TA-50

Department of Energy
National Nuclear Security Administration
Los Alamos Site Office
Los Alamos, New Mexico 87544

AUG 2 5 2003

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Hazardous Waste Bureau

Carl Will, RCRA Permits Management Program
Hazardous & Radioactive Materials Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303

Dear Mr. Will:

Subject: Closure Procedure for the Exhaust System at Technical Area 50, Building 37 (TA-50-37) Los Alamos National Laboratory (LANL)

The purpose of this letter is to outline the closure procedure for the Resource Conservation and Recovery Act (RCRA) closure of the exhaust stack system located at TA-50-37. This exhaust equipment consists of an exhaust stack, ductwork, plenum, fans, and a high efficiency particulate air (HEPA) filter bank that were originally part of the Controlled Air Incinerator (CAI) at TA-50-37 and were addressed in its closure plan. The CAI was certified closed in 1998; however, the exhaust equipment was left intact, with the New Mexico Environment Department's (NMED) approval, for use in the Radioactive Materials Research, Operations, and Demonstration (RAMROD) Facility. The RAMROD Facility was proposed as a Hazardous Waste Facility Permit Modification in December 1996 and withdrawn February 1998.

CAI CLOSURE PLAN

The Closure Plan for the CAI is located in Attachment E.4 of the Hazardous Waste Facility Permit, approved on November 8, 1989 and was amended July 1, 1996 prior to the commencement of the closure proceedings at the CAI (Enclosure 1). Section E.4.3.2 of the closure plan states that components of the CAI may be "reused or disposed of as waste" after closure. The U.S. Department of Energy/University of California (DOE/UC) will utilize the exhaust equipment for non-RCRA activities after closure. RCRA closure will follow the approved CAI closure plan in accordance with 40 CFR 264.112(e) which states:

"Nothing in this section shall preclude the owner or operator from removing hazardous wastes and decontaminating or dismantling equipment in accordance with the approved partial or final closure plan at any time before or after notification of partial or final closure."

CAI CLOSURE CERTIFICATION REPORT

The CAI Closure Certification Report was submitted April 22, 1998. Section 1.3.3 states that during characterization, three exhaust stack samples were collected. One of these samples, the one collected from the top portion of the exhaust stack, indicated an arsenic level of 0.34 parts per billion (ppb). No other hazardous waste constituents were detected. Section 1.3.3 also indicates that the HEPA filters and plenums were decontaminated and disposed of in accordance with the CAI Closure Plan.

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CLOSURE PROCEDURES

Given the above information, this letter presents DOE/UC's intent to close the exhaust equipment at TA-50-37 in accordance with the original CAI Closure Plan as follows:

1. Sampling locations were identified in compliance with Section E.4.4 of the CAI Closure Plan during a walk-through of TA-50-37 on January 21, 2003. The site walk consisted of Mr. Steve Jetter and three members of LANL's Solid Waste Regulatory Compliance Group (RRES-SWRC); Loren Abercrombie, Jack Ellvinger, and Jeff Carmichael. The sample locations determined to be appropriate are identified in Enclosure 2. They include five discrete locations; two from the HEPA filtration bank, two from the exhaust ductwork, and one where the exhaust ductwork enters the bag house. All of these locations will be sampled, provided the locations can be reached with sampling equipment.
2. Swipe samples will be collected from the locations described above and analyzed for the constituents listed in Table E.4-2 of the CAI Closure Plan. The constituents included in Table E.2-4 were chosen for the reasons described in Section E.4.4.
3. An alternate demonstration of closure as described in Section E.4.5 of the CAI Closure Plan may include one of the following:
   - Detectable hazardous waste or hazardous waste constituent concentrations from container storage activities that do not significantly decrease after several wash downs will be allowed to remain if they pose an acceptable risk, as mutually agreed upon with the NMED.
   - Analytical results will be compared to the United States Environmental Protection Agency's Region 6 Medium Specific Screening Levels (MSSL) for tap water. If the result is below the MSSL, closure will be considered complete.
   - If residual contamination levels found in the exhaust equipment are above the MSSLs, an assessment will be conducted using an occupational risk based scenario.

If you have any comments or questions regarding the information presented in this letter and/or in the enclosures, please contact either Gene Turner, DOE, at (505) 667-5794 or Jack Ellvinger, UC, at (505) 667-0633.

Sincerely,

Joseph C. Vozella
Assistant Manager
Office of Facility Operations

OFO:1GT-019

Enclosure

cc:
See Page 3

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ENCLOSURE 1

CAI AMENDED CLOSURE PLAN

AMENDED
CLOSURE PLAN

ATTACHMENT E.4
DISMANTLEMENT REVISION

AMENDED CLOSURE PLAN
PERMIT ATTACHMENT E.4.
DISMANTLEMENT REVISION
NM 0890010515-1

E.4 Chemical Waste Incinerator

The chemical waste incinerator [Controlled Air Incinerator (CAI)] is located in Building 37 at Technical Area 50 (Figure E.4.1) of the Los Alamos National Laboratory (LANL). The original CAI was installed in 1977 and first operated in 1978. The CAI and associated systems were originally research and development (R&D) tools used to prove the viability of incineration as a treatment method for TRU waste. R&D testing ceased in 1987 so that modifications (upgrades) to the system, identified during the initial phase of operation, could be performed. RCRA trial burns were conducted just prior to the cessation of R&D activities. Between 1978 and 1987 a total of 36 campaigns had been completed at the CAI.

LANL received its Hazardous Waste Facility Permit on November 8, 1989 and activities after that date have been in accordance with its permit. Hazardous wastes currently in storage at LANL pursuant to LANL's Hazardous Waste Facility Permit are being managed through shipment off site for treatment and disposal.

The CAI is rated at a nominal 45 kilograms per hour waste feed throughput. The CAI is currently authorized to incinerate Toxic Substance Control Act (TSCA) regulated waste and permitted to incinerate Resource Conservation and Recovery Act (RCRA) regulated waste.

The incinerator was upgraded prior to permit issuance in November 1989 to add liquid waste tanks, solid waste feed preparation lines, a gravity ash removal system, a high-efficiency off-gas cleanup system, and backup utility systems. The combustion chamber was modified to permit effective incineration of waste in solid, liquid, slurry, or gaseous form. Particular attention continues to be given to engineering for proper containment of radioactivity.

CAI system modifications and upgrades since permit issuance were intended to replace equipment due to normal wear or to upgrade existing equipment for routine operations. Upgrades focused on increased component life, increased corrosion resistance, and improved electronics. Modifications for these changes to the CAI were submitted on June 1995 to NMED for its review and approval.

A review of the feed summary data for the CAI indicates that between May 1978 and March 1987, a total of 36 campaigns had been

completed. The feed summary data indicate that the CAI was not used to burn listed wastes. Characteristic waste was included in Run 23. Run 23, March 1987 included ignitable (D001) waste scintillation fluids absorbed by corn cob fractions. The scintillation fluids meet the definition of characteristic as defined at 40 CFR 261 Subpart C *Identification of Characteristic Waste*. The CAI campaigns included equipment checks, treatability studies, efficiency studies, incineration of PCB contaminated materials under TSCA, a RCRA trial burn, and burns of transuranic (TRU) wastes. Eight of the 36 CAI campaigns involved radioactive components. A comprehensive feed summary is provided in Appendix 1.

This closure plan is limited to CAI components to demonstrate closure. This closure plan does not include the building utilities, the building structure, or the waste storage areas located within TA-50, Building 37. Closure activities will be conducted concurrent with the dismantlement and removal of the CAI from the site. During RCRA and TSCA closure, CAI components (i.e., combustion chambers, exhaust ducts, quenching tower, absorption tower, high efficiency particulate air [HEPA] filters, carbon bed adsorber, exhaust stack, ash removal system, liquid waste feed system, and gloveboxes) will be sampled and surveyed to identify the presence of radiological and hazardous contamination. Decontamination activities will be conducted to support reuse and reclamation to the extent practicable. Materials that cannot be reused or reclaimed and wastes generated from decontamination will be characterized using sample results and waste analysis. The refractory used in the incinerator contains chromium, a characteristic hazardous waste for toxicity. The incinerator refractory, if disposed, will be sampled and managed in accordance with the results of sampling and survey analysis. If the waste is determined to contain hazardous constituents it will be disposed of in a RCRA permitted treatment, storage, or disposal facility (TSDF).

