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ENVIRONMENT DEPARTMENT
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GARY E. JOHNSON
GOVERNOR

MARK E. WEIDLER
SECRETARY

EDGAR T. THORNTON, III
DEPUTY SECRETARY



February 28, 1997

VIA FAX

Joe Rochelle, Esq.
Los Alamos National Laboratory
PO Box 1663/ MS A187
Pueblo Complex -1900 Diamond Drive
Los Alamos, New Mexico 87545

**RE: Final Executed Amended Remedial Action Plan to Consent Agreement For Compliance Orders 93-01, 93-02, 93-03 and 93-04.**

Dear Mr. Rochelle:

Enclosed please find a copy of the final executed Amended Remedial Action Plan (ARAP) to the Consent Agreement entered into between the parties in the above-entitled matter. This also confirms that the appropriate person from the New Mexico Environment Department (NMED) to approve the ARAP from the Advisory Group is Mr. Edward Kelley, NMED's Division Director for the Water and Waste Management Division.

We are pleased to have reached an agreement on this amendment. If you have any questions, do not hesitate to contact me.

Sincerely,

Susan M. McMichael
Assistant General Counsel

Enclosure(s)

cc: Hortense Hayes, DOE Legal Counsel
Benito Garcia, Bureau Chief, Hazardous & Radioactive Material Bureau

16701

# Attachment B

# Amended Remedial Action Plan

This Amended Remedial Action Plan amends and is a substitute for that certain Remedial Action Plan, Attachment B to that certain Consent Agreement entered into by the Regents of the University of California, the United States Department of Energy and the New Mexico Environment Department (the "Parties"), and approved by the Secretary of the New Mexico Environment Department by way of Final Order dated December 10, 1993 ("Consent Agreement"). The Consent Agreement sets forth the agreement of the Parties resolving all matters related to New Mexico Hazardous Waste Act Compliance Orders 93-01, 93-02, 93-03 and 93-04.

In accordance with the terms of Section XXI of the Consent Agreement, the Parties hereby express their consent to and approval of the substitution of this Amended Remedial Action Plan as Attachment B to the Consent Agreement, in place of the Remedial Action Plan, Amendment B to the Consent Agreement, by signing in the designated space provided below.

In accordance with the terms of Section XXI of the Consent Agreement, the Secretary of the New Mexico Environment Department hereby expresses his consent to and approval of the substitution of this Amended Remedial Action Plan, as Attachment B to the Consent Agreement, in place of the Remedial Action Plan, Attachment B to the Consent Agreement, by signing in the designated space provided below, and hereby declares that the date of his signing shall be the effective date of such substitution.

APPROVED:

2/13/97

Dennis J. Erickson
Division Director
Environment, Safety and
Health Division
Los Alamos National Laboratory

DATE

2/14/97

G. Thomas Todd
Area Manager
Los Alamos Area Office
U.S. Department of Energy

DATE

Edward Kelley
Director of Water and Waste
Management Division
State of New Mexico Environment Department

2/24/97
DATE

Mark E. Weidler
Secretary
State of New Mexico Environment
Department

2/24/97
DATE

The following sections present listed actions and a phased plan necessary to retrieve TRU radioactive and TRU mixed waste from TRU Pads 1, 2 and 4 and place into inspectable storage. Because the Safety Analysis Report, which is being prepared for this remedial action, is not final, and because the RCRA Part B Permit Application, and the Facility Final Design are currently being reviewed by NMED, this plan may have to be modified to ensure:

- worker and public safety
- protection of the environment
- the most safe and efficient method is used to retrieve the waste
- compliance with State requirements

## Listed Actions

1. Establish site specific environmental surveillance program.
2. Install high volume air samplers.
3. Prepare and complete ES&H documentation, as necessary.
4. Procure Special Equipment for Retrieval and Storage operations.
5. Prepare Preliminary Safety Analysis Report.
6. Prepare Final Safety Analysis Report.
7. Design Upgrade to existing Drum Prep Facility
8. Complete Final Design for TRU Waste Retrieval Dome Project[1].
9. Complete Final Design for TRU Waste Temporary Storage Dome Project [1].
10. Complete Design of Drum Vent System.
11. Prepare Detailed Operating Procedures.
12. Fabricate and Test Drum Vent System.
13. Procure Contractor.

14. Complete Construction of Retrieval Dome over Pad 1; Complete Construction of Storage Domes for Pad 1 waste

15. Personnel Training/Operational Readiness Review

16. Complete Retrieval Operations on Pad 1

17. Complete Construction of Retrieval Dome Over Pad 4; Complete Construction of Storage Domes for Pad 4 waste.

18. Complete Retrieval Operations on Pad 4.

19. Complete Construction of Retrieval Dome over Pad 2; Complete Construction of Storage Dome over Pad 1.

20. Complete Construction of Storage Dome over Pad 4.

21. Complete Retrieval Operations on Pad 2.

22. Complete Salvage of Retrieval Equipment and Retrieval Dome.

1) The retrieval of waste from TRU Pads 1, 2 and 4 is divided up into two projects- The TRU Waste Retrieval Dome Project and TRU Waste Temporary Storage Dome Project.

