Los Alamos Environmental Restoration Records Processing Facility

ER Record I.D.# 38408

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ENVIRONMENTAL RESTORATION
Records Processing Facility
ER Record Index Form
(Side 1 of 2)

Part I: Complete all fields; indicate if not applicable or appropriate; please write legibly.

DOCUMENT TO: —

DOCUMENT DATE: 09-26-86

ORIGINATOR NAME: —

ORGANIZATION: —

SYMBOL: —

PAGE COUNT: 119

SUBJECT/TITLE: Los Alamos CERCLA Phase I Final Report Sept. 26, 1986; Table Status of Sites at TA-15, R-Site

RECORD TYPE (Circle relevant type for primary record; type of attachments should be selected on *Keywords List*):

Analytical Data	Excerpt	Map	Plan	Study
Article	FAX	Memo	Procedure	Summary
Chain-of-Custody	Figure	Microform	Purchase Request	Telephone Record
Chart	Form	Notebook	Receipt Acknowledgment	TOC
Computer Output	Interview	Outline	Report	Transcription
Contract	Letter	Personal Notes	Review	Video
Controlled Distribution	List	Photo	Bow	Work Plan
Drawing	Logbook			Other_____

RECORD CATEGORY: P
(P for Programmatic or R for Reference)

RECORD PACKAGE: —

RECORD FILMED (Y/N): Y

RECORD LOCATION: —
(Indicate location of record if not filmed.)

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ATTACHMENTS FILMED (Y/N): Y
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TECH AREA(S)	PRS NO(S)	ADS NO(S)	STRUCTURE NO(S)/MDA
LIST RELEVANT TECH AREA(S). 15	*LIST RELEVANT PRS(S).* 1086	*LIST RELEVANT TDD/ADS NO(S).* —	*LIST RELEVANT STRUCTURE NO(S)/MDA.* —

31599

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WBS NO(S)	DOCUMENT TO	ORIGINATOR NAMES
LIST RELEVANT WBS NO(S).	LIST MULTIPLE RECIPIENTS.	LIST MULTIPLE ORIGINATORS.

CORRECTION (Y/N): —
(Is this a correction to a record previously processed?)

CORRECTED #: —
(If answer is Yes, please give ER Record # for corrected record.

CORRECTION DESCRIPTION (Optional): —

SUPERCEDE: — **REPLACE:** — **DELETE:** — **ADD:** — **REVISE:** —

ATTACHMENT LIST

A) Report, Subject: Los Alamos CEARP Phase I Final Anne Sept. 26, 1986; Table Status of Sites at TA-15, R-Site (With Notes) Dated: 09/26/86

B) Report, Subject: Los Alamos CEARP Phase I Revision 2 Anne Sept. 26, 1986; TA-15, Dated: 09/26/86

C) Report, Subject: Los Alamos CEARP Phase I Revision Anne Sept. 22, 1986; Table Status of Sites at TA-15, R-Site, Dated: 09/22/86

D) Report, Subject: Los Alamos CEARP Phase I Working Draft December 1986; TA-15-R-Site, Dated: 12/01/86

E) Written Report, Subject: Los Alamos CEARP Phase I Report; TA-15 R-Site, Dated: —

KEYWORDS: Circle relevant KEYWORDS from the list below for ER Record #: 36409

MISCELLANEOUS (List other indexing criteria as necessary; please write legibly): Subject File ; TA-15 CEARP

Abandon
Aboveground Tank
Absorption
Abstract
Accelerator
Access
Accident
Acid
Active
Activities
Administrative
ADS (Activity Data Sheet)
Adsorption
AEC (Atomic Energy Commission)
Aerial
Agenda
Agreement
AIP (Agreement in Principle)
Air
Alpha
Americium
Analysis
Analytical
AOC (Area of Concern)
Approval
Aquifer
ARAR (Applicable, Relevant, or Appropriate Requirements)
Archaeology
Archive
Area
Arsenic
Asbestos
Asphalt
Assessment
Audit

Backfill
Background
Bacteria
Barium
Baseline
BCP (Baseline Change Proposal)
Beds
Bermed Area
Beryllium
Beta
Biology
Blivit
Boiler
Boneyard
Bunker
Buried
Burn

Cadmium
Caisson
Calibration
CAMU (Corrective Action Management Unit)
Canyon
Capacitor
Caustic
CEARP (Comprehensive Environmental Assessment and Response Program)
Cement
CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act)
Certification
Cesium
Chain of Custody
Chamber
Change Control
Change Order
Charge
Chart
Checklist
Chemical
Chromium
Cleanup
Clearance
Closure
Clothing
CMI/RA (Corrective Measures Implementation/Remedial Action)
CMS/FS (Corrective Measures Study/ Feasibility Study)
Cobalt
Comment
Committee
Community Relations
Company
Compliance
Compressed Gas
Computer Modeling
Computer Output
Concern
Concrete
Concurrence
Configuration
Construction
Container
Containment
Contaminant
Contract
Control
Controlled Distribution
Copper
Core
Corrective Action
Correspondence
Criteria
Cyanide
Cyanogen

Data
Deadline
Debris
Decision Analysis
Decommission
Decontamination
Deficiency
Deliverable
Demolition
Description
Detection
Detonation
Development
Diesel
Discharge
Disposal
Documentation
DOE (Department of Energy)
Dose
DQO (Data Quality Objectives)
Draft
Drainage
Drainline
Drawing
Drilling
Drop Tower
Drum
Dry Well
Dump

Ecology
Effluent
EIS (Environmental Impact Statement)
Electrical
Emission
Engineering
Environmental
EOD (Explosive Ordnance Disposal)
EPA (Environmental Protection Agency)
Equipment
ERDA (Energy Research and Development Administration)
Erosion
ERPO (Environmental Restoration Program Office)
ES&H (Environment, Safety, and Health)
Estimate
Evacuation
Evaluation
Evaporator
Evidence
Excavation
Exclusion
Exhaust
Experiment
Explosive
Exposure
Extension
Extraction

Facility
Fallout
Farm
FAX
Fence
Field
Figure
Filter
FIMAD (Facility for Information Management, Analysis, and Display)
Finding
Fire
Firing Site
Fiscal
Fission
Five-Year Plan
Flow
Flow chart
Fluid
Form
Framework
Fuel
Fume

Gamma
Gas
Generation
Generic
Geochemistry
Geology
Geophysics
Glass Beaker
Glove Box
Graph
Guidance
Gun

Handling
Hazardous
Headquarters
Health
HE (High Explosive)
History
HMTA (Hazardous Material Transportation Act)
Hole
Home Owner
Hood
HSWA (Hazardous and Solid Waste Amendments)
Hydrology
Hygiene

Impact
Implementation
Implosion
Impoundment
Inactive
Incident
Incinerator
Industrial
Infiltration
Injection Well
Injury
Inorganic
Inspection
Installation
Interim
Interim Action
Internal
Interview
Inventory
Investigation
IRM (Interim Remedial Measure)
Isotope
IWP (Installation Work Plan)

Lab Job
Laboratory
Lagoon
Land
Landfill
Laundry
Leach
Lead
Leak
Legal
Letter
Limit
Lines
Liquid
List
Location
Log
Logbook

Magazine
Management
Manhole
Map
Material
MDA (Material Disposal Area)
Media
Meeting
Memo
Mercury
Metal
Microform
Minimization
Minutes
MIS (Management Information System)
Mixed Waste
MOA (Memo of Agreement)
Model
Modification
Money (Allocation, Appropriation, Budget, Cost, Funding, etc.)
Monitoring
Monthly Report
Mortar Impact Area
MOU (Memo of Understanding)
MSA (Major System Acquisition)

NEPA (National Environmental Policy Act)
NFA (No Further Action)
Nickel
Nitrate
NMED (New Mexico Environment Department)
NMEID (New Mexico Environmental Improvement Division)
NOD (Notice of Deficiency)
Nonexplosive
Nonradioactive
Notebook
Notification
NPDES (National Pollutant Discharge Elimination System)
NRC (Nuclear Regulatory Commission)
Nuclear