E.4.1 Estimate of Maximum Waste in Storage and Treatment

No hazardous wastes are currently in storage for treatment at the CAI. Therefore, the CAI will have no inventory of hazardous waste at the time of closure.

E.4.2 Description of Waste Handled

The CAI and the exhaust gas treatment systems are capable of combusting a variety of wastes, including RCRA-regulated hazardous waste, mixed waste, TSCA-regulated PCB waste, low-level radioactive waste, and TRU waste. The hazardous and mixed waste feeds initially intended for treatment at the CAI included a mixture of

liquid and solid hazardous wastes composed of various organic solvents and liquids, as well as chemically-contaminated paper, wood, and plastics. As stated earlier in this plan, these hazardous waste streams are being treated at off-site commercial facilities. Mixed wastes are planned to be treated on-site in other units or at other alternative commercial and internal facilities with capacity to treat and dispose of mixed wastes. The CAI was permitted to burn all HWMR-5, Part II, Appendix VIII constituents with an incinerability ranking equal to or better than carbon tetrachloride (for the CAI, the incinerability ranking is based on organics with a heat capacity greater than carbon tetrachloride).

A review of feed summary data indicates that the CAI was not used to burn any RCRA-regulated wastes that contain HWMR-5, Part II, Appendix VIII constituents. However, as stated previously, Run 23 contained waste scintillation fluids that meet the definition of characteristic waste. Appendix 1 summarizes the feed summary data, the run date, feed description, and basis for regulatory status of the feed material.

E.4.3 Closure Procedure

LANL will conduct RCRA closure of the CAI based on the documentation that no RCRA-regulated listed wastes were treated in the unit and that the ignitable characteristics of Run 23 were treated through incineration as specified at 40 CFR Part 268 Appendix VI. To ensure that closure of the CAI is protective of both human health and the environment, LANL will conduct sampling of the CAI, as described in Section E.4.4 of this closure plan, to verify that no HWMR-5, Part II, Appendix VIII hazardous constituents are present.

Radiological surveys will also be conducted to ensure that the requirements of U.S. Department of Energy (DOE) Orders 5400.5 "Radiation Protection of the Public and the Environment" and 5820.2A "Radioactive Waste Management" are met. TSCA closure activities of the CAI will be conducted concurrent with dismantlement, removal, and RCRA closure.

E.4.3.1 Partial Closure

Partial RCRA closure of the CAI is not being pursued. The CAI is to be closed as a RCRA unit including, but not limited to, the combustion chambers, all waste feed, exhaust, filter, and residue management components.

E.4.3.2 Final Closure

This section describes closure of the CAI. At the beginning of closure, the CAI will be surveyed for radioactive contamination to determine radiological boundaries and personal protective equipment (PPE) requirements. Once radiological boundaries are established, swipe samples will be taken and analyzed to verify the absence of hazardous constituent contamination. Verification will consist of sampling the principal CAI components throughout the system that have been in contact with material feeds, residues, or secondary wastes. If RCRA hazardous contamination is found, components amenable to decontamination will be cleaned with detergent solution and/or steam cleaning. The spent cleaning solution will be collected and analyzed for hazardous constituents. If no constituents are detected statistically above background, these components will be deemed decontaminated and can then be reused or disposed of as waste. If components are not amenable to decontamination, they will be managed as newly generated hazardous, toxic, or mixed waste, as indicated through waste analysis, in accordance with Laboratory procedure. All radioactive components will be decontaminated to the extent practicable and disposed of according to appropriate DOE Orders. Sampling procedures are described below in Section E.4.8 of this closure plan. Samples will be analyzed for the hazardous constituents listed in Table E.4-2.

Analytical results will be used to verify the absence of hazardous constituents in the CAI components or qualify the regulatory status of CAI waste. These analytical results along with the documentation of CAI closure activities will be used to validate

E.4.3.3 Amendment of the Closure Plan

If it is necessary to amend this closure plan, LANL will submit a written notification of, or request for, a permit modification describing any change in operation or unit design that could affect the closure plan. The written notification or request will include a copy of the amended closure plan for approval by the NMED. LANL will submit a written notification of, or a request for, a permit modification to authorize a change in the approved plan if either of the following occur:

1. There are changes in operating plans, unit design, or waste types treated that affect the closure plan

2. Unexpected events occur during closure that require modification of the approved closure plan

LANL will submit a written request for a permit modification with a copy of the amended closure plan no later than 60 days after an

occurrence of an unexpected event that affects the closure plan. If the unexpected event occurs during closure, the permit modification will be requested within 30 days of the occurrence. If the Secretary of the NMED requests a modification of the closure plan during closure, a closure plan modified in accordance with the request will be submitted within 30 days of notification.

E.4.4 Verification of No Contamination

Sampling for verification will be based on a biased sampling plan. Sample locations will be determined using engineering judgement and knowledge of the CAI system layout and past operation to obtain samples from principal treatment components with the highest likelihood for contamination (Figure E.4-5). Additionally, a minimum of one sample will be collected from an area with a low probability of contamination as a check on the biased sampling location data. This should provide a conservative data base from which a determination that RCRA constituents are absent can be made.

Multiple samples from selected locations will be acquired to provide adequate statistical data control. The samples to be collected from each location, as well as the specific location and sampling method, will be specified in the QA/QC plan. Initial sampling locations are listed below:

- Solid Waste feed — Sampling of the solid waste feed glovebox
- Liquid waste feed — Sampling of the liquid waste feed tanks
- Quenching tower — Sampling of the quenching tower
- Adsorption tower — Sampling of the adsorption tower
- HEPA filters — Sampling of the outlet from the HEPA filter back
- Activated carbon adsorber — Sampling of the inside housing of the activated adsorber
- Exhaust stack — Sampling of the inside of the exhaust stack

- Ash Removal System — Sampling of the gravity ash dropout hopper
- Combustion Chamber — Sampling of the combustion chamber

The constituents listed in Table E.4-2 include regulated constituents which were expected to be treated in the unit. A scan for volatile and semivolatile organics will be performed to ensure that solvents commonly used at LANL have not contaminated the unit. Two field blanks will be prepared and analyzed for the constituents listed in Table E.4-2. Analytical results from field blanks and control samples of the solid waste feed glovebox will provide background data for verification of the absence of contamination. The glovebox was chosen as a control location because the component has never been used for managing wastes. Analytical procedures will conform to U.S. EPA SW-846 methods. CAI components will be considered to be contaminated if verification samples show a statistically significant increase in the listed constituents over the field blank and control samples.

LANL will carefully review all operational and sampling analytical data to provide for a determination of whether there has been a release external to the incinerator. If a release has occurred, the appropriate decontamination and verification sampling will be done by LANL. Such sampling would include the structures within the building, building floors, etc., plus environmental media (e.g. soils) if it should be so indicated. All sampling and analysis plans, which are not addressed procedurally in this Closure Plan, are subject to the approval of NMED.

Absence of hazardous contamination will be verified if:

1. No hazardous constituents are detected in samples from the CAI locations, or
2. Hazardous constituents detected in samples from the CAI locations are equal to or less than, at the 0.01 confidence level, their concentration in the unused wash water field blank or background sample.

E.4.5 Verification of Decontamination

Sampling will be used to verify the success of decontamination activities used during CAI closure. Before decontaminating a CAI component, two samples will be taken of the clean wash solution and analyzed for the constituents listed in Table E.4-2 of this attachment. These analytical results will provide background data for decontamination verification.