## The Retrieval Operation

### A. Construction and Retrieval Phasing

The retrieval of waste from TRU Pads 1, 2 and 4 is organized into four construction phases. After each of the first three construction phases, waste is retrieved from TRU Pads 1, 4, and 2, respectively. The fourth construction phase is necessary to salvage equipment, and disassemble the retrieval dome. Each construction phase is divided up into two separate projects; the Retrieval Dome Project and the Storage Dome Project.

Project site activities will begin with Construction Phases I-R and I-S (-R refers to the Retrieval Dome Project and -S refers to the Storage Dome Project). Activities within Phases I-S and I-R are clearly identified in Figures 1 and 2.

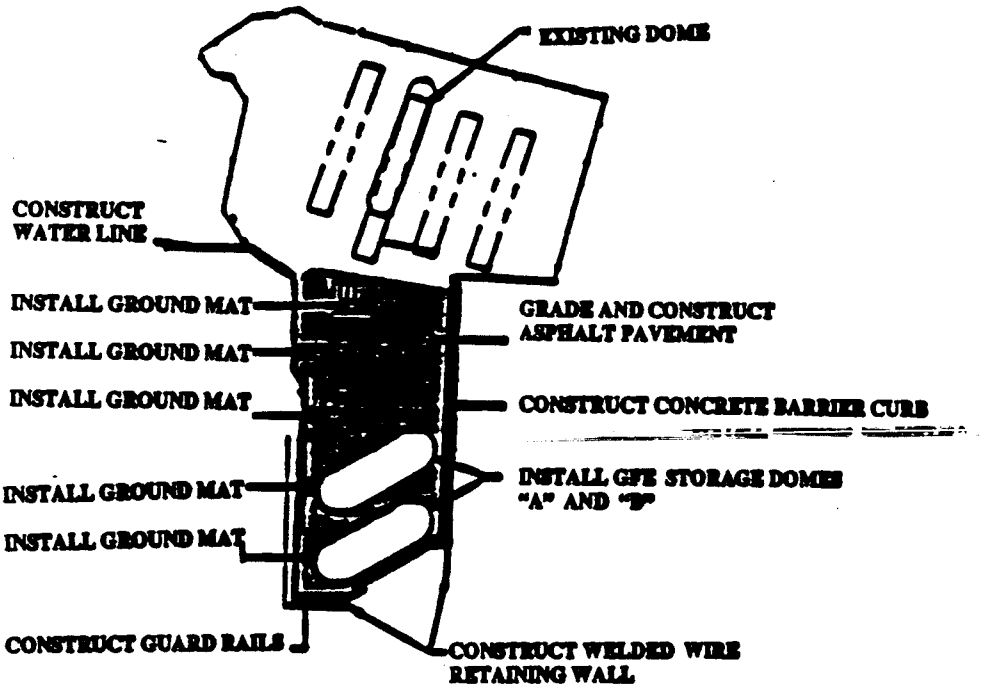


**Figure 1. Construction Phase I-S**

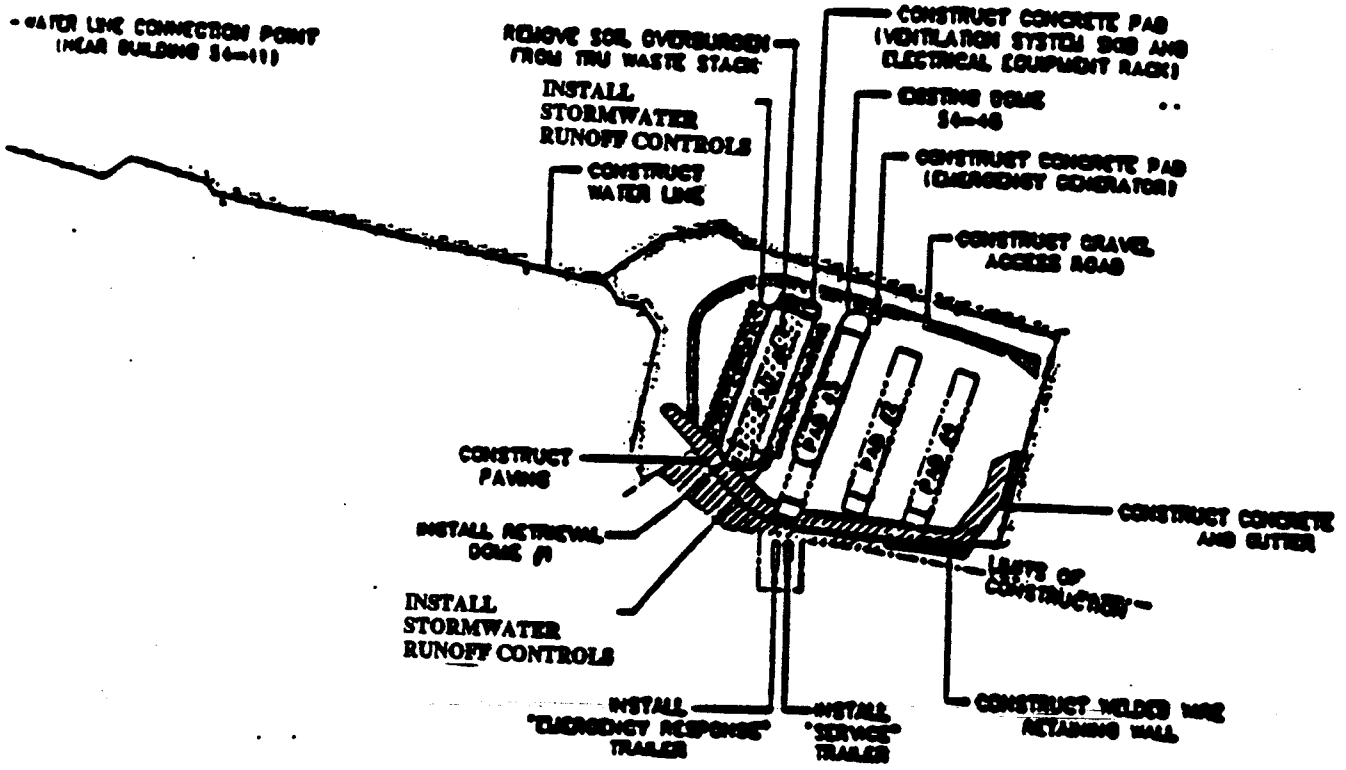


**Figure 2. Construction Phase I-R**

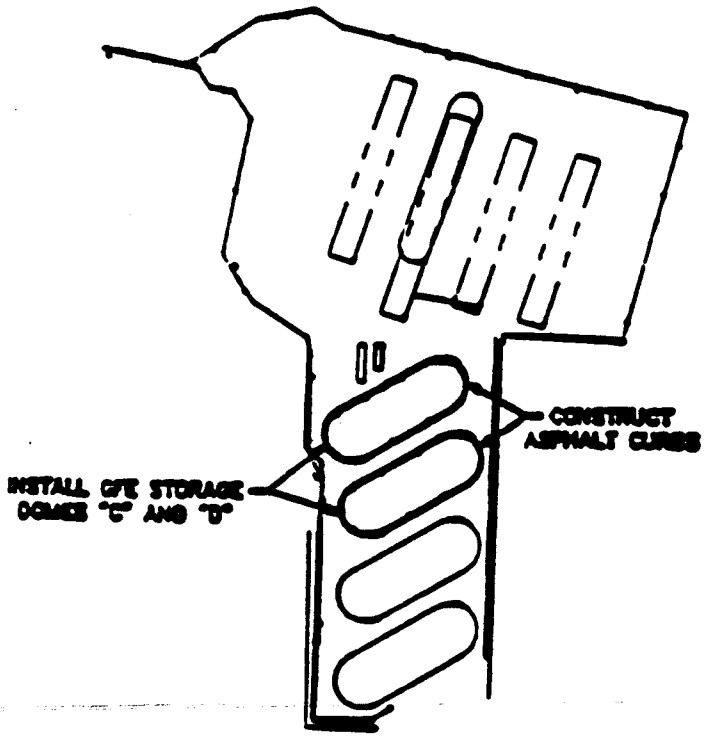


**Figure 3. Construction Phase II-S**

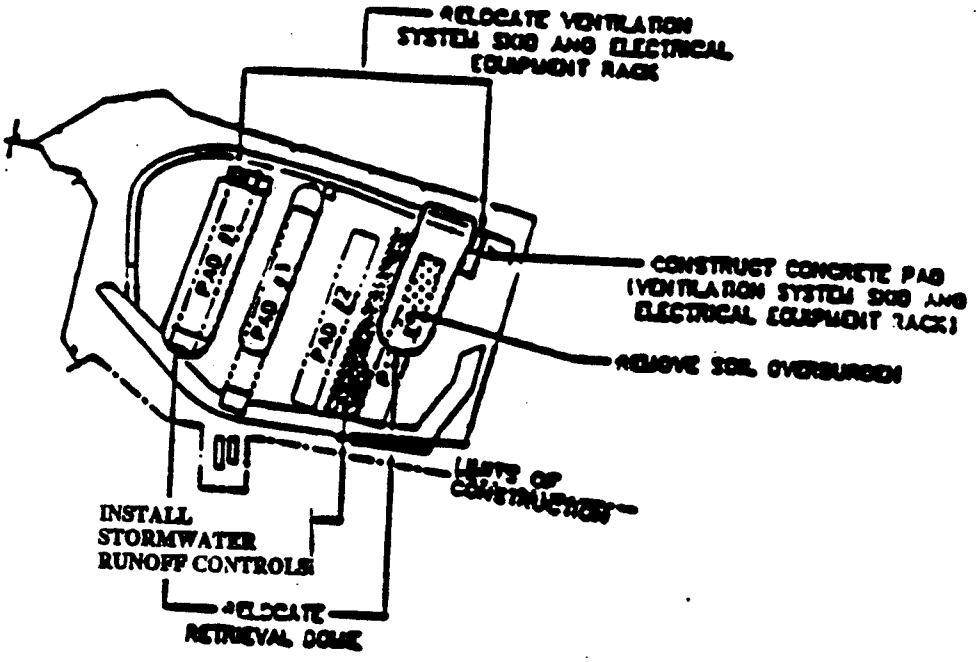


**Figure 4. Construction Phase II-R**

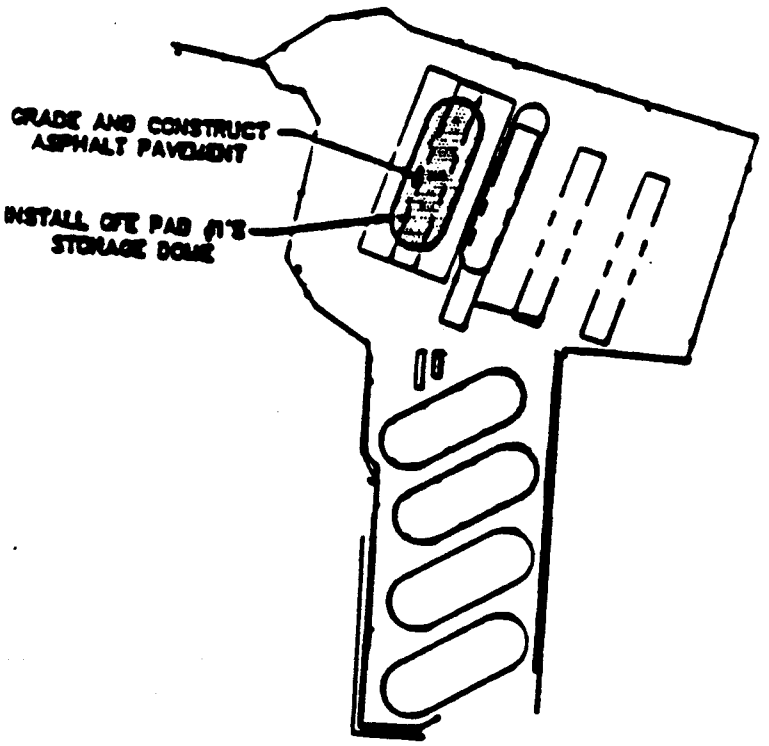


Figure 5. Construction Phase III-S

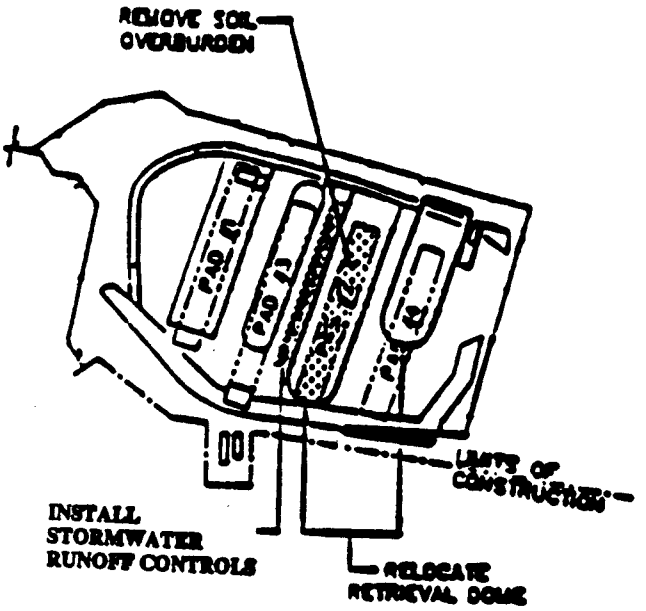


**Figure 6. Construction Phase III-R**

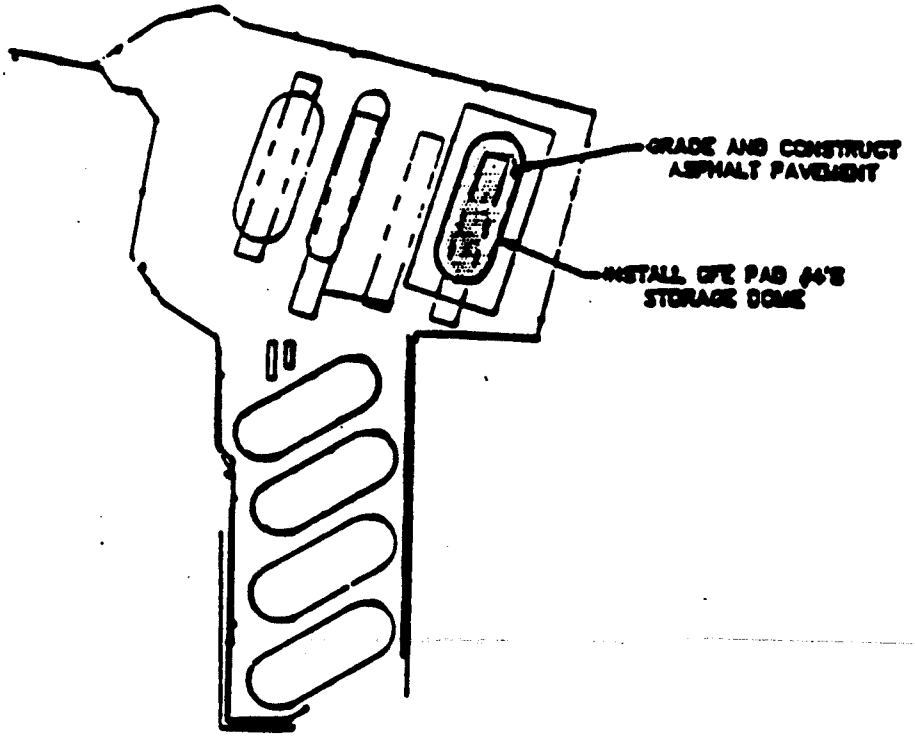