Observation
Off-gas
Oil
Open
Open Burning
Operation
Order
Organic
Organization
OSHA (Occupational Safety & Health Administration)
OSR (Operational Safety Requirements)
OU (Operable Unit)
Outfall
Outline

Pad
PA/RFA (Preliminary Assessment /RCRA Facility Assessment)
PCB (Polychlorinated Biphenyl)
Permit
Personal Notes
Personnel
Personnel Qualification
Photo
Pilot Study
Pipe
Pit
Plan
Plant
Plutonium
Point-of-Contact
Pollution
Polonium
Polaroid
Potential
Prevention
Priority
Procedure
Program
Programmatic
Project
Project Leader
Propellant
Property
Proposal
Protection
Protocol
PRS (Potential Release Site)
Public
Pump
Purchase Request

QA (Quality Assurance)
QP (Quality Procedure)
Quality
Quarterly Report

Radioactive
Radiochemistry
Radionuclide
Radium
Rationale
RCRA (Resource, Conservation, and Recovery Act)
Reactor
Receipt Acknowledgment
Recommendation
Reconnaissance
Records
Recovery
Recycle
Reduction
Reference
Regulation
Release
Remediation
Removal
Report
Request
Requirements
Research
Resin Bed
Resolution
Resource
Respirator
Response
Restoration
Restriction
Results
Review
Revision
RFI/RI (RCRA Facility Investigation/Remedial Investigation)
Risk
RPF (Records-Processing Facility)

Safety
Salamander
Salvage
Sample
Sampling Plan
Sanitary
Satellite
Schedule
Scope
Scrap
Scrap Detonation Site
Screening
Scrubber
Search
Security
Seep
Semivolatile
Septic
Sewer
Shaft
Sheet
Shell
Shot
Silver
Site
Sludge
Soil
Solid
Solvent
SOP (Standard Operating Procedure)
SOW (Statement or Scope of Work)
Specific
Spill
Stack
Standard
Statistics
Status
Steamline
Steel
Storage
Strontium
Structure
Study
Subcontractor
Subsurface
Summary
Sump
Support
Surface
Surveillance
Survey
Swipe
SWMU (Solid Waste Management Unit)
System

Table
Tank
Task
TCLP (Toxicity Characteristic Leaching Procedure)
TDD (Technical Document Description)
Technical
Technical Team
Technology
Telephone Record
Test Area
Testing
TLD (Thermoluminescent Dosimeter)
TOC (Table of Contents)
Townsite
Toxic
Tracking
Training
Transcription
Transfer
Transformer
Transmittal
Transport
Treatment
Trench
Trip Report
Tritium
TRU (Transuranic)
TSCA (Toxic Substances Control Act)
Tuballoy
Tuff

Underground
Update
Uranium
Urine
USGS (United States Geological Survey)
UST (Underground Storage Tank)
Utility

Validation
Variance
VE (Value Engineering)
Ventilation
Verification
Volatile
Volume

Warehouse
Waste
Water
WBS (Work Breakdown Structure)
Weapon
Well
Work
Working Group

Zinc

(119)

TABLE STATUS OF SITES AT TA-15, R-SITE

TA15-1-CA-1-HW/RW (Firing Sites)

Background--The first installations at R-Site were completed in 1944 and consisted of a central control building, a laboratory, a trimming building, a few hutments and small magazines, and several firing points (LASL 1947a).

A 1944 report describes a firing point 3/8 mile from the control building to use with charges up to about 50 lbs and a second firing point 1/2 mile distant with a large barricade, camera base, and subsurface instrument room (LASL 1944a). Engineering drawing R-5110 indicates that firing platforms TA-15-176 and -177 were removed in 1947. Whether they are the two firing points referred to above and where they were located is not known.

In 1944, a blast test was reported in "the Gulch" 1 mile below R-Site. Charges of up to 300 lb of Composition B and 500 lb of ammonium picrate were set off (LASL 1944b). Apparently, no further tests were done here.

In 1945, 2,500-lb shots were reported for TA-15 (LASL 1945). Then in 1946, the decision was made to designate the site a permanent location for firing explosives experiments involving charges up to as much as 2 tons. A series of small, permanent firing chambers and a new, large-scale firing site with an underground, timber control building were constructed (LASL 1947a).

In 1947, Group M-6 was using firing points A, B, C, and D at TA-15 and Group M-6 was using the "recently completed firing points E and F," (LASL 1947b).

Firing point A was located southwest of existing building TA-15-183 and was designated TA-15-14 on the ENG-R-131 location plan, dated 1951. Firing point B was a

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few hundred yards southwest of point A and was designated TA-15-74 on the same location plan.

According to a former employee, by 1957 neither of these firing points was being used. In 1965, a contamination survey indicated nondetectable levels of both high explosive and radionuclides at TA-15-14 and -74 (LASL 1965a, b). However, during a field survey, an employee remembered uranium contamination being found and soil being removed in the area that was, from his description, probably site A. No further documentation on decommissioning has been found. During the field survey, it was noted that the x-unit chamber firing points and associated structures are no longer at the site. Engineering drawings also indicate their absence.

Firing point C is identified as TA-15-35 on location plan ENG-R130. It was at the junction of the road to E-F-Site, according to ENG-R131, dated 1957. Firing point D, TA-15-34, was on the south side of the road between existing structures TA-15-41 and firing point C, as shown on ENG-R131.

ENG-R130 shows C and D to have been abandoned by the mid-1950s. A 1949 report does not mention C or D being active; thus they probably had discontinued operation even by that date (LASL 1949a). A field survey indicated that today, there are no remaining structures. No written documentation on decommissioning has been found.

In a 1983 interview, a former employee mentioned that south of the road going to E-F-Site is an area along the road "that may have contamination from various tests (E) 1983). The reference is probably to firing sites C and D.

Firing points E and F have been a major firing site since the 1940s at TA-15. ENG-R131, dated 1957, shows firing point E, TA-15-26, on the north and F, TA-15-36, on the south in the general area around control building TA-15-27, which remains in place today. The site is near the north rim of Potrillo Canyon. By the 1950s, x-unit chambers TA-15-36 and -26 were noted to have been removed, according to drawing ENG-R5110,

dated 1983. A large, central site with two mound walls was apparently built and remained in operation until a few years ago. It was referred to as E-F. At the time of the field survey, E-F was indicated to be inactive.

Many materials have been fired at E-F, including steel, aluminum, lithium hydride, uranium, mercury, lead, beryllium, boron, cadmium, gold, and possibly tritium. The types of high explosive that have been used include HMX, RDX, TNT, PETN, "Cycotol," and Baratol, an explosive containing barium (LASL 1973). Thorium was also fired (H-Div 1950a). Several 10,000s of kilograms of uranium are believed to have been fired at this site. A former employee stated that E-F-Site and Site R44 shared "equally in the amount of uranium expended at inactive sites at TA-15." He also said that E-F, R44, and R-45 were the three major sites for beryllium shots and that each probably fired similar amounts. CEARP files show many shots, some of which involved kilogram quantities of beryllium, to have been fired at TA-15.

Concentrations of the residues from shots in surrounding soils have been studied for a number of years. As early as 1948, samples of beryllium in soil were being taken. The background was found to be .13-.15 micrograms/gm sand for beryllium, with concentrations of up to 2.9 micrograms/gm sand after a shot (Hayes 1948 a, b). These data are believed to come from E-F-Site, but they could be from another. One report mentions that "an appreciable quantity of beryllium was found at a distance of 2,000 ft from the firing point," (H-Div 1958). The firing point is not identified, however.

In 1976, a survey of E-F firing points was made for radionuclides using a Phoswich meter. Berms on both sides of the firing point were found to be highly contaminated with uranium. Nowhere in the immediate area was there less than 10,000 c/m, and most of the area was more than 100,000 c/m (LASL 1976a). During another survey, uranium greater than 3,000 micrograms/g soil was found in some areas in surface soil at E-F-Site (LASL 1976b).