Dirty wash-down solutions will be analyzed for the constituents listed in Table E.4-2. Analytical procedures will conform to the methods found in SW-846. Components will be considered contaminated if the dirty wash solutions show a significant increase in the listed constituents over the clean wash solution.

Successful decontamination for each component is defined as one of the following:

1. No detectable hazardous constituents in the final sample.

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 wash water or background sample.

An alternative demonstration of decontamination may be proposed and justified at the time of closure as circumstances indicate. The Secretary will evaluate the proposed alternative in accordance with the standards and guidance in effect and, if approved, incorporate, by permit modification, the alternative into the closure plan.

E.4.6 Closure Schedule

Closure activities will be conducted in accordance with an approved closure plan. The year of closure for the CAI is estimated to be 1996. The closure schedule is provided in Table E.4-1. Federal Acquisition Regulations require competitive procurement in obtaining contract support for this type of effort, therefore contracts will be secured before closure begins. The closure activities described in this plan are estimated to take 250 days.

In the event that closure or closure activities cannot be completed at the CAI within 250 days of notification of closure to the New Mexico Environment Department (NMED), LANL will notify the Secretary of the NMED in accordance with extension requirements.

E.4.7 Closure Certification

An independent registered professional engineer and the Permittee or his representative 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 facility has been closed in accordance with this plan. The letter shall be dated and signed by each party, stamped by the registered professional engineer, and the original copy submitted by the DOE to the Secretary of NMED. One copy shall be maintained at the DOE office and one copy maintained by LANL.

E.4.8 Sampling and Analytical Procedures

This section describes the procedures and methods used for sampling and analysis. While the procedures and methods are specific, any applicable procedure or method given in the current update of *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (SW-846) may be used if conditions or experience shows the alternate method to be more appropriate. All analytical procedures actually used will be annotated in the final closure report.

Samples will be taken, placed in bottles, sealed, tagged, and immediately packed in vermiculite, sawdust, or, if refrigeration is required, an insulated container with ice. Sample containers appropriate for the requested analyses will be used for all samples. Requirements for sample containers, preservation, and holding times are summarized in Tables E.4-3 and E.4-4. Disposable sampling equipment may be used.

Personal protective clothing and respirator protection will be worn at all times as identified by LANL's Industrial Hygiene and Safety Group and in the approved Radiological Work Permit. Sampling activities will be conducted in a manner to ensure that worker exposure levels are maintained as low as reasonably achievable (ALARA).

E.4.8.1 Analytical Procedures

All sample analyses will be conducted using methods prescribed in the current update of SW-846, including those for quality assurance/quality control (QA/QC). Target detection limits, analytical methods, and instrumentation for metals, organics, and miscellaneous analyses are listed in Tables E.4-5, E.4-6, and E.4-7.

E.4.8.2 Field and Laboratory Quality Assurance Quality Control

QC activities will include collection of the following samples: trip blanks, duplicate or split samples, field blanks, and equipment rinsate blanks. QC samples are described in this section and summarized in Table E.4-8. QC samples will be analyzed for the same parameters as the verification samples (Table E.4-1). QC samples will be assigned unique identification numbers (similar to verification sample numbers) that do not indicate to the laboratory that the samples are for QA/QC purposes.

A trip blank will be prepared whenever samples are collected for volatile organic compounds analysis. The trip blank is a sample container filled with organic-free deionized water. The filled container is taken to the sampling site in the cooler or sample

carrier, remains unopened, and is shipped to the analytical laboratory along with the samples. One trip blank will be included per cooler or sample carrier.

One sample for every ten samples will be either duplicated or split. The duplicated or split sample will be identified by a code so that its source is not available to the analytical laboratory, but analytical results can be compared to its twin.

Blank samples collected will include field blanks and equipment rinsate blanks. A field blank is a sample collected to assess the ambient conditions at the sampling site. The field blank for verification of no contamination is a swipe prepared in the laboratory that will be opened to the ambient conditions of the site, removed with sampling tongs, and replaced into the sampling container. A field blank for decontamination verification is a sample of organic-free deionized water poured into a sample container under normal sampling conditions. Frequency of blank samples will be 1 in 20 samples. If fewer than 20 samples are collected, at least one blank sample will be collected. An equipment rinsate blank is collected to assess the cleanliness of the sampling equipment. The sampling equipment is cleaned according to the procedures described below in Section E.4.8.3, then organic-free deionized water is poured over the decontaminated equipment's sampling surface and collected in a sample container.

Instrument calibration and maintenance are field activities subject to QC procedures. Field equipment requiring calibration will be calibrated and maintained using the manufacturer's instructions and appropriate standard operating procedures.

LANL will ensure that the on-site or contract analytical laboratory operates under a quality assurance program plan (QAPP) which meets the requirements in the current update of SW-846. QC procedures in the analytical laboratory are guided by their QAPP. In order to assess the quality of the analytical data, the analytical laboratory is required to run QC samples to establish accuracy and precision. Laboratory QC procedures are summarized in Table E.4-9.

E.4.8.3 Cleaning of Sampling Equipment

To prevent cross-contamination of samples, sampling equipment will be cleaned prior to each use with a warm soap solution, rinsed several times with tap water, rinsed with distilled water, drained of excess water, and air-dried or wiped. A disposable sampler may be presumed clean if still in a factory sealed wrapper.

E.4.8.4 Refractory Sampling

All collectable treatment residues have been removed from the CAI and therefore the only sampling of solids will be of the refractory lining in the combustion chamber. The refractory lining is a porous material that is imbedded with ash and is not amenable for removal using incinerator operating procedures. A representative sample of the refractory material will be obtained as follows:

1. Use a clean brush to scrub small, equal portions of material from the surface of the refractory lining at several locations along the bottom of the chamber.

2. Combine the material in the container until the gram volume of sample required for the analysis is obtained.

3. Cap the sample container and attach a label and seal.

4. Record sampling information in the field log book as described in Section E.4.8.

5. Complete the sample analysis request form and chain-of-custody record.

E.4.8.5 Swipe Sampling

Swipe samples will be taken to identify hazardous constituent contamination on CAI components. Samples will be collected by swiping areas of components identified in Section E.4.4 that have the greatest likelihood for contamination (e.g., stains, seams, basins). Swipe samples will be conducted as follows:

1. Use a standardized template [10 centimeters (cm) x 10 cm] to delineate the area of sampling.

2. Use a gauze pad or glass wool of known size and weight, saturated with the appropriate solvent (e.g., organic-free deionized water, hexane, acetone) for the swiping medium. The gauze, or glass wool, will be prepared in the laboratory with the analyte designation noted on the label prior to entry to the field.

3. Store the swiping medium in sealed glass vials until it is used for the swipe test.

4. Perform the swipe very quickly after air exposure to avoid losing the solvent medium.

5. Place swipes into sample containers immediately upon completion of the swipe.

6. Close, label, and seal the sample container to ensure the integrity of the sample.

7. Record sampling information in the field log book as described in Section E.4.9.

8. Complete a LANL sample analysis request form and a chain-of-custody record for each sample.

E.4.8.6 Liquid Sampling

To determine whether CAI components have been successfully decontaminated, wash water used in the decontamination process will be sampled to identify the presence or absence of contamination. Waste water generated from such decontamination activities will be managed in accordance with applicable regulations. Wash water solutions will be sampled before use to determine background parameters; dirty wash water used in cleaning components will also be sampled in order to identify any hazardous constituent contamination. Samples will be collected by spraying wash solution onto areas of the components identified in Section E.4.8 that have the greatest likelihood for contamination (e.g., bends, horizontal surfaces, seams, basins). Brushes may be used to help dislodge particulate and laminated residues from the surfaces of the sampling area. Washed areas will be rinsed and all waters collected using vacuum or manual pumps. The volume of wash water collected will be recorded in the log book. Wash waters will be transferred to sampling containers using glass tubes to obtain representative samples as follows:

1. Spray wash solution onto areas of the sampling location that have the greatest likelihood for contamination (e.g., bends, horizontal surfaces, seams, basins, etc.).