**Figure 7. Construction Phase IV-S**

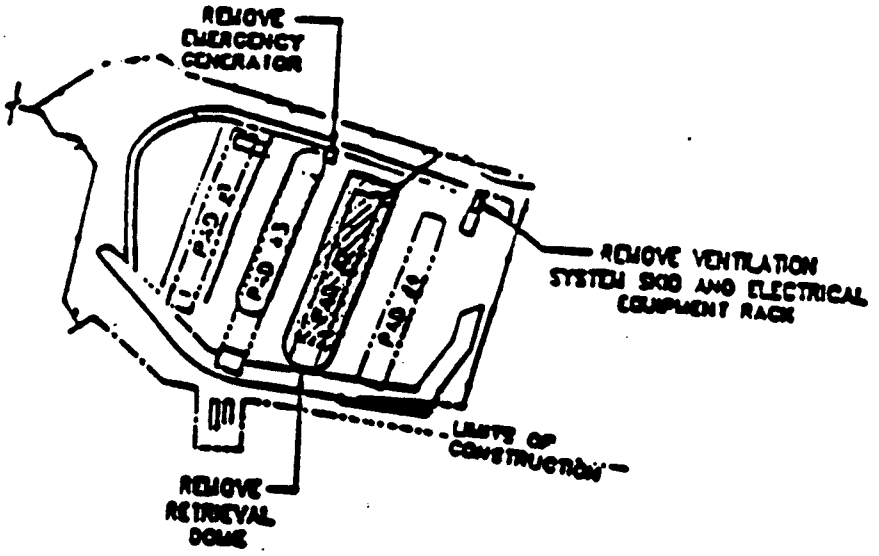


**Figure 8. Construction Phase IV-R**

**Attachment B**
**Amended Remedial Action Plan**

## B. Detailed Description

### 1. Storage Domes

As Figure 1 shows, Construction Phases I-S include considerable site work. The surface of LLW Pits 1 and 3 (just south of the TRU pads where the retrieval operation will be executed) is not level enough to permit construction of the four new storage domes without grading. Because the site is over old waste disposal pits, grading must be accomplished primarily by fill and compact methods. The soil surface will be surveyed to determine whether radioactive contamination exists from previous disposal operations. If radiation above background levels is detected, the areas of contamination will be handled appropriately. Clean fill will be obtained from the spoils pile of crushed tuff created by excavation of LLW disposal pits. After compaction and grading, the asphalt pad will be laid.

A primary reason for the large amount of site work is to ensure that stormwater discharge requirements under the Laboratory's National Pollution Discharge Elimination System (NPDES) general permit are met and best management practices for stormwater runoff control are utilized.