A memo discussing recent unpublished work by HSE-12 indicates that 1) beryllium is present in the E-F surface soils at slightly elevated levels, but is probably not present in soluble form, 2) lead is present in the surface soil at levels bordering on phototoxic levels, and 3) uranium is present at the several thousand ppm level in the surface soil and is of concern as a toxic heavy metal. The uranium is oxidizing into a soluble form, is being mobilized, and is moving downward into the lower soils (LANL 1985).

By 1949, in addition to firing points A, B, E, and F, firing points G and H were in use (LASL 1949b). On ENG-R131, G, TA-15-28, is shown just north of existing building TA-15-9. This facility was removed in 1967, according to engineering record ENG-R5110. No documentation on decommissioning was found. Firing site H, TA-15-17, was just northwest of the present Pulse High Energy Radiographic Machine Emitting X Rays (PHERMEX) facility. It must have been removed in the late 1950s when PHERMEX was built (ENG 1960). Again, no documentation on decommissioning was found.

By 1949, firing points I and J were also in operation. At that time, they were designated TA-15-32 and -31. They were transferred to Kappa Site for groups to use there and are now included in that site; hence, these firing areas are not included with TA-15.

By 1954, TA-15-44 and -45 had been built. During a field survey, R-44 was seen to be currently used for ballistic studies, and a gun is located at the site. Site R45 was not active at the time of the field survey, but there were indications that small shots may be fired in the near future. These two sites, although somewhat 'younger' than E-F, appear to have been the location at which large quantities of uranium and beryllium, and the same materials indicated for E-F, were fired.

However, the environmental studies performed at E-F have not included these two major firing sites. One would expect soil concentrations of beryllium and heavy metals to be elevated above background at these sites the same as as they are at E-F. A 1957

report indicates up to 1.7 micrograms beryllium/gm soil at R-44 (LASL 1957). In 1965, dirt around R-44 was sampled for 238-uranium and tritium; elevated levels were found (LASL 1965c).

Although extensive field surveys have not been made for R-44 and R-45, a great deal of shrapnel is believed to be at the sites.

CERCLA Finding--Uncertain for FFSDIF, PA, and PSI; therefore, there is not sufficient information to calculate MHRS and HRS Migration Mode Scores.

Planned Future Action--A CEARP Phase I supplemental study will be conducted to determine the presence or absence of hazardous substances and the potential for groundwater contamination. Based on the results of this study, appropriate action will be taken.

TA15-2-CA-A-HW/RW (Firing Sites)

Background--TA-15 has two large firing sites in use at the moment; the PHERMEX machine and associated firing pad and the ECTOR (a proper name, not an acronym) machine and associated firing facilities.

The PHERMEX, TA-15-184, is used for radiographic studies of explosives and explosive-driven metal systems; thus, the experiment itself is 'exploded' on the pad next to PHERMEX. The facility was built in the early 1960s and is on the south rim of Potrillo Canyon (Mader et al. 1980a). Materials studied--and therefore fired--include aluminum, copper, nickel, mercury, lead, thorium, uranium, and beryllium (Mader et al. 1980b). Large amounts of uranium have been involved in the shots, and one memo indicates that small amounts of gallium were also fired (LASL 1966a).

Cleaning to remove plutonium contamination was noted at building 186, part of PHERMEX, in 1967 (LASL 1967). In 1975, an upgrade for PHERMEX was undertaken. The instructions were, "Prior to any work in areas contaminated with 238-uranium and beryllium in front of the PHERMEX building, R-184, Zia should clean the immediate

area of debris and 2-4 inches of loose surface soil and sand, and remove all metal plates," (LASL 1975). Where this material was taken is not known.

ECTOR is a more recent machine. It is in TA-15-280 with firing point chamber TA-15-276. The same type of studies are done here as at the PHERMEX facility. Very little data appear to exist on the extent of contamination in the areas surrounding PHERMEX and ECTOR. At present, gun ballistic studies are being performed at R-44, a field survey revealed.

CERCLA Finding--Positive for FFSDIF, PA, and PSI. The site's uranium was ranked and gave an HRS Score of 12.3 and a MHRS Score of 1.4. Contamination in the surface water did not contribute to the score because no use is made of the surface water within 3 miles.

Planned Future Action--A CEARP Phase I supplemental reconnaissance field study will be conducted to determine the presence of hazardous substances and potential for groundwater contamination. Based on the results of this study, appropriate action will be taken.

TA15-3-CA-1-HW/RW (Holes)

Background--A series of holes, TA-15-264, -265, -270, -271, -272, and -273 is on the north side of the site near Three Mile Canyon. They are believed to be quite deep. In 1970, 4,000 lbs of TNT was fired in one hole. Later, at least one shot involving tritium took place (LASL 1970).

During the field survey, these holes were not carefully inspected to see whether adequate covers are being used and proper warning signs and/or fences are in place.

CERCLA Finding--Uncertain for FFSDIF, PA, and PSI; therefore, there is not sufficient information to calculate an HRS Migration Mode Score.

Planned Future Action--A CEARP Phase I supplemental study will be conducted to determine the presence or absence of hazardous substances and the potential for groundwater contamination. Based on the results of this study, appropriate action will be taken.

TA15-4-CA-I-HW/RW (Burning Area)

Background--A 1950 report states, "A test was conducted at R-Site to determine the feasibility of collecting by flypaper uranium oxide particles that had been dispersed into the air by burning the tuballoy (uranium) with gasoline and HE," (H-Div 1950b).

In 1979, small-scale burn tests of uranium turnings in contact with uranium rods took place near E-F-Site (LASL 1979a, b). Oil-soaked natural uranium turnings and scrap were also burned (LASL 1980).

During a field survey, one former employee recalled two occasions on which oil/uranium mixtures were burned 100-150 yards west of E-F-Site and others on which uranium was burned at E-F-Site itself.

CERCLA Finding--Uncertain for FFSDIF, PA, and PSI; therefore, MHRS and HRS Migration Mode Scores cannot be calculated.

Planned Future Action--A CEARP Phase I study will be conducted to determine the quantity and distribution of hazardous substances. Based on the results of this study, appropriate action will be taken.

TA15-5-CA-OD-I-HW/RW (Dumping by E-F into the Canyon and Other Areas)

Background--In 1954, a bulldozer was noted at the E-F point firing pit, apparently attempting to prepare a new pit after an old shot. Soil samples for uranium in this area showed concentrations of .1 percent, and beryllium was also present in concentrations high enough to require a respirator for the bulldozer operator (LASL 1954).

In 1955, a report said that the pit area was watered, the ground was broken with a chisel, and dirt was removed by a clam shovel to dump trucks and dumped over the edge of the canyon about 150 yards southeast of the pit. All workers wore respirators, which, when analyzed, showed beryllium in a truck driver's and in a bulldozer operator's filter (LASL 1955). The quantity of dirt removed was reported to be approximately 100 cubic yards (H-Div 1955). Whether dirt was also dumped at other times is not known.

In 1965, there was a report of a large, concrete chamber that had exploded on the edge of the rim of the canyon, approximately 500 ft south of E point. It was contaminated with 1 mR/h beta-gamma, and 7,000 cpm alpha was reported. Metal frames and boxes on the edge of the rim of the canyon, approximately 400 ft south of E point, showed 300-500 cpm alpha. Other debris in the two areas gave up to 5,000 cpm alpha (LASL 1965d). A CEARP field survey has not yet covered E-F-Site; therefore, the present status of open dumping at the site is not known.

In 1959, a note stated that it was all right for the contractor for the PHERMEX facility to use "the area known as the Contractors' Dump." Where it was located is not known (LASL 1959a). It may be Area M.

In 1983, the discovery was made that the people at TA-15 "had not followed their SOPs and depleted uranium was disposed of in several areas including a chemical waste disposal area and in trash on the canyon edge," (LANL 1983). What is meant by 'several areas' and where they may be is not known. Area Z might be that referred to as 'on the canyon edge.'

In the field survey, a small amount of concrete and building debris was found to have been dumped behind R-22. TA-15 also includes waste disposal sites Areas Z and N. More information on these areas is given in the section on waste disposal sites.

CERCLA Finding--Positive for FFSDIF, PA, and PSI; however, there is not enough information to calculate MHRS and HRS Migration Mode Scores.