2. If areas of slag, ash, or lacquer remain after spraying, use a sampling brush to dislodge the material.

3. Use vacuum or pump to collect washwaters from the sampling location. Use caution not to allow washwaters to migrate from the sampling area.

4. Ensure that sampling equipment is present (glass tube with stopper, sample container, laboratory wipe, pen, etc.). Ensure that the stopper provides a tight closure.

5. Slowly lower the glass tube into the liquid at a rate that permits the levels of the liquid inside and outside the glass tube to be about the same. If the level of the liquid in the glass tube is lower than that outside the glass tube, the sampling rate is too fast and will result in a nonrepresentative sample.

6. When the glass tube hits the bottom of the liquid container, push the stopper in to close the glass tube.

7. Slowly withdraw the glass tube from the container with one hand while wiping the glass tube with a disposable cloth with the other hand.

8. Carefully discharge the sample into a sample container by slowly opening the glass tube. This is done by slowly pulling the stopper from the glass tube while the lower end of the sampler is positioned in the sample container.

9. Cap the sample container and attach a label and seal.

10. Record sampling information in the field log book as described in Section E.4.9.

11. Complete the sample analysis request form and chain-of-custody record.

E.4.9 Sample Handling and Documentation

Samples will be analyzed either at LANL or at a commercial laboratory. In either case, each sample will be labeled, sealed, and accompanied by a chain-of-custody and a sample analysis request form.

The sample container will be sealed with a gummed paper seal attached to the container in such a way that the seal will be broken in order to open the container. The seal and sample label will be completed with a waterproof pen. An example of a sample seal is shown in Figure E.4.2.

The sample label is necessary to prevent misidentification of samples and shall include, if applicable, the sample location number referenced to CAI components. The site information will include information necessary to identify the area sampled within the component specified (e.g., sump basin of the quenching tower). An example of a sample label is shown in Figure E.4.3.

The chain-of-custody record is necessary to trace sample possession from the time of collection and will accompany every sample. This

chain-of-custody record consists of two pages with the original accompanying the shipment and the copy retained by LANL. An example of this form is shown in Figure E.4.4.

A separate closure sampling log book will be kept and will contain all information pertinent to closure surveys and sampling. The log book shall have bound and consecutively numbered pages in an 8-1/2 by 11-inch format.

Minimum entries shall include:

a. Purpose of sample (closure sampling)

b. Location of sampling (component name and location)

c. Name and address of person making log entry

d. Type of sampling process

e. Number and volume of sample

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, United Parcel Service, etc.)

i. Diagram or photograph of the sampling location, if any

j. Field observations (radiological status, break in utility service, etc.)

k. Field measurements, if any (pH, flammability, conductivity, explosivity, etc)

l. Collector's sample identification number(s)

m. Signature of person responsible for the log entry

Sampling situations vary widely. No specific rule can be given as to the extent of information that will be entered in the log book. Sufficient information will be recorded so that the sampling situation can be reconstructed without relying on the collector's memory.

The sample shipment and chain-of-custody record is accompanied by a sample analysis request form. The sample analysis request form

has two portions: field and laboratory. The field portion of this form will be completed by the person collecting the sample and include most of the pertinent information noted in the log book. The laboratory portion will be completed by the laboratory personnel when the sample is received.

E.4.10 Quality Assurance/Quality Control

The Permittee shall designate a qualified individual or individuals to independently oversee the closure activities and report directly to LANL management on the quality of the performance of this closure. This individual will personally observe a portion of the key activities, ensure that sample blanks are obtained, and review the analytical reports for accuracy and adequacy. A written QA/QC plan in accordance with SW-846 guidance shall be prepared and followed, with variations from the QA/QC plan documented and explained. The designated individual shall prepare a written statement for the final closure report commenting on the adequacy of the analysis verifying closure.

E.4.11 Final Closure Report

Upon completion of the closure activities, the Permittee shall submit a final closure report certified by a New Mexico independent reegistered professional engineer to the Secretary of NMED. The report shall document the final closure and contain, at a minimum, the following:

a. The certification described in paragraph E.4.6

b. Any variance from the approved activities and the reason for the variance

c. A tabular summary of all sampling results (including QC sample results), showing:

   1. Sample identification
   2. Sampling location
   3. The datum reported
   4. Detection limit for each datum
   5. A measure of analytical precision (e.g. uncertainty, range, variance)
   6. Identification of analytical procedure
   7. Identification of analytical laboratory

d. A QA/QC statement on the adequacy of the analyses and the decontamination determination

e. The location of the file of supporting documentation:

1. Log books
2. Laboratory sample analysis reports
3. The QA/QC documentation
4. Chain of custody records

f. Disposal location of all regulated and nonregulated residues

g. A certification of accuracy of the report

TABLE E.4-1

Closure Schedule
Controlled Air Incinerator[a]

Activity	Maximum Time Required[b]
Preclosure Let contract request for proposals	-70
Receive proposals	-40
Select contractor and award contract	-10
Closure Begin closure activities	Day 0
Survey CAI external components, associated external subsystems, for radiological contamination	Day 30
Obtain samples for RCRA hazardous waste constituents and submit for analysis	Day 75
Receive sample analysis	Day 105
Obtain additional samples (if necessary)	Day 135
Receive sample analysis (if necessary)	Day 180
Obtain certification of closure	Day 240
Submit final closure report to NMED	Day 250

[a]Assumes RCRA closure; no incineration of RCRA hazardous wastes or hazardous constituents; and sample
and analysis of the CAI and associated external subsystems.
[b]The schedule above indicated calendar days from the beginning of closure by which activities will be completed.
Some activities may be conducted simultaneously.

TABLE E.4-2

Analytical Parameters for CAI

Concentration of Metals	Organics	Other
Arsenic Barium Beryllium Cadmium Chromium Lead Mercury Nickel Selenium Silver Thallium	Halogenated volatile organics Nonhalogenated volatile organics Acid-extractable semivolatile organics Base-neutral extractable semivolatile organics	Cyanides Ignitability Corrosivity/pH

Metals will be analyzed for total content.

Any metal whose total concentration nears, equals, or exceeds the standard for the Toxicity Characteristic Leaching Procedure (TCLP) will be analyzed using TCLP methods. All data will be provided in the final closure report.

Analytical methods will follow those provided in "Test Methods for Evaluating Solid Waste," U.S. Environmental Protection Agency (EPA) SW-846, and may be superseded by more current methods from SW-846 or alternate EPA-approved methods.

TABLE E.4-3

Sample Containers, Preservation, and Holding Times for Liquid Samples

Analyte Group	Container	Preservative	Holding Time
Target compound volatile organics	2 x 40 ml G[e] septa vials	HCl[b], Cool 4°C	14 days from field collection to determinative analysis
Target compound semivolatile organics	2 x 1 liter AG[a] (teflon lined caps)	Cool 4°C[1]	7 days from field collection to preparative extraction 40 days from preparative extraction to determinative analysis
Target analyte metals (except mercury)	1 liter P[c] or G[e]	HNO_3[d] to pH < 2	180 days from field collection to determinative analysis
Mercury	1 liter P[c] or G[e]	HNO_3 to pH < 2 Cool 4°C	28 days from field collection to determinative analysis
Cyanides	P[c] or G[e]	NaOH[f] to pH ≥ 12 Cool 4°C[2,3]	14 days from field collection to sample preparation
Corrosivity/pH	1 liter P[c] or G[e]	N/A	As soon as possible for pH
Ignitability	1 liter P[c] or G[e]	N/A	

[a]AG - Amber glass
[b]HCl - Hydrochloric acid (if no residual chlorine is present, adjust the pH < 2 with HCl, H_2SO_4 or $NaHSO_4$, if residual chlorine is present, add sodium thiosulfate (4 drops of 10 percent solution)).
[c]P - Polyethylene
[d]HNO_3 - Nitric acid
[e]G - Glass
[f]NaOH - Sodium hydroxide, 50 percent

[1]If residual chlorine is present, add 3 ml of 10 percent sodium thiosulfate per gallon.
[2]Determination of presence of oxidizing agents and treatment thereof to be performed as per SW-846 Method 9010A.
[3]Detergents and surfactants, if a problem, can be extracted as described in SW-846 Method 9010A.

