background soil samples collected at Sigma Mesa show a mean cadmium concentration of 0.17 mg/l (the modified Supplemental Report summarizes these data). All other metals in the remaining impoundment soil samples were below EP-toxic minimum concentrations and did not differ from background.

The Laboratory will conduct additional sampling of the soils within and around the surface impoundment excavation. Simple random sampling techniques will be employed to determine twelve additional sample locations. Figure 5-1B shows the locations from where these additional samples will be obtained. After statistical analyses of data obtained through these additional samples, the Laboratory may determine what additional actions are necessary.

If the soil sample data show a significant level of contamination, the soil will be removed to a depth of 12 inches, placed into containers and sent to TA-54 Area L for storage prior to disposal off site at a permitted facility. The area exposed by the excavation will be resampled at a minimum of five points and analyzed as above. If contamination is detected, the Laboratory will repeat the procedure until no further contamination is present or propose an amendment to this plan pursuant to HWMR-5, Pt. VI, sec. 265.112(c).

5 1.5 Sampling and Analysis Procedures

The following sections defined procedures and methods for sampling and analysis and documentation applicable to this closure plan. While the procedures and methods are specific, any applicable procedure or method defined in Test Methods for Evaluating Solid Wastes (SW-846) may be used if conditions or experience shows the alternate method to be more appropriate.

The sample collection personnel will observe the following precautions.

- . Do not store, eat, or handle any objects not necessary for sampling while performing sampling procedures.
- . Do not sample downwind of any potential volatile organics sources such as car exhausts, open fuel tanks, etc. These could result in contamination of the sample. If any such sources are unavoidable, make a note of them in the field logbook.
- . Avoid handling the teflon bottle cap liners. Do not use any liner which falls out of the cap and onto the ground.
- . Clean chemically resistant gloves will be worn when taking samples and when handling bottles, especially those with added preservative.

5.1.5.1 Waste Liquid and Rinseate Sampling

A COLIWASA sampler and/or glass tubes are used to sample liquids in the surface impoundment and rinseate from the liner and equipment cleaning. As an alternative to the COLIWASA, glass tubes provide the primary advantage of allowing disposal as hazardous waste after each sample is collected, thus eliminating the potential of cross-contamination. Disposable COLIWASA samplers may also be used.

5.1.5.1.1 Sampler Preparations

Laboratory procedures require that the COLIWASA sampler be cleaned before use. The sampler must be washed with a warm detergent solution (Liquinox or Alconox), rinsed several times with tap water, rinsed with distilled water, drained of excess water, and air-dried or wiped dry. A necessary piece of equipment for cleaning the tube of the COLIWASA is a bottle brush that fits tightly inside the diameter of the tube. The brush is connected to a rod of sufficient length to reach the entire length of the sampler tube. Using this ramrod and fiber-reinforced paper towels, the COLIWASA tube may be quickly

cleaned. Clean COLIWASA samplers can be stored in polyethylene plastic tubes or bags in a clean and protected area until use.

Sampling Procedures:

- . Assemble the clean COLIWASA sampler and check to make sure the sampler is functioning properly. Adjust the locking mechanism, if necessary, to make sure the neoprene rubber stopper provides a tight closure.
- . Wear necessary protective clothing and gear and observe required sampling precautions.
- . Put the sampler in the open position and slowly lower the COLIWASA sampler into the liquid at a rate that permits the levels of the liquid inside and outside the sampler tube to be about the same.
- . When the sampler stopper hits the bottom of the liquid container, push the sampler tube downward against the stopper to close the sampler. Lock the sampler and slowly withdraw the sampler from the container with one hand while wiping the sampler tube with a disposable cloth with the other hand.
- . Carefully discharge the sampler into a glass container by slowly opening the sampler.
- . Cap the glass container, attach a label and seal record in the field log book, and complete the sample analysis request sheet and chain-of-custody record.

5.1.5.2 Soil Sampling

The sampling procedures outlined below shall be used to collect non-liquid residue/soil samples. Adequate preparation ensures that proper sampling is accomplished. All samples are collected in appropriate containers and preserved in accordance with EPA methods. Any additional sampling at the site will follow the same procedures.

Towel or Scoop:

- . Take small, equal portions of sample from the surface or near the surface of the material to be sampled at points selected with random statistical procedures.
- . Cap the container, attach a label and seal, record in field log book, and complete the sample analysis request sheet and chain-of-custody record (Section 5.1.5.3).