Planned Future Action--A CEARP Phase I reconnaissance field study will be conducted to determine the quantity and distribution of hazardous substances. Based on the results of this study, appropriate action will be taken.

TA15-6-CA-1-HW/RW (Decommissioned Building Areas))

Background--The site had many buildings that are no longer present, according to engineering document R-5110 dated 1983. Except for the date removed, no information was found for decommissioning the following structures:

Structure	Use	Date of Removal
TA-15-175	Equipment Platform	1945
TA-15-176	Firing Platform	1947
TA-15-197	Firing Platform	1947
TA-15-24	Storage	1951
TA-15-79	Underground Tank	1952
TA-15-6	Control Chamber 'A'	1959
TA-15-3	Storage	1955
TA-15-4	Storage	1955
TA-15-5	Trimming Building	1962
TA-15-1	Laboratory and Shops	1962
TA-15-7	Office and Darkroom	1962
TA-15-11	Magazine	1967
TA-15-12	Magazine	1967
TA-15-13	Magazine	1967
TA-15-33	Radioactive Source Building	1967

Whether drains, sumps, and the like from the laboratory and shops, and the office and darkroom were removed and their state of contamination is not known. Also unknown is the status of contamination in the source building.

A mercury spill is known to have occurred in building 7 (H-Div 1952). Thorium contamination was found in building 1 (LASL 1950). Mercury was used in experiments in building 1 (LASL 1966).

On a 1948 topo map, what appears to be a bunker is shown near the present disposal area, N. Engineering records from 1957, ENG-R130 and R131, indicate this structure was no longer present.

Early in 1965, the following structures were surveyed and found to be free of high explosive and radionuclide contamination: TA-15-2, warehouse; TA-15-10, magazine; TA-15-15, control room; TA-15-16, instrument chamber; TA-15-21, -38, -68, -69, magazines; TA-15-71, plate barricade; TA-15-76 and -77, personnel shelters; TA-15-78, septic tank; TA-15-80, camera chamber; TA-15-98, control chamber; and TA-15-135, storage (LASL 1965a, b). In addition, structures TA-15-18, a magazine, and TA-15-34, -35, control chambers, were monitored and found to be free of radionuclides later in 1965 (LASL 1965d). These structures were all removed in 1967.

In 1965, R-71, a plate barricade, R125, a manhole, and R-126, a manhole, were found to be contaminated and the recommendation was to remove them to the contaminated dump (LASL 1965e). ENG-R5110, dated 1967, notes they were removed in 1967.

Although no documentation on the decommissioning of buildings at TA-15 has been found, disposal area N is noted to be "a pit located east of buildings R-23, TA-15, containing remnants of several structures from RSite, which had been exposed to explosives or chemical contamination," (LASL 1965f). Unless the pit was left open,

disposal area N must contain only buildings removed before 1965. Where the buildings removed during the 1967 work were put is not known.

CERCLA Finding--Uncertain for FFSDIF, PA, and PSI; therefore, an HRS Migration Mode Score cannot be calculated.

Planned Future Action--A CEARP Phase I study will be conducted to determine the quantity and distribution of hazardous substances. Based on the results of this study, appropriate action will be taken.

TA15-7-CA-1-RW/HW (Bunkers and Other Structures Still Standing)

Background--The dirt bunkers, TA-15-44 and -45, and E firing points are noted to contain low levels of uranium (LANL 1986). Cleaning beryllium in building R-233, the now-inactive betatron building, was noted in 1969 (LASL 1969). Beryllium contamination of the oil in diffusion pumps is reported for R-50 (LASL 1961a).

CERCLA Finding---

Planned Future Action--

TA15-8-S/ST/O-1-HW/RW (Inactive Sumps, Drains, Outfalls, Septic Tanks)

Background--As mentioned, in TA-15-4 section, there is no information on drains from buildings 1, 5, and 7. In a field survey, there was an indication that building R-23, inactive, has a septic tank, but that the tank is probably not contaminated with high explosive. This may be tank 80, noted on ENG-R5110 to be abandoned.

ENG R716 indicates that in 1958, the sanitary sewer from the camera firing point, building 92, removed in 1967, went to the edge of the canyon either with a seepage field or outfall. Whether this drain was contaminated with chemicals or high explosive and whether it was removed is not known.

ENG-R692 indicates that in 1958, building 8, a shop, was served by septic tank 147, which is still in place. The tank does not appear to be active. In a 1972 survey, this

tank was noted to have possible high explosive contamination (LASL 1972). ENG-R694, dated 1958, shows building 20, an assembly building, to have a drain connection that appears to go to a canyon outfall, in addition to having a drain to septic tank 51, the effluent from which also drained to a canyon outfall.

The overflow from septic tank 63 serving building 40 appears to have gone to an outfall, as shown on ENG-R694, dated 1958. Also that year, building 27, a control unit firing at E-F, was served by septic tank 72, which may have drained to a canyon outfall, see ENG R709. This system is no longer active and the possibility of contamination in the system and drainage area is not known.

In the 1960s, building R194 had a vapor degreaser and strip tanks (LASL 1961b). Besides the degreaser, solutions included H_2SO_4, chromate, and hydrochloric acid. In 1978, plans were drawn for a dry well approximately 4 ft in diameter and 50 ft deep to connect to the existing drain at R-194. Whether the well was constructed is not known (LASL 1978).

In the 1960s, building R-50 was noted to have two acid cleaning tanks draining to a sump "located at the edge of canyon," (LASL 1960). Another memo indicated that the drain might go into the canyon (LASL 1959b). In a field survey, R-50 was found to be used at present as a shop, and the sinks have been removed. The drain from the sinks was found to be still in place, to exit the building, and apparently to connect with the drainage ditch, which goes into the canyon. The building was also found to have floor drains. Building 203 used to have several sources that discharged cooling water to the canyon; it was reported during the field survey.

In the field survey, a hole covered by a lid was found; liquid was moving into the hole. This may be the dry well that was designed for TA-15-194, or a sump for TA-15-50, or some other sump. No one at the time of the field survey knew the origin of the liquid flowing into the hole.

An old, undated NPDES map indicates that there were two outfalls at building 40. The northwest outfall included photo wastes, whereas the outfall to the northeast was for cooling water. Cooling water discharge from R-44 is also shown.

CERCLA Finding??

Planned Future Action---

TA15-9-S/ST/O-A-HW/RW (Active Sumps, Drains, Outfalls, Septic Tanks)

Background--The write-up on inactive sumps, drains, and the like, mentioned that during a field survey near TA-15-144, a hole was found with liquid flowing into it. The source of the liquid is not known. Near building TA-15-144 is building TA-15-203, in which a compressor is located. Its cooling water is routed to a drainage ditch outside the building. The ditch runs to the edge of the canyon.

The chemical drains in building TA-15-183, including one down which developer is poured, were found to go to an outfall behind the building. During a field survey, the building was found to have floor drains through which cooling water was routed; however, their destination is unknown.

In the PHERMEX facility, floor drains from the buildings are routed to an outside ditch. An oil spill in the facility resulted in oil discharging to the ditch. Routinely, cooling water discharges to the floor drains, and therefore, also to the ditch. This facility is also served by a wet cooling tower. In 1971, the volume of blowdown from the tower was indicated to be 360,000 gpy; organo chelates were being used to control dissolved solids (LASL 1971).

Building TA-15-263 was found during the field survey to house a laser that apparently uses once-through cooling water, which discharges to a ditch.

The ECTOR facility includes water-cooled lasers. The water goes to a ditch, which drains into the canyon--it was indicated during the field survey.

Active septic tanks at TA-15 include TA-15-51 and -61, the overflow goes to a seepage pit; TA-15-62, the overflow goes to a drain line and appears to go to the canyon (information from (ENG R699 and a 1981 Zia report); TA-15-63, the overflow goes to a seepage pit; TA-15-195, the overflow goes to a seepage pit, requires pumping and has a scum layer, which may be the result of 'nonsanitary waste' being dumped in it; TA-15-205 and -282, overflow goes to leach fields; and TA-15-293, the overflow goes to a seepage pit (Pan Am 1986).