Source: SW-846, Update I and Update II

TABLE E.4-4

Sample Containers, Preservation, and Holding Times for Refractory Samples

Analyte Group	Container	Preservative	Holding Time
Target compound volatile organics	8 oz WM[a]-G[b] Septum-sealed	Cool 4°C	14 days from field collection to determinative analysis or TCLP extraction 14 days from TCLP extraction to determinative analysis
Target compound semivolatile organics	2 x 120 ml WM[a]-G[b] Teflon-lined cap	Cool 4°C	14 days from field collection to TCLP extraction 7 days from field collection or TCLP extraction to preparative extraction 40 days from preparative extraction to determinative analysis
Target analyte metals (except mercury)	8 oz WM[a]-G[b] or P[c]	Cool 4°C HNO_3[d]	180 days from field collection to determinative analysis or TCLP extraction 180 days from TCLP extraction to determinative analysis
Mercury	1 liter P[c] or WM[a]-G[b]	HNO_3[d] to pH < 2	28 days from field collection to determinative analysis or TCLP extraction 28 days from TCLP extraction to determinative analysis
Cyanides	G[b] or P[c]	Cool 4°C[1]	14 days from field collection to sample preparation

[a]WM = Wide-mouth
[b]G = Glass
[c]P = Polyethylene
[d]HNO_3 = Nitric acid - Preservative not added until after TCLP extraction. Preservative added to the extract.

[1]Solid may be extracted prior to analysis by SW-846 Method 9013.

Source: SW-846, Update I and Update II

TABLE E.4-5

Target Detection Limits, Analytical Methods, and Instrumentation for Metals Analysis

Analyte	Target Detection[a] Limit (µg/L)	EPA SW-846 Analytical Method	Instrumentation[b]
Arsenic	10	6010A, 7060A	ICP, GFAA
Barium	200	6010A, 7080A, 7081	ICP, FLAA, GFAA
Beryllium	5	6010A, 7090, 7091	ICP, FLAA, GFAA
Cadmium	2	6010A, 7030, 7131A	ICP, FLAA, GFAA
Chromium	10	6010A, 7190, 7191	ICP, FLAA, GFAA
Lead	5	6010A, 7420, 7421	ICP, FLAA, GFAA
Mercury	0.2	7470A	CVAA
Nickel	40	6010A, 7520	ICP, FLAA
Selenium	5	6010A, 7740	ICP, GFAA
Silver	10	6010A, 7760A, 7761	ICP, FLAA, GFAA
Thallium	10	6010A, 7840, 7841	ICP, FLAA, GFAA

[a]Detection limits listed are for drinking water. Actual detection limits may be higher depending on sample composition and matrix type.
[b]ICP - Inductively Coupled Plasma Emission Spectroscopy
GFAA - Graphite Furnace Atomic Absorption Spectroscopy
FLAA - Flame Atomic Absorption Spectroscopy
CVAA - Cold Vapor Atomic Absorption Spectroscopy

TABLE E.4-6

Target Detection Limits[a], Analytical Methods, and Instrumentation for Organics Analysis

Analyte (Group)	Regulatory Limits	EPA SW-846 Analytical Method	Instrumentation[b]
Target Compound List Volatiles + 10 Tentatively Identified Compounds (TICs)	10 µg/L water 10-120 µg/kg solids	8240B, or 8260A	GC/MS
Target Compound List Semivolatiles + 20 TICs	10 µg/L water 330-50,000 µg/kg solids	8250A, or 8270B	GC/MS

[a]Detection limits expressed as practical quantitation limits.
[b]GC/MS = Gas chromatography/mass spectrometry

NOTE: µg/L and mg/L used for liquid samples and TCLP extracts.
µg/kg and mg/kg used for residues.
Use the most appropriate for the magnitude of the number.

TABLE E.4-7

Analytical References
for Miscellaneous Methods

Analyte/Property	EPA SW-846 Analytical Method
Cyanides	9010A
Corrosivity/pH	9040B or 9045C and 1110
Ignitability	1020A or 1010
TCLP[1]	1311

[1]Toxicity Characterization Leaching Procedure is to be utilized for the analysis of refractory samples.

TABLE E.4-8

Summary of Field Quality Control Samples

QC Sample Type	QC Sample Matrix	Applicable Analysis	Frequency	Purpose	Acceptance Criteria	Corrective[a] Action
Trip Blank	Water	Volatiles	One set (2) per shipping cooler containing samples	Monitor possible sample contamination in field	-[b]	Advisory—no action required
Field Blank	Water	Volatiles, Semivolatiles, Metals	One sample per sampling event (can prepare and hold pending sample results)	Monitor field sample contamination/ air contamination	-[b]	Advisory—no action required
Field Duplicate	Refractory/ Water	Volatiles, Semivolatiles, Metals, TCLP	One for every 20 samples or 5 percent minimum	Documents precision of sampling process	Analytical method criteria, if applicable	Advisory—no action required
Equipment Rinsate Blank	Wash water	Volatiles, Semivolatiles, Metals	One sample per day (can prepare and hold pending sample results)	Monitor decontaminatio n effectiveness and sample cross contamination	-[b]	Advisory—no action required

5/23 - never did this b/c never leased sampling equipment

[a]EPA Functional Guidelines for Data Validation may apply.
[b]For volatiles and semivolatiles analysis, if blank shows detectable levels of any common laboratory contaminant (methylene chloride, acetone, 2-butanone, toluene, and/or any phthalate ester), sample must exhibit that contaminant at a level 10 times the quantitation limit to be considered detectable. For all other contaminants, sample must exhibit the contaminant at a level 5 times the quantitation level to be considered detectable.
Source: SW-846, Update I and Update II

National Laboratory
Hazardous Waste Permit
Permittee Copy
Modified June 1996

TABLE E.4-9a

Summary of Laboratory Quality Control Procedures
by Analytical Method

Target Compound Volatile Organics

EPA SW-846 Analytical Method	Quality Control Check	Frequency	Acceptance Criteria	Corrective Action
8240B or 8260A	Instrument performance: mass calibration/ion abundance pattern	Every 12 hours of analysis time or every batch	Per method	Repeat until acceptance criteria satisfied
	Initial calibration: instrument sensitivity and linearity of response	Five concentration levels; after any instrument performance failure; check prior to sample analysis	Meet SPCCs[a] and CCCs[b] criteria per method	Repeat calibration
	Continuing calibration	Every 12 hours of analysis time or every batch	Meet SPCCs and CCCs criteria per method	Determine problem, correct and reanalyze a continuing calibration or recalibrate.
	Internal standards	Added to all calibration standards, field samples, QC[c] samples, and blanks	Extracted ion current profile (EICP)[a]; Δ -50% to +100% Retention time shifts < 0.50 minutes[e]	Correct malfunction; reanalyze sample per method criteria
	Method blank	Every 12 hours of analysis time or every batch	< 5 times quantitation limit for methylene chloride, acetone, 2-butanone; all other compounds ≤ quantitation limit	Determine source of contamination and document corrective action; reanalyze samples
	Matrix spike and matrix spike duplicate	Each analytical batch	Per method	Prepare and analyze QC reference standard per method

TABLE E.4-9a

Summary of Laboratory Quality Control Procedures
by Analytical Method

Target Compound Volatile Organics
(Continued)

EPA SW-846 Analytical Method	Quality Control Check	Frequency	Acceptance Criteria	Corrective Action
8240B or 8260A (Continued)	System monitoring compounds (surrogate compounds)	Every calibration standard, method blank, QC sample, field sample, matrix spike, matrix spike duplicate	Per method and matrix	Check instrument and calculations; reanalyze per method criteria

[a]SPCC = System performance check compounds
[b]CCC = Calibration check compounds
[c]QC = Quality control
[d]EICP = Extracted ion current profile
[e]This criteria applies to the internal standards but is only evaluated for the continuing calibration check.