Shelby Sampler:

- . Assemble the clean Shelby sampler to the drill rod.
- . Drive the Shelby sampler one to two feet ahead of the auger string.
- . Withdraw the drill rod from the auger string and retrieve the Shelby sampler.
- . Store the core sample in an appropriate sampler container and packed in an insulated container with ice.
- . Label the sample, affix the seals, record in the field log book, complete sample analysis request sheet and chain-of-custody record, and deliver the samples to the laboratory for analysis (Section 5.1.5.3).

Cleaning of Downhole Drilling Tools: All downhole drilling tools (augers, drive rods, etc.) must be steam cleaned or pressure washed after completion of each boring. All Shelby samplers must be cleaned after each location or depth interval is sampled. Wash fluids must be collected and analyzed to determine a proper disposal protocol.

5.1.5.3 Sample Handling and Documentation

Sample containers shall be sealed with a gummed paper seal attached to the container in such a way that the seal must be broken in order to open the container.

The sample label is necessary to prevent misidentification of samples and shall include, if applicable, the grid number referenced to positions stacked on the site perimeter. The "field information" in the case of soil sampling, shall include observations such as the soil texture and surface appearance, ambient temperature and cloud cover at time of sampling, and precipitation conditions 24 hours before sampling.

The chain-of-custody form is necessary to trace sample possession from the time of collection and **must accompany every sample**. This is a two-page record with the original accompanying shipment and the "copy" retained by the Laboratory.

A separate closure sampling field log book must be used in record information pertinent to field surveys and sampling. The log book shall have bound and consecutively numbered pages in 8-1/2 by 11-inch format. Minimum entries include:

- a. Purpose of sample (routine sampling, special sampling);

- ✓ b. Location of sampling (coordinates referenced to staked field points, if soil sample);
- ✓ c. Name and address of person making log entry;
- ✓ d. Type of process producing waste;
- ✓ e. Number and volume of sample taken;
- ✓ f. Description of each sampling location, sampling methodology, equipment used, etc.;
- ✓ g. Date and time of sample collection;
- ✓ h. Sample destination and transporter's name (name of laboratory, UPS, etc.);
- ✓ i. Map or photograph of the sampling site, if any;
- ✓ j. Field observations (ambient temperature, sky conditions, past 24-hour precipitation, etc.);
- k. Field measurements, if any (pH, flammability, explosivity, specific conductance, etc.);
- ✓ l. Collector's sample identification numbers(s);
- ✓ m. Signature of person responsible for the log entry, and
- ✓ n. Analytical parameters requested.

The pertinent log book information from previous sampling is provided in the modified Supplemental Report. It should be noted that a log was not maintained with regard to liner sampling and decontamination; as a result, repeated sampling, as described in Section 5.1.3., will be conducted to obtain all necessary information prior to final disposition.

The sample shipment and chain-of-custody record must be accompanied by a sample-analysis request sheet. The request sheet has two parts: field and laboratory. The field portion of this form must be completed by the person collecting the sample and include most of the pertinent information noted in the log book. The laboratory portion is intended to be completed by the laboratory personnel when the sample is received.

5.1.5.4 Sample Analysis

All analyses, quality assurance, and quality control follow methods defined in SW-846. The analytical methods used in analysis of previously collected samples and to be followed with

regard to additional analyses, are denoted in Table 5-3 included with this plan.

5.1.6 Determination of the Presence of Contamination

Any soils in or around the excavation that exhibit HWMR-5, Part V, sec. 264, Appendix IX hazardous constituents in concentrations above background levels will be considered contaminated and subject to remedial action. The soil analysis plan is required to determine that soil waste constituents are at or below background levels. Any waste constituents found to be above background must be reported to EID and decontaminated to levels below EID approved limits. These limits are based upon water quality standards and criteria, health-based limits based on verified reference doses (RfDs) and carcinogenic potency factors, or site-specific EID approved health advisories.

5.1.7 Decontamination

The approach to decontamination depends on the extent of contamination, as determined by the evaluation of all sampling data. If the sampling data indicate that there are no contaminated areas at the surface impoundment, the excavation will be backfilled, graded, revegetated, and considered "clean".

Should removal of contaminated soil be necessary, the Laboratory will contract with a permitted transporter and disposal site contractor who will provide sealed gondola trucks and provide for decontamination of these trucks at the disposal site. Small equipment used to pick up soil will be scraped and brushed clean, and the accumulated dust will be placed in drums for transportation to TA-54 Area L for off-site disposal. The equipment will be decontaminated as outlined in Section 5.1.2.4.