During the latter part of Construction Phases I-S and I-R, Storage Domes A and B will be erected at the south end of the completed asphalt pad. Each of the planned storage domes is a tension support structure with fabric walls and aluminum supports. Asphalt curbs will then be installed around the inside perimeter of each of the domes. Power, communication systems, and fire protection (hydrants) services will be extended to the domes. Finally, prior to waste transfer into the new domes, ambient air monitoring will be conducted inside the dome to establish "background" conditions.

Construction Phase II-S includes erecting Storage Domes C and D on the asphalt pad. Asphalt curbs will also be constructed around the inside perimeter of these domes. As necessary, utilities will again be extended to the domes.

During Construction Phase III-S, some additional site work and erection of Pad 1's Storage Dome will occur. Additional asphalt will be added to both east and west sides of the present Pad 1. This site work will allow Pad 1's Storage Dome to fit on the Pad 1. As with the previous domes, an asphalt curb will be present around the inside perimeter of the dome.

Similar to Construction Phase III-S, Construction Phase IV-S includes additional site work before Pad 4's New Storage Dome can be constructed. Similar to Pad 1, asphalt will have to be added to both east and west sides of Pad 4. The Laboratory fully expects Pad 1's and Pad 4's asphalt pad to be in excellent condition. If the asphalt is not in excellent condition, that is if 30% or more of the asphalt pad is degraded, the entire asphalt pad will be replaced. In any case, any damaged portions of asphalt will be repaired.

## 2. Retrieval Dome

Construction Phase I-R also has a substantial amount of site work most of which is focused around Pad 1. The site work includes a water line installation, asphalt access paving along south edge of the site, extension of electrical power, installation of stormwater runoff controls, removal of the majority of the tuff cover over Pad 1 and erection of the Retrieval Dome over Pad 1. All tuff cover will not be removed because it is necessary to leave minimal cover of soil on top of the stack to provide weather protection and a fillet of tuff around the perimeter to support and stabilize the stack of waste containers. As appropriate, the tuff will be screened for radionuclide constituent contamination. Clean tuff removed from the pad will either be taken to the current LLW disposal pit for use as backfill or used as fill for Construction Phase I-S. Contaminated soil will be handled as appropriate.

Once site preparation for the Retrieval Dome is complete and the retrieval dome is erected, equipment and structural accessories necessary to ensure the Retrieval Dome is functional will be installed. The HEPA-filtered exhaust system and associated ductwork will be installed and attached to the skid-mounted exhaust blower and filter bank. An emergency power system (EPS) will be placed to the north of Pad 1. Though the EPS should not be necessary because work will stop if power is lost, it will provide power during power outages, or other emergencies. Two partitioning curtains will be hung from the dome frame to segregate the work area from the remainder of the enclosure and each curtain will be moved along the pad as waste is being removed. Personnel doors for emergency egress will be present along both sides of the work area. Electrical power will be extended into the Retrieval Dome to power continuous air monitors (CAMs), local and general ventilation systems, and the drum venting system, as needed. Support trailers will be located near Pads 1, 2 and 4.

Once the waste from Pad 1 is retrieved, Construction Phase II-R for retrieval of Pad 4 waste will then begin. The Retrieval Dome will remain available for interim storage of wastes during and after retrieval operations. This phase includes preparatory site work at Pad 4, equipment relocation as needed, installation of stormwater runoff controls, and the relocation of the existing Retrieval Dome from Pad I to Pad 4.

After retrieval operations at Pad 4 are complete, Construction Phase III-R for retrieval of Pad 2 waste will then begin. Similar to Construction Phase II-R, this phase includes preparatory site work around Pad 2 including installation of stormwater runoff controls, equipment relocation as needed, and the relocation of the Retrieval Dome from Pad 4 to Pad 2. Finally, after retrieval operations are finished on Pad 2, Construction Phase IV-R will ensure that all equipment is either salvaged or disposed as appropriate.

## 3. Soil Removal

As retrieval operations progress on each pad, the tuff over the working face of the stack will be removed by various pieces of earth moving equipment and supplemented by hand loading tuff into wheelbarrows as needed.

The fillet of tuff across the front of the stack and that which extends along the sides near the working face will also be removed by various pieces of earth moving equipment and hand loading if needed. When the fillet has been dropped below the top row of waste packages, the crates will be otherwise supported until the working face has been brought into a stable, stepped configuration. As the working face of the stack retreats, the soil removal operation will be repeated several times.

When all of the tuff has been removed from the working face, an air sample will be drawn from within the plywood and plastic cover. Along with the continued monitoring throughout the entire project, this sample will help Health Physics (HPT) and Industrial Hygienist (IHT) Technicians determine the extent of respiratory protection required during the removal of the plywood and plastic sheeting. After tuff removal, the plastic and plywood cover material will be disposed as appropriate.