SOURCE: SW-846, Update I and Update II

TABLE E.4-9b

Summary of Laboratory Quality Control Procedures
by Analytical Method

Target Compound Semivolatile Organics

EPA SW-846 Analytical Method	Quality Control Check	Frequency	Acceptance Criteria	Corrective Action
8250A or 8270B	Instrument performance: mass calibration/ion abundance pattern	Every 12 hours of analysis time or every batch	Per method	Repeat until acceptance criteria satisfied
	Initial calibration: instrument sensitivity and linearity of response	Five concentration levels; after any performance failure; check prior to sample analysis	Meet criteria for SPCCs[a] and CCCs[b] per method	Repeat calibration
	Continuing calibration	Every 12 hours of analysis time or every batch	Meet criteria for SPCCs and CCCs per method	Determine problem, correct and analyze another continuing calibration, or repeat calibration
	Internal standards	Added to all calibration standards, field samples, QC[c] samples, and blanks	EICP[d] Δ -50% to +100% Retention time shifts < 0.50 minutes[e]	Correct malfunction: reanalyze sample per method criteria
	Method blank	Each batch of samples of similar matrix and concentration level, or each extraction batch	< 5 times quantitation limit for phthalate esters; all other compounds ≤ quantitation limit	Determine source of contamination; document corrective action; reextract and reanalyze samples
	Matrix spike and matrix spike duplicate	Each analytical batch	Per method	Prepare and analyze QC reference standard per method

TABLE E.4-9b

Summary of Laboratory Quality Control Procedures
by Analytical Method

Target Compound Semivolatile Organics
(Continued)

EPA SW-846 Analytical Method	Quality Control Check	Frequency	Acceptance Criteria	Corrective Action
8250A or 8270B (Continued)	System monitoring compounds (surrogate compounds)	Each field sample, blank, QC sample, and calibration standard	Matrix specific per method limits	Check instrument and calculations; reextract and reanalyze per method criteria

[a]SPCC = System performance check compounds
[b]CCC = Calibration check compounds
[c]QC = Quality control
[d]EICP = Extracted ion current profile
[e]This criteria applies to the internal standards but is only evaluated for the continuing calibration check.

SOURCE: SW-846, Update I and Update II

TABLE E.4-9c
Summary of Laboratory Quality Control Procedures by Analytical Method

Metals Except Mercury

EPA SW-846 Analytical Method	Quality Control Check	Frequency	Acceptance Criteria	Corrective Action
6010A	Initial Calibration	Daily (3 standards)		
	Calibration Verification	Daily after initial calibration	± 5% of initial	Recalibrate
	Continuing Calibration	Every 10 samples and end of the analytical run	± 10% of expected value	Recalibrate
	Calibration Blank	Every 10 samples, at end of analytical run, and at initial calibration	± 3 SD of mean blank values	Repeat, average result, or recalibrate
	Reagent Blank (also called preparation blank)	One per preparation sample batch	< CRQL[a]	Redigest and reanalyze
	Instrument Check Standard	Every 10 samples	± 10% of expected value	Fluid problem, reanalyze previous samples
	Interference Check Standard	Beginning and end of analytical run	± 20% of true value	Correct problem
	Serial Dilution	One per field batch per matrix	± 10% of original determination	Flag data
	Replicates/Duplicates	One per analytical run	Per method or contract requirements	Flag data
	Matrix Spike	Per method and contract requirements	± 25% of known value	Flag data

TABLE E.4-9c

Summary of Laboratory Quality Control Procedures
by Analytical Method

Metals Except Mercury
(Continued)

EPA SW-846 Analytical Method	Quality Control Check	Frequency	Acceptance Criteria	Corrective Action
6010A (Continued)	Spiked replicate	Per method or contract requirements	± 20% of actual value	Flag data

[a]CRQL = Contract required quantitation limit

SOURCE: SW-846, Update I and Update II

TABLE E.4-9d

Summary of Laboratory Quality Control Procedures
by Analytical Method

Metals

EPA SW-846 Analytical Method	Quality Control Check	Frequency	Acceptance Criteria	Corrective Action
All 7000 and 7000A Methods	Initial Calibration	Daily (3 standards)		
	Calibration Verification	Daily after initial calibration	± 10% of true value	Recalibrate
	Continuing Calibration	Every 10 Samples	± 20% or true value	Recalibrate and reanalyze samples
	Calibration Blanks	Every 10 samples, at end of analytical run, and initial calibration	± 3 SD of mean blank values	Repeat, average, recalibrate if necessary
	Reagent Blank (also called preparation blank)	One per preparation sample batch	< CRQL[a]	Redigest and reanalyze
	Laboratory Control Sample (LCS)	One per analytical batch	± 20% of true value	Correct problem, redigest, and reanalyze all samples from last LCS
	Interference Check Standard	One per analytical batch	± 10% difference between undiluted and 5X diluted per method	Per method
	Matrix Spike	Every analytical batch	Per method	Flag data
	Serial Dilution	One per field batch per matrix	± 10% of original determination	Flag data

TABLE E.4-9d

Summary of Laboratory Quality Control Procedures
by Analytical Method

Metals
(Continued)

EPA SW-846 Analytical Method	Quality Control Check	Frequency	Acceptance Criteria	Corrective Action
All 7000 and 7000A Methods (Continued)	Matrix Spike Duplicate	Every analytical batch	RPD[b] < 20%	Flag data
	Method of Standard Additions	When needed for problem matrices	Per method	Per method

[a]CRQL = Contract required quantitation limit
[b]RPD = Relative percent difference

SOURCE: SW-846, Update I and Update II

TABLE E.4-9e

Summary of Laboratory Quality Control Procedures
by Analytical Method

TCLP

EPA SW-846 Analytical Method	Quality Control Check	Frequency	Acceptance Criteria	Corrective Action
1311	Extraction fluid blank	Every 20 extractions conducted in an extraction vessel	Per analytical method	Per analytical method
	Matrix	Each analytical batch	Per analytical method	Per analytical method