If circumstances arise that render this closure plan impractical, the plan will be amended as provided under HWMR-5, Pt. VI, sec. 265.112(b).

5.1.8 Decontamination Verification

If removal of contaminated soils is necessary, they will first be tested for the presence of HE. HE-contaminated soils will be burned pursuant to WX Division standard operating procedures. Contaminated soils that do not contain HE will be removed using a shovel or backhoe (depending on the extent of contamination), drummed, and sent to TA-54 Area L for proper treatment or disposal.

If soil removal is deemed necessary, decontamination of the surface impoundment will be demonstrated by additional sampling. Because removal of contaminated soil will leave an exposed surface, the disturbed surface will be resampled in the same

locations.

5.1.9. Closure Schedule

The Laboratory has sampled impoundment liquids, residues, and surrounding and underlying soils, and has sampled and removed the impoundment liner since submittal of the original closure plan in 1986. It is anticipated that final closure will be completed in 1990. The following schedule lists the time required for remaining actions:

<u>TIME</u>	<u>ACTIVITY</u>
Day 0	Approval of plan
Day 30	Resampling and certification of liner
Day 30	Additional soil sampling
Day 75	Laboratory analysis and data review
Day 90	Soil removal (if necessary)
Day 210	Backfill, regrade and plan vegetative cover.
Day 220	Submit final closure report

The excavation will be filled with clean indigenous soils, and compacted and regraded to its original contour. Selection and application of soil additives, such as fertilizers, and seed mixtures will follow U.S. Forest Service recommendations. The site will be watered sufficiently to establish seedlings. If weather conditions at the time of final closure activities do not allow for planting, an extension of this closure schedule is hereby sought to allow for completion of this step as soon as practicable after the last freeze of the season. If any other circumstances require an extension to the schedule, an amendment to the plan will be requested of EID pursuant to HWMR-5, Pt. VI, sec. 265.112(c).

5.1.10 Closure Certification

An independent registered professional engineer and the owner/operator of the facility shall witness the closure and ensure that the closure follows this plan. Upon completion of closure, the engineer and the DOE shall prepare a letter certifying that the area has been closed in accordance with this plan. The letter shall be dated and signed by each party and stamped by the registered engineer, and the original copy submitted by the DOE to the Director of the NMEID. One copy shall be maintained at the DOE offices and one copy maintained by the HSE-8 Regulatory Compliance Section.

5.2 POST-CLOSURE PLAN

A post-closure plan is not required for land disposal units when clean closure can be demonstrated. All data documenting that the closure can be considered clean will be available for inspection.

5.3 NOTIFICATION IN DEED TO PROPERTY

The Laboratory will submit notice to the Los Alamos County Register of Deeds Office of the Los Alamos County Clerk, 2300 Trinity Drive, Los Alamos, NM 87544, in accordance with HWMR-5, Pt. VI, sec. 265.119 and a notation of deed in accordance with HWMR-5, Pt. VI, sec. 265.120.

5.4 QUALITY ASSURANCE/QUALITY CONTROL

The Permittee shall designate a qualified individual or individuals to independently oversee the closure activities and report directly to senior management on the quality of the performance of this closure. This individual will personally observe a portion of the key activities, assure that sample blanks are used and analyzed and review the analysis reports for accuracy and adequacy. A written QA/QC plan shall be prepared and followed, with variations from the plan documented and explained. The designated individual shall prepare a written statement for the final report commenting on the adequacy of the analysis showing decontamination.

5.5 FINAL CLOSURE REPORT

Upon completion of the closure activities, the Laboratory shall submit a Final Closure Report to the Director. The report shall document the final closure and contain, at a minimum, the following:

- A. The certification described in paragraph 5.1.10.
- B. A tabular summary of all sampling results, showing:
 1. The datum reported,
 2. Detection limit for each datum,
 3. A measure of analytical precision (e.g. uncertainty, range, variance),
 4. Identification of analytical procedure, and
 5. Identification of analytical laboratory.
- C. A QA/QC statement on the adequacy of the analyses and

- the decontamination demonstration.
- D. The location of the file of supporting documentation:
 - 1. Field logbooks,
 - 2. Laboratory sample analysis reports
 - 3. The QA/QC documentation, and
 - 4. Chain of custody records.
 - E. Disposal location of all regulated and nonregulated residues.
 - F. A certification of accuracy of the report