The fate of septic tank 284, which may have served TA-15-233, the betatron building, and of -286, which probably served TA-15-285, the confinement and test facility, is not known. Although they are not on Pan Am's list, ENG-R-5110 indicates that they are probably still being used.

A 1972 survey indicated that tank TA-15-51 was possibly contaminated with high explosive (LASL 1972). In 1981, the tank was found to be 'daylighting' (surfacing) to the canyon. Samples were taken, and no high explosive was detected (Zia 1981). Over the years of operation, whether chemicals were released to sanitary systems is not known. Thus, whether drains, seepage pits, and leach fields have become contaminated is not known.

CERCLA Finding--Uncertain for FFSDIF, PA, and PSI; therefore, there is not sufficient information to calculate an HRS Migration Mode Score.

Planned Future Action--A CEARP Phase I supplemental study will be conducted to determine the presence or absence of hazardous substances and the potential for groundwater contamination. Based on the results of this study, appropriate action will be taken.

TA15-10-UST-A-PP (Underground Storage Tanks)

Background--On ENG-R5110, underground fuel tank TA-15-48 is shown near the old shop, and underground fuel tank TA-15-52 near old assembly building, TA-15-20. During a

field survey, it was found that underground storage tank TA-15-266 is used to store oil for the Marx generators for PHERMEX. The survey indicated underground tank TA-15-287 was empty at the moment. Some confusion exists about these two underground tanks and their status (i.e.,-287 may be in use, and not -266).

CERCLA Findings??

Planned Future Action--A CEARP Phase I supplemental study will be conducted to determine the presence or absence of hazardous substances and the potential for groundwater contamination. Based on the results of this study, appropriate action will be taken.

TA15-11-CA-1/A-HW (PCBs)

Background--A broken capacitor containing PCBs was reported for TA-15-183 in 1961 (LASL 1961c). During the field survey, all capacitors in TA-15-183 were found to contain PCBs.

CERCLA Finding??

Planned Future Action--A CEARP Phase I supplemental study will be conducted to determine the presence or absence of hazardous substances and the potential for groundwater contamination. Based on the results of this study, appropriate action will be taken.

TA15-12-CA-1-HW (Vacuum Pump Oil)

Background--Reports say that in the early days, used vacuum pump oil was dumped on the ground whenever it was deemed convenient to do so. (Employee interview not in files regarding this--John's citation--might omit--Betty).

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TABLE STATUS OF SITES AT TA-15, R-SITE

TA15-1-CA-1-HW/RW (Firing Sites)

Background--The first installations at R-Site were completed in 1944 and consisted of a central control building, a laboratory, a trimming building, a few hutments and small magazines, and several firing points (LASL 1947a).

A 1944 report describes a firing point 3/8 mile from the control building to use with charges up to about 50 lbs and a second firing point 1/2 mile distant with a large barricade, camera base, and subsurface instrument room (LASL 1944a). Engineering drawing R-5110 indicates that firing platforms TA-15-176 and -177 were removed in 1947. Whether they are the two firing points referred to above and where they were located is not known.

In 1944, a blast test was reported in "the Gulch" 1 mile below R-Site. Charges of up to 300 lb of Composition B and 500 lb of ammonium picrate were set off (LASL 1944b). Apparently, no further tests were done here.

In 1945, 2,500-lb shots were reported for TA-15 (LASL 1945). Then in 1946, the decision was made to designate the site a permanent location for firing explosives experiments involving charges up to as much as 2 tons. A series of small, permanent firing chambers and a new, large-scale firing site with an underground, timber control building were constructed (LASL 1947a).

In 1947, Group M-6 was using firing points A, B, C, and D at TA-15 and Group M-6 was using the "recently completed firing points E and F," (LASL 1947b).

Firing point A was located southwest of existing building TA-15-183 and was designated TA-15-14 on the ENG-R-131 location plan, dated 1951. Firing point B was a

few hundred yards southwest of point A and was designated TA-15-74 on the same location plan.

According to a former employee, by 1957 neither of these firing points was being used. In 1965, a contamination survey indicated nondetectable levels of both high explosive and radionuclides at TA-15-14 and -74 (LASL 1965a, b). However, during a field survey, an employee remembered uranium contamination being found and soil being removed in the area that was, from his description, probably site A. No further documentation on decommissioning has been found. During the field survey, it was noted that the x-unit chamber firing points and associated structures are no longer at the site. Engineering drawings also indicate their absence.

Firing point C is identified as TA-15-35 on location plan ENG-R130. It was at the junction of the road to E-F-Site, according to ENG-R131, dated 1957. Firing point D, TA-15-34, was on the south side of the road between existing structures TA-15-41 and firing point C, as shown on ENG-R131.

ENG-R130 shows C and D to have been abandoned by the mid-1950s. A 1949 report does not mention C or D being active; thus they probably had discontinued operation even by that date (LASL 1949a). A field survey indicated that today, there are no remaining structures. No written documentation on decommissioning has been found.

In a 1983 interview, a former employee mentioned that south of the road going to E-F-Site is an area along the road "that may have contamination from various tests (El 1983). The reference is probably to firing sites C and D.

Firing points E and F have been a major firing site since the 1940s at TA-15. ENG-R131, dated 1957, shows firing point E, TA-15-26, on the north and F, TA-15-36, on the south in the general area around control building TA-15-27, which remains in place today. The site is near the north rim of Potrillo Canyon. By the 1950s, x-unit chambers TA-15-36 and -26 were noted to have been removed, according to drawing ENG-R5110,

dated 1983. A large, central site with two mounds (units) was apparently built and remained in operation until a few years ago. It was referred to as E-F. At the time of the field survey, E-F was indicated to be inactive.

Many materials have been fired at E-F, including steel, aluminum, lithium hydride, uranium, mercury, lead, beryllium, boron, cadmium, gold, and possibly tritium. The types of high explosive that have been used include HMX, RDX, TNT, PETN, "Cycotol," and Baratol, an explosive containing barium (LASL 1973). Thorium was also fired (H-Div 1950a). Several 10,000s of kilograms of uranium are believed to have been fired at this site.

The US DOE Onsite Discharge Information System as of 7/12/82 lists the total amount of natural uranium expended at TA-15 as 13,950 Ci and 238-U as 11,085 Ci

A former employee stated that E-F-Site and Site R44 shared "equally in the amount of uranium expended at inactive sites at TA-15." He also said that E-F, R44, and R-45 were the three major sites for beryllium shots and that each probably fired similar amounts. CEARP files show many shots, some of which involved kilogram quantities of beryllium, to have been fired at TA-15.

Concentrations of the residues from shots in surrounding soils have been studied for a number of years. As early as 1948, samples of beryllium in soil were being taken. The background was found to be .13-.15 micrograms/gm sand for beryllium, with concentrations of up to 2.9 micrograms/gm sand after a shot (Hayes 1948 a, b). These data are believed to come from E-F-Site, but they could be from another. One report mentions that "an appreciable quantity of beryllium was found at a distance of 2,000 ft from the firing point," (H-Div 1958). The firing point is not identified, however.

In 1976, a survey of E-F firing points was made for radionuclides using a Phoswich meter. Berms on both sides of the firing point were found to be highly contaminated with uranium. Nowhere in the immediate area was there less than 10,000 c/m, and most of the area was more than 100,000 c/m (LASL 1976a). During another survey, uranium greater than 3,000 micrograms/g soil was found in some areas in surface soil at E-F-Site (LASL 1976b).

A memo discussing recent unpublished work by HSE-12 indicates that 1) beryllium is present in the E-F surface soils at slightly elevated levels, but is probably not present in soluble form, 2) lead is present in the surface soil at levels bordering on phototoxic levels, and 3) uranium is present at the several thousand ppm level in the surface soil and is of concern as a toxic heavy metal. The uranium is oxidizing into a soluble form, is being mobilized, and is moving downward into the lower soils (LANL 1985).