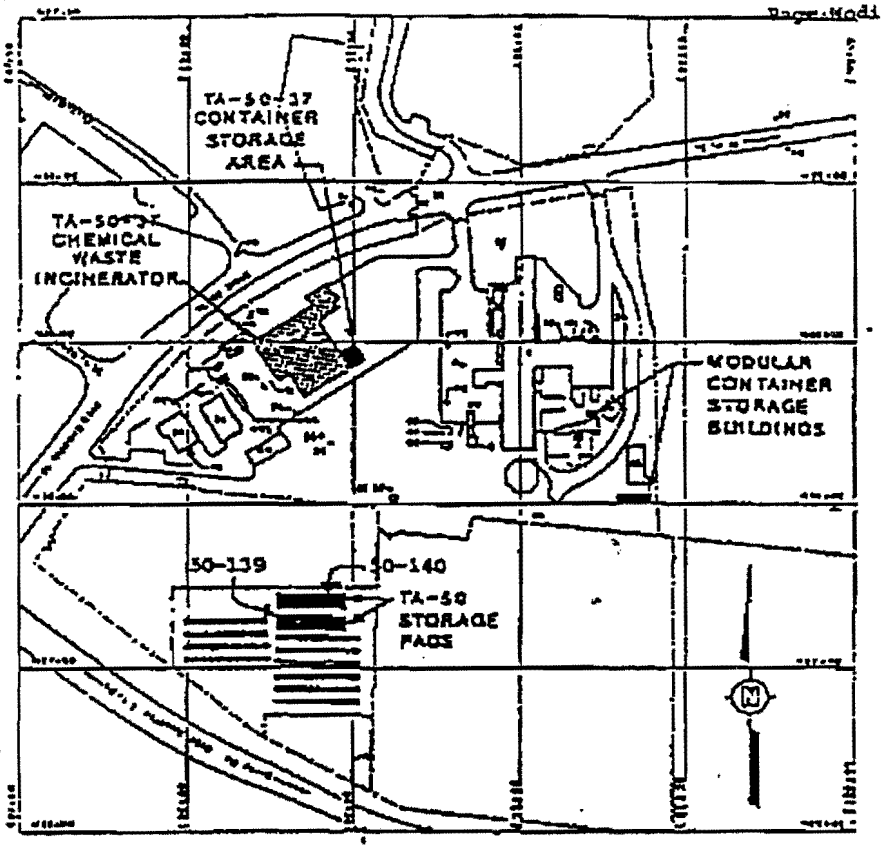

FIGURE 4

LOCATIONS OF TA-50
CHEMICAL WASTE INCINERATOR
AND CONTAINER STORAGE
UNITS

PREPARED FOR

LOS ALAMOS
NATIONAL LABORATORY
LOS ALAMOS, NEW MEXICO

INTERNATIONAL
TECHNOLOGY
CORPORATION

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FIGURE E.4-1

Locations of TA-50 Chemical Waste Incinerator
and Container Storage Units

OFFICIAL SAMPLE SEAL

Collected by_____ Collector's Sample No._____
(Signature)

Date Collected_____ Time Collected_____

Place Collected_____

FIGURE E.4-2

Example of Sample Seal

OFFICIAL SAMPLE LABEL

Collected_____ Collector's Sample No._____

Place of Collection_____

Date Sampled_____ Time Sampled_____

FIGURE E.4-3

Example of Sample Label

Hazardous Materials
Collector's Sample No._____

Location of Sampling: ____Producer ____Hauler
____Disposal Site
____Other:_____

_____

Company's Name_____ Telephone(__)_____

Address_____
number street city state zip

Collector's Name_____ Telephone(__)_____

Date Sampled_____ Time Sampled_____hours

Type of Process Producing Waste_____

Waste Type Code_____ Other_____

Field Information_____

_____

_____

Sample Allocation:

1. _____
name of organization

2. _____
name of organization

3. _____
name of organization

Chain of Possession

1. _____ _____ _____
signature title inclusive dates

2. _____ _____ _____
signature title inclusive dates

FIGURE E.4-4

Chain of Custody Record

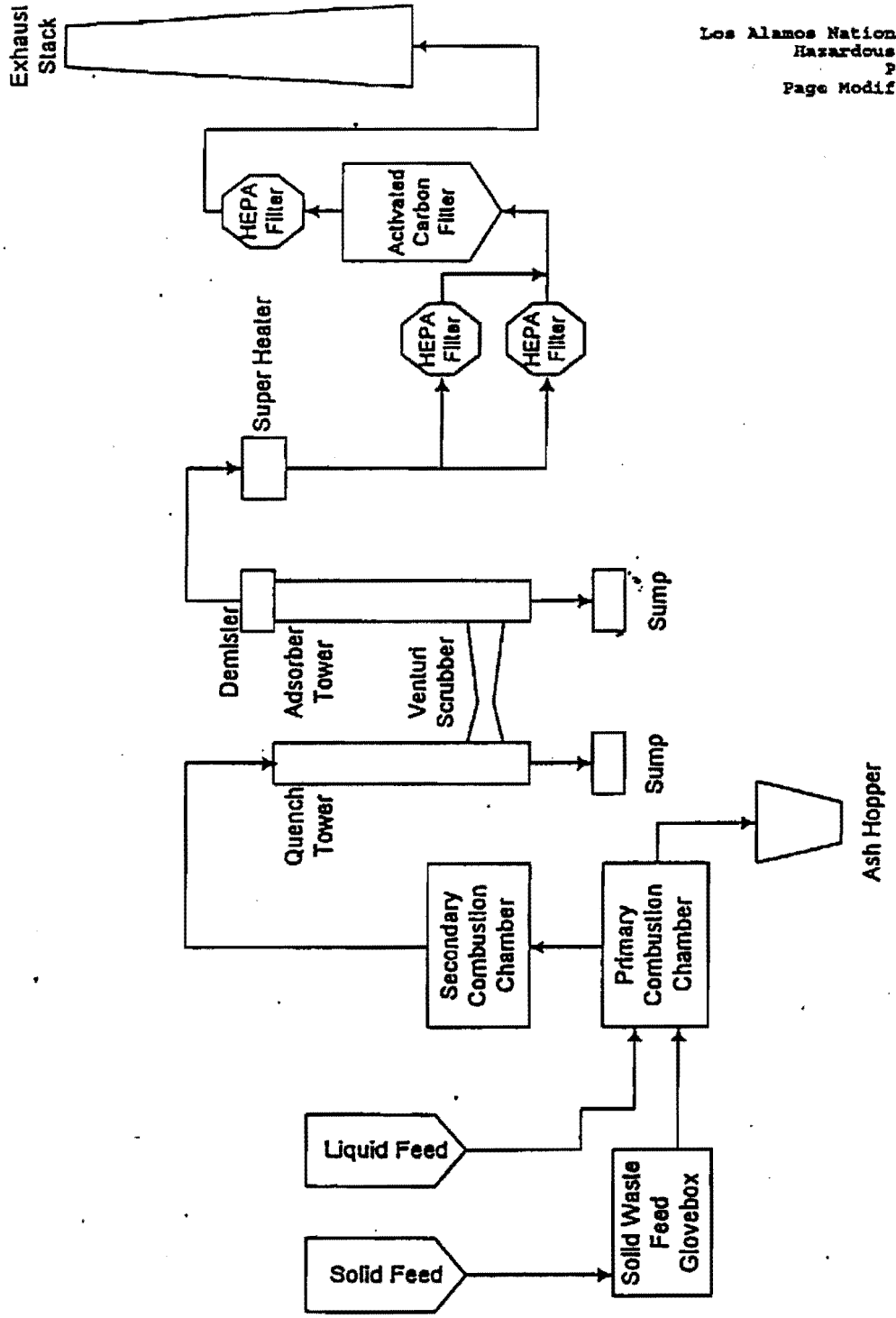


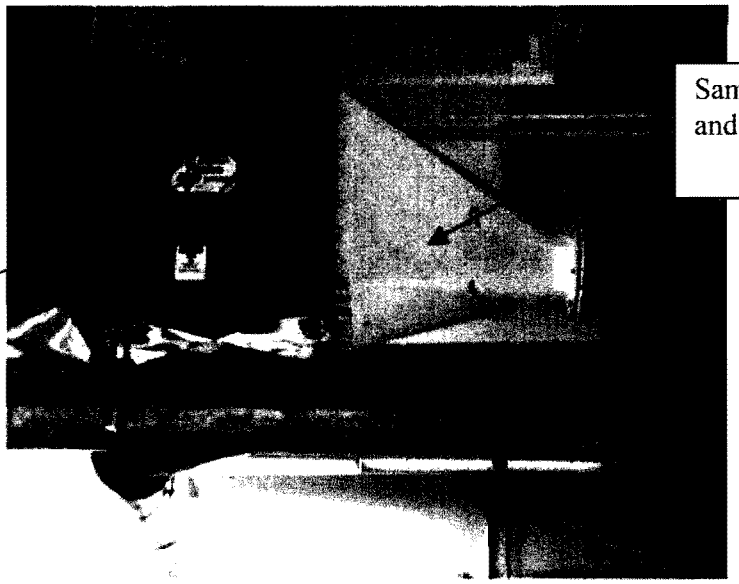
Figure E.4-5
Principal Treatment Components
of the Controlled Air Incinerator