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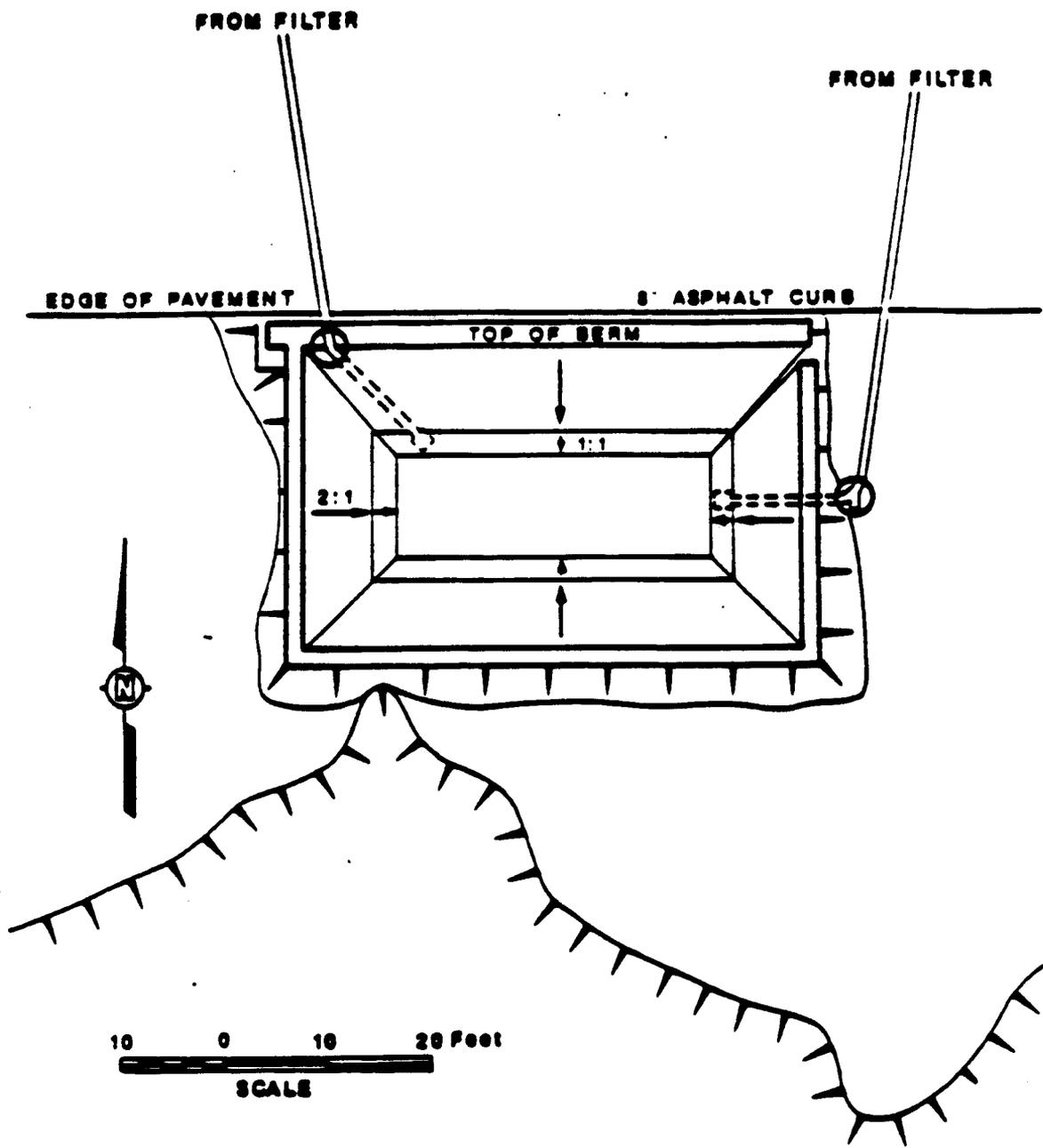