By 1949, in addition to firing points A, B, E, and F, firing points G and H were in use (LASL 1949b). On ENG-R131, G, TA-15-28, is shown just north of existing building TA-15-9. This facility was removed in 1967, according to engineering record ENG-R5110. No documentation on decommissioning was found. Firing site H, TA-15-17, was just northwest of the present Pulse High Energy Radiographic Machine Emitting X Rays (PHERMEX) facility. It must have been removed in the late 1950s when PHERMEX was built (ENG 1960). Again, no documentation on decommissioning was found.

By 1949, firing points I and J were also in operation. At that time, they were designated TA-15-32 and -31. They were transferred to Kappa Site for groups to use there and are now included in that site; hence, these firing areas are not included with TA-15.

By 1954, TA-15-44 and -45 had been built. During a field survey, R-44 was seen to be currently used for ballistic studies, and a gun is located at the site. Site R45 was not active at the time of the field survey, but there were indications that small shots may be fired in the near future. These two sites, although somewhat 'younger' than E-F, appear to have been the location at which large quantities of uranium and beryllium, and the same materials indicated for E-F, were fired.

However, the environmental studies performed at E-F have not included these two major firing sites. One would expect soil concentrations of beryllium and heavy metals to be elevated above background at these sites the same as as they are at E-F. A 1957

report indicates up to 1.7 micrograms beryllium/gm soil at R-44 (LASL 1957). In 1965, dirt around R-44 was sampled for 238-uranium and tritium; elevated levels were found (LASL 1965c).

Although extensive field surveys have not been made for R-44 and R-45, a great deal of shrapnel is believed to be at the sites.

CERCLA Finding--Uncertain for FFSDIF, PA, and PSI; therefore, there is not sufficient information to calculate MHRS and HRS Migration Mode Scores.

Planned Future Action--A CEARP Phase I supplemental study will be conducted to determine the presence or absence of hazardous substances and the potential for groundwater contamination. Based on the results of this study, appropriate action will be taken.

TA15-2-CA-A-HW/RW (Firing Sites)

Background--TA-15 has two large firing sites in use at the moment; the PHERMEX machine and associated firing pad and the ECTOR (a proper name, not an acronym) machine and associated firing facilities.

The PHERMEX, TA-15-184, is used for radiographic studies of explosives and explosive-driven metal systems; thus, the experiment itself is 'exploded' on the pad next to PHERMEX. The facility was built in the early 1960s and is on the south rim of Potrillo Canyon (Mader et al. 1980a). Materials studied--and therefore fired--include aluminum, copper, nickel, mercury, lead, thorium, uranium, and beryllium (Mader et al. 1980b). Large amounts of uranium have been involved in the shots, and one memo indicates that small amounts of gallium were also fired (LASL 1966a).

Cleaning to remove plutonium contamination was noted at building 186, part of PHERMEX, in 1967 (LASL 1967). In 1975, an upgrade for PHERMEX was undertaken. The instructions were, "Prior to any work in areas contaminated with 238-uranium and beryllium in front of the PHERMEX building, R-184, Zia should clean the immediate

area of debris and 2-4 inches of loose surface soil and sand, and remove all metal plates," (LASL 1975). Where this material was taken is not known.

ECTOR is a more recent machine. It is in TA-15-280 with firing point chamber TA-15-276. The same type of studies are done here as at the PHERMEX facility. Very little data appear to exist on the extent of contamination in the areas surrounding PHERMEX and ECTOR. At present, gun ballistic studies are being performed at R-44, a field survey revealed.

CERCLA Finding--Positive for FFSDIF, PA, and PSI. The site's uranium was ranked and gave an HRS Score of 12.3 and a MHRS Score of 1.4. Contamination in the surface water did not contribute to the score because no use is made of the surface water within 3 miles.

Planned Future Action--A CEARP Phase I supplemental reconnaissance field study will be conducted to determine the presence of hazardous substances and potential for groundwater contamination. Based on the results of this study, appropriate action will be taken.

TA15-3-CA-I-HW/RW (Holes)

Background--A series of holes, TA-15-264, -265, -270, -271, -272, and -273 is on the north side of the site near Three Mile Canyon. They are believed to be quite deep. In 1970, 4,000 lbs of TNT was fired in one hole. Later, at least one shot involving tritium took place (LASL 1970).

During the field survey, these holes were not carefully inspected to see whether adequate covers are being used and proper warning signs and/or fences are in place.

CERCLA Finding--Uncertain for FFSDIF, PA, and PSI; therefore, there is not sufficient information to calculate an HRS Migration Mode Score.

Planned Future Action--A CEARP Phase I supplemental study will be conducted to determine the presence or absence of hazardous substances and the potential for groundwater contamination. Based on the results of this study, appropriate action will be taken.

TA15-4-CA-I-HW/RW (Burning Area)

Background--A 1950 report states, "A test was conducted at R-Site to determine the feasibility of collecting by flypaper uranium oxide particles that had been dispersed into the air by burning the tuballoy (uranium) with gasoline and HE," (H-Div 1950b).

In 1979, small-scale burn tests of uranium turnings in contact with uranium rods took place near E-F-Site (LASL 1979a, b). Oil-soaked natural uranium turnings and scrap were also burned (LASL 1980).

During a field survey, one former employee recalled two occasions on which oil/uranium mixtures were burned 100-150 yards west of E-F-Site and others on which uranium was burned at E-F-Site itself.

CERCLA Finding--Uncertain for FFSDIF, PA, and PSI; therefore, MHRS and HRS Migration Mode Scores cannot be calculated.

Planned Future Action--A CEARP Phase I study will be conducted to determine the quantity and distribution of hazardous substances. Based on the results of this study, appropriate action will be taken.

TA15-5-CA-OD-I-HW/RW (Dumping by E-F Into the Canyon and Other Areas)

Background--In 1954, a bulldozer was noted at the E-F point firing pit, apparently attempting to prepare a new pit after an old shot. Soil samples for uranium in this area showed concentrations of .1 percent, and beryllium was also present in concentrations high enough to require a respirator for the bulldozer operator (LASL 1954).

In 1955, a report said that the pit area was watered, the ground was broken with a chisel, and dirt was removed by a clam shovel to dump trucks and dumped over the edge of the canyon about 150 yards southeast of the pit. All workers wore respirators, which, when analyzed, showed beryllium in a truck driver's and in a bulldozer operator's filter (LASL 1955). The quantity of dirt removed was reported to be approximately 100 cubic yards (H-Div 1955). Whether dirt was also dumped at other times is not known.

In 1965, there was a report of a large, concrete chamber that had exploded on the edge of the rim of the canyon, approximately 500 ft south of E point. It was contaminated with 1 mR/h beta-gamma, and 7,000 cpm alpha was reported. Metal frames and boxes on the edge of the rim of the canyon, approximately 400 ft south of E point, showed 300-500 cpm alpha. Other debris in the two areas gave up to 5,000 cpm alpha (LASL 1965d). A CEARP field survey has not yet covered E-F-Site; therefore, the present status of open dumping at the site is not known.

In 1959, a note stated that it was all right for the contractor for the PHERMEX facility to use "the area known as the Contractors' Dump." Where it was located is not known (LASL 1959a). It may be Area M.

omit pit's of the quote?

It was updated that it had been discovered that

In 1983, ~~the discovery was made that the people at~~ TA-15 "had not followed their ~~SOPs and~~ depleted uranium was disposed of in several areas including a chemical waste disposal area and in trash on the canyon edge." (LANL 1983). What is meant by 'several areas' and where they may be is not known. Area Z might be that referred to as 'on the canyon edge.'

In the field survey, a small amount of concrete and building debris was found to have been dumped behind R-22. TA-15 also includes waste disposal sites Areas Z and N. More information on these areas is given in the section on waste disposal sites.

CERCLA Finding--Positive for FFSDIF, PA, and PSI; however, there is not enough information to calculate MHRS and HRS Migration Mode Scores.

Planned Future Action--A CEARP Phase I reconnaissance field study will be conducted to determine the quantity and distribution of hazardous substances. Based on the results of this study, appropriate action will be taken.