ENCLOSURE 2

EXHAUST SYSTEM SAMPLING LOCATIONS

Sampling Locations
Exhaust System (Including Stack)

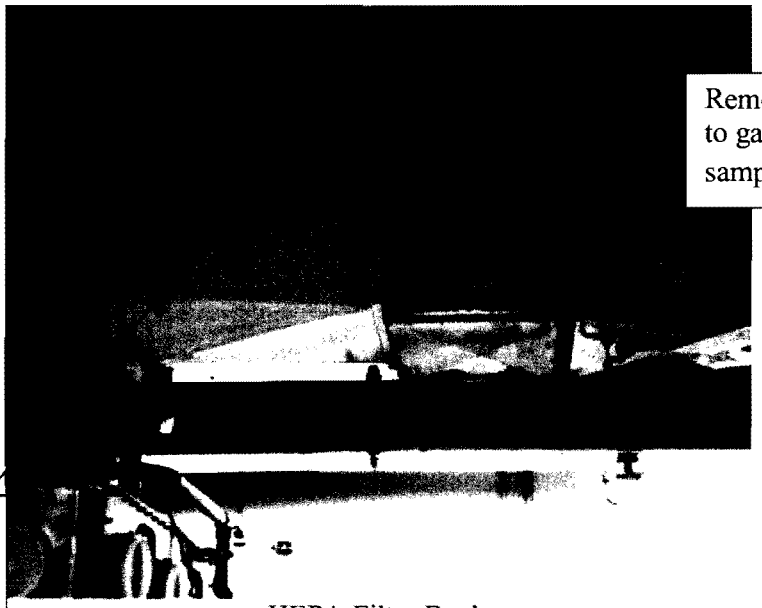
Five locations have been identified for possible samples within the exhaust system. All of these locations will be sampled, provided the locations can be reached with sampling equipment. The location points are as follows:



Sample transition and elbow

Remove HEPA filter to gain access to sampling location

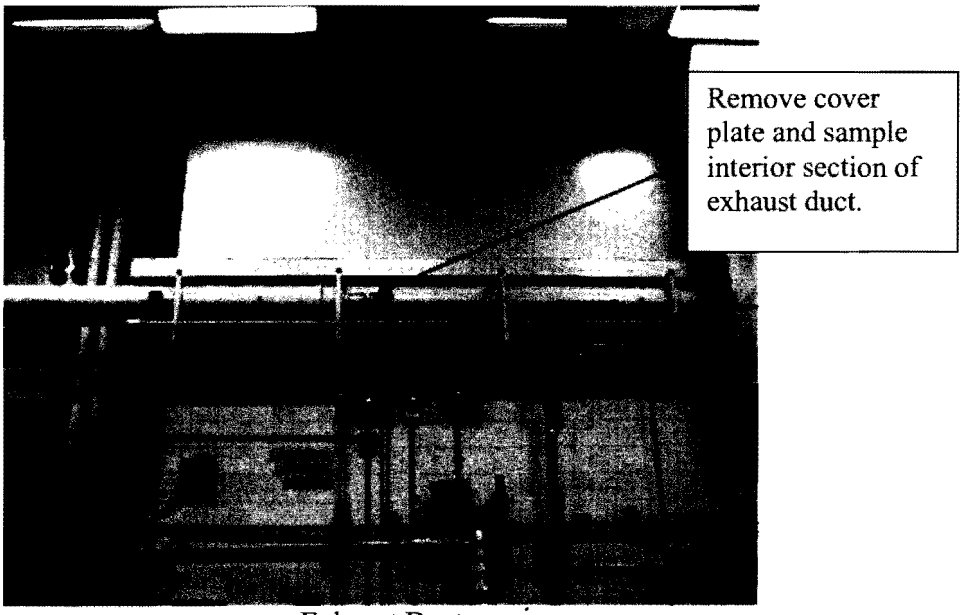
High Efficiency Particulate Air (HEPA) Filter bank
Sample Location #1



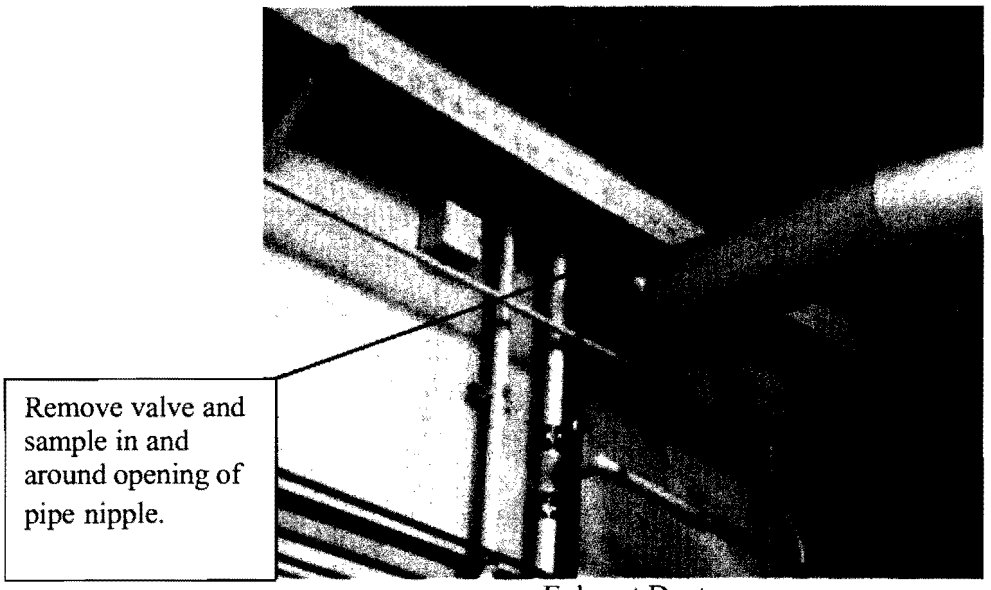
Remove HEPA filter to gain access to sampling location

Sample Transition and straight section of exhaust system

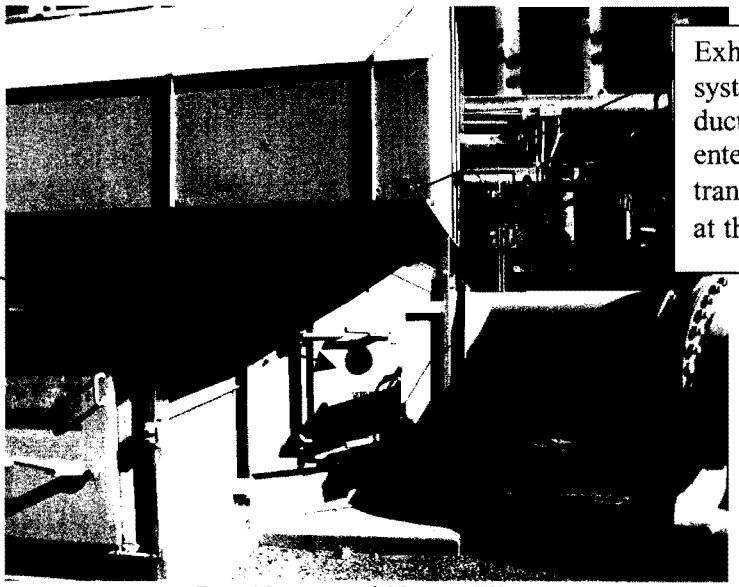
HEPA Filter Bank
Sample Location #2



Exhaust Duct
Sample Location #3



Exhaust Duct
Sample Location #4



Exhaust system ductwork enters transition piece at this location

Access to Sample Location #5 is through the access door. Sample location will be the transition and exhaust duct.

Bag House and HEPA Filter
Sample Location #5

Note: All sampling locations require accessing the internal surfaces of the ductwork. Prior to any sampling Radiological Work Permit (RWP) will be required. Access to the bag house will require a confined space permit.