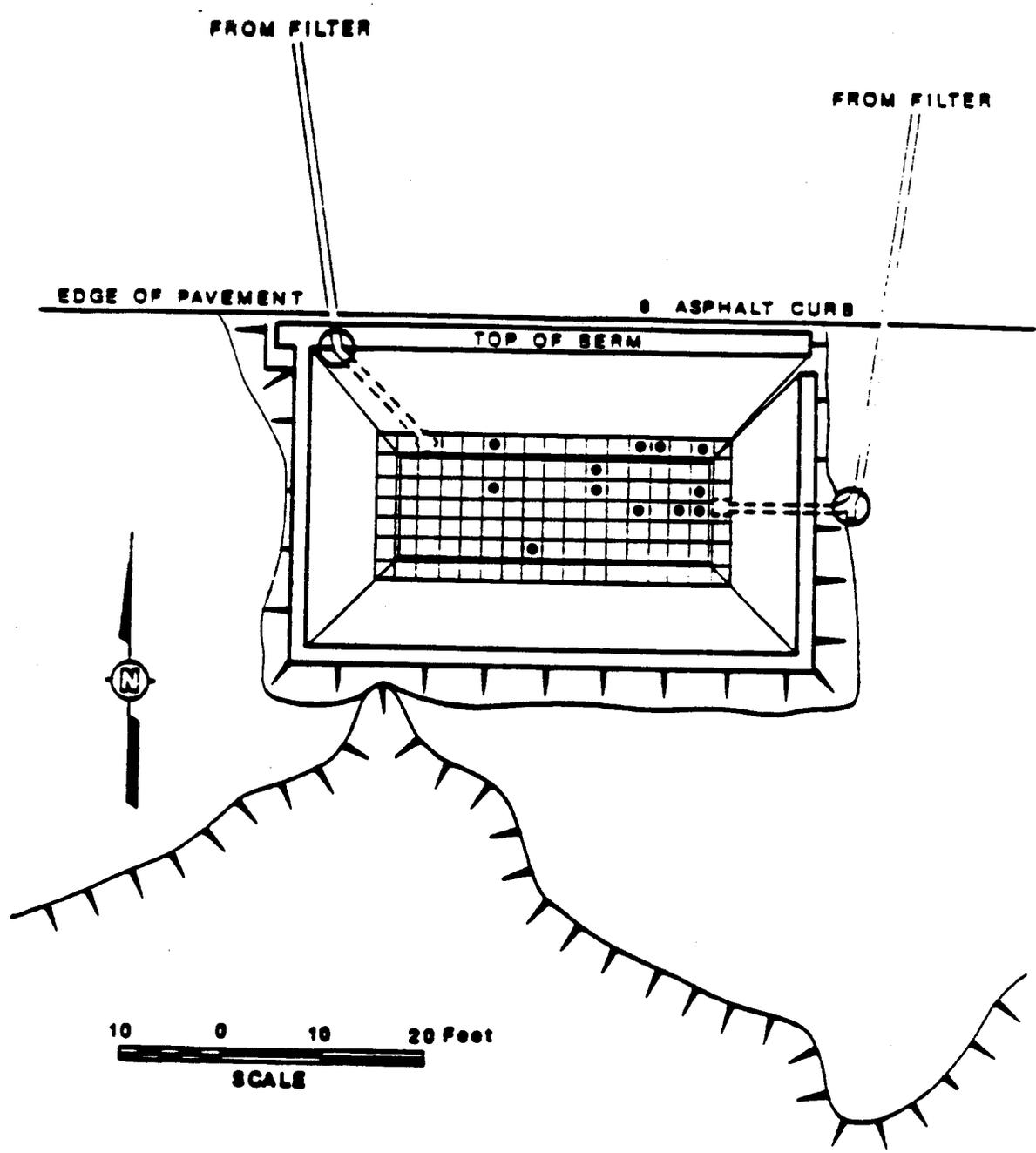
FIGURE 2-1

TA-16
SURFACE IMPOUNDMENT

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LOS ALAMOS, NEW MEXICO



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• SOIL SAMPLING LOCATIONS

FIGURE 5-1B

TA-16 ADDITIONAL
SOIL SAMPLING LOCATIONS

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LOS ALAMOS, NEW MEXICO

TABLE 5-3
ANALYTICAL PARAMETERS AND METHODS FOR SOIL
SAMPLES COLLECTED AT THE TA-16 SURFACE IMPOUNDMENT

<u>EPA Hazardous Waste Number</u>	<u>Metals</u>	<u>EP Toxic Regulated Concentrations</u>	<u>EPA Analytical Method</u>
D004	Arsenic	5.0 mg/l	6010
D005	Barium	100.00	6010
D006	Cadmium	1.0	6010
D007	Chromium	5.0	6010
D008	Lead	5.0	6010
D009	Mercury	0.2	7470 or 7471
D010	Selenium	1.0	6010
D011	Silver	5.0	6010
--	Nickel	-	6010

Organic Scan

GC/MS for volatiles	8240
GC/MS for base/neutral extractables	8270
GC/MS for acid extractables	8270
GC or GC/MS for nitroaromatics	8090 or 8270

¹Analytical methods are taken from Test Methods for Evaluating Solid Waste, EPA SW 846, and may be superseded by more current or alternate methods from SW 846.