TA15-6-CA-I-HW/RW (Decommissioned Building Areas))

Background--The site had many buildings that are no longer present, according to engineering document R-5110 dated 1983. Except for the date removed, no information was found for decommissioning the following structures:

Structure	Use	Date of Removal
TA-15-175	Equipment Platform	1945
TA-15-176	Firing Platform	1947
TA-15-197	Firing Platform	1947
TA-15-24	Storage	1951
TA-15-79	Underground Tank	1952
TA-15-6	Control Chamber 'A'	1959
TA-15-3	Storage	1955
TA-15-4	Storage	1955
TA-15-5	Trimming Building	1962
TA-15-1	Laboratory and Shops	1962
TA-15-7	Office and Darkroom	1962
TA-15-11	Magazine	1967
TA-15-12	Magazine	1967
TA-15-13	Magazine	1967
TA-15-33	Radioactive Source Building	1967

Whether drains, sumps, and the like from the laboratory and shops, and the office and darkroom were removed and their state of contamination is not known. Also unknown is the status of contamination in the source building.

A mercury spill is known to have occurred in building 7 (H-Div 1952). Thorium contamination was found in building 1 (LASL 1950). Mercury was used in experiments in building 1 (LASL 1966).

On a 1948 topo map, what appears to be a bunker is shown near the present disposal area, N. Engineering records from 1957, ENG-R130 and R131, indicate this structure was no longer present.

Early in 1965, the following structures were surveyed and found to be free of high explosive and radionuclide contamination: TA-15-2, warehouse; TA-15-10, magazine; TA-15-15, control room; TA-15-16, instrument chamber; TA-15-21, -38, -68, -69, magazines; TA-15-71, plate barricade; TA-15-76 and -77, personnel shelters; TA-15-78, septic tank; TA-15-80, camera chamber; TA-15-98, control chamber; and TA-15-135, storage (LASL 1965a, b). In addition, structures TA-15-18, a magazine, and TA-15-34, -35, control chambers, were monitored and found to be free of radionuclides later in 1965 (LASL 1965d). These structures were all removed in 1967.

In 1965, R-71, a plate barricade, R125, a manhole, and R-126, a manhole, were found to be contaminated and the recommendation was to remove them to the contaminated dump (LASL 1965e). ENG-R5110, dated 1967, notes they were removed in 1967.

Although no documentation on the decommissioning of buildings at TA-15 has been found, disposal area N is noted to be "a pit located east of buildings R-23, TA-15, containing remnants of several structures from RSite, which had been exposed to explosives or chemical contamination," (LASL 1965f). Unless the pit was left open,

disposal area N must contain only buildings removed before 1965. Where the buildings removed during the 1967 work were put is not known.

CERCLA Finding--Uncertain for FFSDIF, PA, and PSI; therefore, an HRS Migration Mode Score cannot be calculated.

Planned Future Action--A CEARP Phase I study will be conducted to determine the quantity and distribution of hazardous substances. Based on the results of this study, appropriate action will be taken.

TA15-7-CA-1-RW/HW (Bunkers and Other Structures Still Standing)

Background--The dirt bunkers, TA-15-44 and -45, and E firing points are noted to contain low levels of uranium (LANL 1986). Cleaning beryllium in building R-233, the now-inactive betatron building, was noted in 1969 (LASL 1969). Beryllium contamination of the oil in diffusion pumps is reported for R-50 (LASL 1961a).

CERCLA Finding---

Planned Future Action--

TA15-8-S/ST/O-1-HW/RW (Inactive Sumps, Drains, Outfalls, Septic Tanks)

Background--As mentioned, in TA-15-4 section, there is no information on drains from buildings 1, 5, and 7. In a field survey, there was an indication that building R-23, inactive, has a septic tank, but that the tank is probably not contaminated with high explosive. This may be tank 80, noted on ENG-R5110 to be abandoned.

ENG R716 indicates that in 1958, the sanitary sewer from the camera firing point, building 92, removed in 1967, went to the edge of the canyon either with a seepage field or outfall. Whether this drain was contaminated with chemicals or high explosive and whether it was removed is not known.

ENG-R692 indicates that in 1958, building 8, a shop, was served by septic tank 147, which is still in place. The tank does not appear to be active. In a 1972 survey, this

tank was noted to have possible high explosive contamination (LASL 1972). ENG-R694, dated 1958, shows building 20, an assembly building, to have a drain connection that appears to go to a canyon outfall, in addition to having a drain to septic tank 51, the effluent from which also drained to a canyon outfall.

The overflow from septic tank 63 serving building 40 appears to have gone to an outfall, as shown on ENG-R694, dated 1958. Also that year, building 27, a control unit firing at E-F, was served by septic tank 72, which may have drained to a canyon outfall, see ENG R709. This system is no longer active and the possibility of contamination in the system and drainage area is not known.

In the 1960s, building R194 had a vapor degreaser and strip tanks (LASL 1961b). Besides the degreaser, solutions included H_2SO_4, chromate, and hydrochloric acid. In 1978, plans were drawn for a dry well approximately 4 ft in diameter and 50 ft deep to connect to the existing drain at R-194. Whether the well was constructed is not known (LASL 1978).

In the 1960s, building R-50 was noted to have two acid cleaning tanks draining to a sump "located at the edge of canyon," (LASL 1960). Another memo indicated that the drain might go into the canyon (LASL 1959b). In a field survey, R-50 was found to be used at present as a shop, and the sinks have been removed. The drain from the sinks was found to be still in place, to exit the building, and apparently to connect with the drainage ditch, which goes into the canyon. The building was also found to have floor drains. Building 203 used to have several sources that discharged cooling water to the canyon; it was reported during the field survey.

In the field survey, a hole covered by a lid was found; liquid was moving into the hole. This may be the dry well that was designed for TA-15-194, or a sump for TA-15-50, or some other sump. No one at the time of the field survey knew the origin of the liquid flowing into the hole.

An old, undated NPDES map indicates that there were two outfalls at building 40. The northwest outfall included photo wastes, whereas the outfall to the northeast was for cooling water. Cooling water discharge from R-44 is also shown.

CERCLA Finding??

Planned Future Action---

TA15-9-S/ST/O-A-HW/RW (Active Sumps, Drains, Outfalls, Septic Tanks)

Background--The write-up on inactive sumps, drains, and the like, mentioned that during a field survey near TA-15-144, a hole was found with liquid flowing into it. The source of the liquid is not known. Near building TA-15-144 is building TA-15-203, in which a compressor is located. Its cooling water is routed to a drainage ditch outside the building. The ditch runs to the edge of the canyon.

The chemical drains in building TA-15-183, including one down which developer is poured, were found to go to an outfall behind the building. During a field survey, the building was found to have floor drains through which cooling water was routed; however, their destination is unknown.

In the PHERMEX facility, floor drains from the buildings are routed to an outside ditch. An oil spill in the facility resulted in oil discharging to the ditch. Routinely, cooling water discharges to the floor drains, and therefore, also to the ditch. This facility is also served by a wet cooling tower. In 1971, the volume of blowdown from the tower was indicated to be 360,000 gpy; organo chelates were being used to control dissolved solids (LASL 1971).

Building TA-15-263 was found during the field survey to house a laser that apparently uses once-through cooling water, which discharges to a ditch.

The ECTOR facility includes water-cooled lasers. The water goes to a ditch, which drains into the canyon--it was indicated during the field survey.

Active septic tanks at TA-15 include TA-15-51 and -61, the overflow goes to a seepage pit; TA-15-62, the overflow goes to a drain line and appears to go to the canyon (information from (ENG R699 and a 1981 Zia report); TA-15-63, the overflow goes to a seepage pit; TA-15-195, the overflow goes to a seepage pit, requires pumping and has a scum layer, which may be the result of 'nonsanitary waste' being dumped in it; TA-15-205 and -282, overflow goes to leach fields; and TA-15-293, the overflow goes to a seepage pit (Pan Am 1986).

The fate of septic tank 284, which may have served TA-15-233, the betatron building, and of 7-286, which probably served TA-15-285, the confinement and test facility, is not known. Although they are not on Pan Am's list, ENG-R-5110 indicates that they are probably still being used.

A 1972 survey indicated that tank TA-15-51 was possibly contaminated with high explosive (LASL 1972). In 1981, the tank was found to be 'daylighting' (surfacing) to the canyon. Samples were taken, and no high explosive was detected (Zia 1981). Over the years of operation, whether chemicals were released to sanitary systems is not known. Thus, whether drains, seepage pits, and leach fields have become contaminated is not known.