**4. Waste Package Retrieval**

After the tuff has been removed from the working face and unnecessary dirt removal equipment removed from the working area, waste package retrieval can begin. Retrieval equipment will include forklifts, a small crane, a front end loader, CAMs, a HEPA-filtered vacuum cleaner, and HEPA-filtered ventilation system, and hand held tools.

The waste package configuration within the stack can vary, but the most common arrangement consists of crates stacked along the sides and ends of individual storage cells, with drums stacked in the center. Crates are seldom stacked more than two high (with the largest crates on the bottom), and drums are commonly stacked four high. Waste package data, including an identification number, radioisotopic data, LANL waste content code, waste generator, weight, and the date the package was sealed are readily available from the TRU waste database. The database information will be available at the work site so that workers will know the nature of the waste in each package before it is handled.

**a. Crates**

Because FRP crate construction was not standardized when the waste was packaged, crate handling during waste retrieval cannot be standardized. The exact retrieval method used will be determined on a case-by-case basis. One method for crate retrieval may be to remove all waste packages around the individual crate, attach a long section of horizontally suspended I-beam (strongback) with fabric slings (which are spread to prevent crushing the top of the container), and lift the crate by strong back with a small crane or a forklift. An alternate method for FRP crate removal may involve using a large capacity forklift. If the bottom of the crate is significantly degraded, a metal sheet can be slid under the crate and the slings will pick the crate up from this new metal base. All such damaged crates will be repaired, overpacked, or repackaged before they leave the work area by placing the contents of the damaged container in a sea-land metal container.

Interviews (October, 1993) with technicians, who worked on the TRU Pads in the late 1980's, revealed that some crates may contain liquids. The interviews revealed two sources for this potential liquid. Rain water is one potential source. The rainwater may be present because the crates were left outside for significant periods before they were covered with a plastic tarp and overburden. The second source for the potential liquids is associated with capped process piping, process piping which was used in conjunction with the gloveboxes. Though all piping was drained (as thoroughly as possible) and capped

before placement into the crates, it is difficult for the Laboratory to ensure there are no residual liquids remaining within the capped pipes. Therefore, crates must be handled on a case by case basis, but all crates will be checked for rainwater and drained of rainwater as necessary. After each crate is inspected to ensure crate integrity, the crate will be sent directly to the appropriate storage dome. Again, because it may be nearly impossible to ensure any particular crate has absolutely no liquids within it, all crates will be stored on additional containment areas when placed in the appropriate storage dome.

**b. Drums**

Steel drums will usually be retrieved by forklifts or a small crane. Drum retrieval will begin with a visual, in-place assessment of the drum integrity. The drum top, visible sides, and visible portions of the bottom rim will be inspected for corrosion, pitting, and rim separation. Drums that fail the visual inspection will be reinforced and overpacked in situ before their removal from the stack. A radiological contamination swipe survey will be performed before moving the drum to determine whether removable contamination exists on the drum exterior.

If the drum appears to have integrity and a smear shows no removable surface contamination, the drum will be removed from the array using manual techniques and construction equipment. After the drum is safely in the drum staging area, dust and dirt will be removed from the drum using filtered vacuuming or manual cleaning, and a thorough radiological survey for contamination will be conducted. Should removable surface contamination be detected, worker protective measures will be evaluated and contamination-control procedures, such as vacuuming, fixation, or plastic wrapping, will be implemented before subsequent handling. A permanent bar code label containing the drum identification number will be affixed to the drum after this cleaning and inspection. This drum identification number will be cross-referenced to the original drum identification number contained in the LANL TRU waste database.

During this time, local ventilation will be drawing air from the foot of the stack and from the floor level where the drums are being placed. This local ventilation will supplement the work area ventilation. The number of drums removed at one time will vary, but will average about 24 per day.

Drums that potentially contain liquids may be examined by real time radiography (RTR) after they are vented or after they are placed into storage. If liquids do appear in the RTR examination, these drums will be overpacked with an absorbent between the 55 gallon drum and the overpack. Drums that contain a waste matrix with a likelihood to contain free liquids will be overpacked with an absorbent between the 55 gallon drum and the overpack. Any drum either identified by the RTR as a container with free liquids or identified as a drum which contains a waste matrix with a probability to have free liquids will be stored within an area with additional containment inside the appropriate storage dome.

**5. Drum Preparation**

Drums received at the Drum Preparation Facility will be unloaded by forklift to the ground where they will be transferred onto multi-wheeled dollies or drum carts to be cleaned, inspected, surveyed for contamination and surface radiation levels, painted as necessary and/or vented as necessary. Each drum will be supplied with appropriate barcode and other identification labels. Drums will then be sent to storage.

## 6. Drum-Venting System

Drums which have been pre-identified through a database review as potentially containing an explosive gas mixture will be vented to ensure they do not contain an explosive mixture of gases in the headspace. Drums requiring venting will be placed one at a time, into the skid mounted Drum Venting System (DVS) where the drum lid will be punctured and a gas sample drawn. The explosivity of the gas mixture will be determined, and a HEPA-filtered vent will be installed. If a drum actually contains an explosive mixture, it will either be purged or simply allowed to aspirate until a safe mixture is attained. All drums will be vented to meet the Waste Acceptance Criteria of the disposal facility as necessary.

## 7. Transportation

Retrieved waste crates and drums will be transported, as appropriate, to the Drum Preparation Facility, to storage, or from the Drum Preparation Facility to storage. Transport vehicles will be loaded in the retrieval work area. The equipment used to manipulate packages will usually be a forklift, rigged with either forks or a boom. The vehicles used to transport waste packages within TA-54 will be either stake bed trucks or trailers that have been selected to achieve the minimum lifting and handling requirements. Closed transport vehicles will not be necessary because adequate surge capacity at each point in the retrieval and storage process will ensure that the waste is not moved during inclement weather.

## 8. Storage Operations

Within the storage domes, the waste packages will be handled by common commercial equipment such as forklifts with drum lifting attachments, strongbacks, and slings. The forklifts will be either propane or diesel fueled. Other equipment in the storage enclosures will include an assortment of survey instruments, CAMs, eye wash stations and fire extinguishers.

Crates will be arranged in rows, one high and one wide, with at least 28 inches between rows to allow for inspection. 55-gallon drums of similar waste will be banded together in groups of four on metal pallets which are then stacked three high in rows at least 28 inches apart. Overpacked drums will receive similar treatment except that they will be placed on larger pallets and stacked only two high. Any container, from the TRU Pads, that has been confirmed to contain liquid will be segregated within the operating storage dome to an area of additional containment. Whenever waste packages are moved, the waste package identification numbers, their origin and destination, and package changes (overpack volume and/or dimensions) will be documented and used to update the TRU waste database.

## COMPLIANCE SCHEDULE: Attachment "C" (10/25/93)

| | | |
|---|---|---|
| Complete[1] | LANL[2] | Submit Preliminary Construction Design Criteria for storage domes 1, 4, A, B, C, and D (hereinafter referred to as Area G TRU Storage Units). |
| Complete | NMED | Issue initial comments for design document submitted 07/01/93. |
| Complete | LANL | Submit Part B application, including Title II (Definitive Design) documentation, for Area G TRU Storage Units. |
| Complete | NMED | Conclude Administrative completeness Review of the permit application.[3] Issue a Notice of Deficiency, if necessary. |
| 11/05/93 | LANL | Submit a request to the Secretary or Designee for permit modification. |
| 11/15/93 | LANL | Submit a complete response to NMED's Notice of Deficiency, if issued, for the Administrative Completeness Review. |
| 12/13/93 | LANL | Hold a public meeting regarding the permit modification request. |
| 12/17/93 | NMED | Conclude initial Technical Completeness Review of the permit application. Issue a Notice of Deficiency, if necessary. |
| 01/21/94 | LANL | Submit a complete response to NMED's Notice of Deficiency, if issued, for initial Technical Completeness Review. |
| 02/04/94 | NMED | Conclude final Technical Completeness Review of the permit application. |
| 02/07/94 | NMED | Either approve the modification request, with or without changes, and modify the permit accordingly; deny the modification request; require that the modification request follow procedures for Class III modifications; or notify LANL that the Secretary or Designee will decide on the request within the next thirty days.[4] |

| | | |
|---|---|---|
| 02/18/94 | LANL | Submit additional information as requested by NMED on 02/07/94. |
| 03/08/94 | NMED | Secretary or Designee issues final decision on permit modification. |
| 09/30/98 | LANL | Complete Pad #1 Retrieval. |
| 09/30/2000 | LANL | Complete Pad #4 Retrieval. |
| [Effective Date of Consent Order] /2003[5] | LANL | Complete pad[2] retrieval and have all wastes from Area G hazardous waste storage Pad#s 1, 2 and 4 placed into Area G TRU Storage Units. |

**Notes**

1. The first milestones predate the agreement and have been accomplished.
2. For the purposes of this Compliance Schedule, "LANL" means the respondents, the Regents of the University of California and the Department of Energy.
3. For the purposes of this Compliance Schedule, "Permit Application" means only those portions related to the Area G TRU Storage Units.
4. In the event that a determination is made that it is necessary to follow Class III procedures, the schedule shall be extended according to regulation to account for the additional time required to comply.
5. See Consent Agreement "A" (Secretary's Final Order).