CERCLA Finding--Uncertain for FFSDIF, PA, and PSI; therefore, there is not sufficient information to calculate an HRS Migration Mode Score.

Planned Future Action--A CEARP Phase I supplemental study will be conducted to determine the presence or absence of hazardous substances and the potential for groundwater contamination. Based on the results of this study, appropriate action will be taken.

TA15-10-UST-A-PP (Underground Storage Tanks)

Background--On ENG-R5110, underground fuel tank TA-15-48 is shown near the old shop, and underground fuel tank TA-15-52 near old assembly building, TA-15-20. During a

EI 1983: CEARP Phase I interview with Los Alamos Scientific Laboratory employee on Nov. 14, 1983; CEARP files at Los Alamos National Laboratory.

ENG 1960: Los Alamos Scientific Laboratory engineering record ENG-R131, 1960.

Hayes 1948a, b: CEARP files at LANL; letter from Russell Hayes, University of Rochester, School of Medicine and Dentistry, to H.F. Schulte, Los Alamos Scientific Laboratory, a) Sept. 17, 1948, b) Sept. 30, 1948.

H-Div 1950a: Los Alamos Scientific Laboratory, *H Division Progress Report*, March 20-April 20, 1950.

H-Div 1950b: Los Alamos Scientific Laboratory, *H Division Progress Report*, May 20-June20, 1950, p. 12.

H-Div 1952: Los Alamos Scientific Laboratory, *H Division Progress Report*, Aug. 20-Sept. 20, 1952, p. 22.

H-Div 1955: Los Alamos Scientific Laboratory, *H Division Progress Report*, Feb. 20-March 20, 1955, p. 20.

H-Div 1958: Los Alamos Scientific Laboratory, *H Division Progress Report*, Apr. 20-May 20, 1958, p. 5.

LANL 1983: Los Alamos National Laboratory, "Operational Waste Management Advisory Committee Minutes," July 22, 1983, p. 1.

LANL 1985: Los Alamos National Laboratory, memo to John Rodgers from E.J. Cokal, "~~Construction~~ Continuation of of E-F Work Following My Transfer," March 27, 1985.

LANL 1986: Karen A. Balo and John L. Warren, "Waste Management Site Plan," Los Alamos National Laboratory report LA-UR-86990, March 1986, p. 61.

LASL 1944a: Los Alamos Scientific Laboratory, *E-5 Interim Report*, June 1944.

LASL 1944b: Los Alamos Scientific Laboratory, Henry Linschitz *Terminal Observations Progress Report*, July 28, 1944, p. 2.

LASL 1945: Los Alamos Scientific Laboratory memo to Safety Committee from Cdr. N.E. Bradbury, "Procedures for 2,500-lb Shots at R-Site," May 1945.

LASL 1947a: *A Technical Maintenance Group Report on General Background Data Concerning the Los Alamos Scientific Laboratory Required for Planning Purposes*, Los Alamos Scientific Laboratory report LAB-A-5, Sept. 11, 1947, p. 11.

LASL 1947b: *A Technical Maintenance Group Report on Background Data Concerning the Organization, Space Occupancy, and Building Requirements of the Los Alamos Scientific Laboratory*, Los Alamos Scientific Laboratory report LAB-A5-2, Nov. 4, 1947, pp. 10-12.

LASL 1949a: Los Alamos Scientific Laboratory untitled report, Nov. 16, 1949; in the CEARP files at LANL.

LASL 1949b: Los Alamos Scientific Laboratory memo to Distribution from Roy Reider, "R-Site Procedures," Nov. 18, 1949.

LASL 1950: Los Alamos Scientific Laboratory memo to Charles H. Perry from Carl Buckland, "Thorium Survey, R-Site," April 15, 1950.

LASL 1954: Los Alamos Scientific Laboratory memo to H.F. Schulte from M.C. Robbins, "Beryllium Contamination of Firing Pit at R-Site," Aug. 12, 1954.

TA 15 - 13 - I - 1 - HW

The PHERMEX facility TA-15-182 in addition to being used as an experiment site is also used for waste treatment in that waste scraps of HE are detonated there in order to safely dispose of them. It was found in the field survey.

Find out if any ~~in~~ scraps are ever scattered & left on ground (Problem is probably minor compared to experimental firing)

TA 15 - 14 - CA - A - HW

Bunkers TA-15-41 + TA-15-242 are used for storage of scrap HE for short periods of time until it can be disposed of safely. Quantities stored at one location never exceed 55 gallon.

In 1955, a report said that the pit area was watered, the ground was broken with a chisel, and dirt was removed by a clam shovel to dump trucks and dumped over the edge of the canyon about 150 yards southeast of the pit. All workers wore respirators, which, when analyzed, showed beryllium in a truck driver's and in a bulldozer operator's filter (LASL 1955). The quantity of dirt removed was reported to be approximately 100 cubic yards (H-Div 1955). Whether dirt was also dumped at other times is not known.

In 1965, there was a report of a large, concrete chamber that had exploded on the edge of the rim of the canyon, approximately 500 ft south of E point. It was contaminated with 1 mR/h beta-gamma, and 7,000 cpm alpha was reported. Metal frames and boxes on the edge of the rim of the canyon, approximately 400 ft south of E point, showed 300-500 cpm alpha. Other debris in the two areas gave up to 5,000 cpm alpha (LASL 1965d). A CEARP field survey has not yet covered E-F-Site; therefore, the present status of open dumping at the site is not known.

In 1959, a note stated that it was all right for the contractor for the PHERMEX facility to use "the area known as the Contractors' Dump." Where it was located is not known (LASL 1959a). It may be Area M.

In 1983, the discovery was made that the people at TA-15 "had not followed their SOPs and depleted uranium was disposed of in several areas including a chemical waste disposal area and in trash on the canyon edge," (LANL 1983). What is meant by 'several areas' and where they may be is not known. Area Z might be that referred to as 'on the canyon edge.'

In the field survey, a small amount of concrete and building debris was found to have been dumped behind R-22. More information on these areas is given in the section on waste disposal sites. TA-15 also includes waste disposal sites Areas Z and N.

LASL 1955: Los Alamos Scientific Laboratory memo to H.F. Schulte from M. Chain Robbins and B.C. Eutsler, "Removal of Beryllium from the Firing Pit of E-F Point at R-Site," March 18, 1955.

LASL 1957: Los Alamos Scientific Laboratory, GMX-4, Sheet 1564, July 24, 1957.

LASL 1959a: Los Alamos Scientific Laboratory memo to R.E. Dunning, LAAO, from LASL Engineering Department, "Contractors' Dump," May 13, 1959.

LASL 1959b: Los Alamos Scientific Laboratory memo to F.R. Tesche from C.B. Westfall, "Ventilation for Soldering, Welding, and Cleaning Operations in Building R-50," Dec. 16, 1959.

LASL 1960: Los Alamos Scientific Laboratory, "Industrial Hygiene Group H-5 Plan Approval," April 25, 1960.

LASL 1961a: Los Alamos Scientific Laboratory, "Survey Sheet, R-Site," Feb. 14, 1961.

LASL 1961b: Los Alamos Scientific Laboratory, "Industrial Hygiene Group H-5 Plan Approval," March 3, 1961.

LASL 1961c: Los Alamos Scientific Laboratory, "Industrial Hygiene Group H-5 Plan Approval," March 25, 1961.

LASL 1965a: Los Alamos Scientific Laboratory memo to S.E. Russo from W.C. Courtright, "Contamination Survey," Jan. 16, 1965.

LASL 1965b: Los Alamos Scientific Laboratory memo to S.E. Russo from Carl Buckland, "Radiation Survey: R-Site Structures," Jan. 18, 1965.

LASL 1965c: Los Alamos Scientific Laboratory memo to Dean Meyer from Donald R. Gibbons, "Soil Samples at R-Site," Feb. 4, 1965.

LASL 1965d: Los Alamos Scientific Laboratory memo to Carl Buckland from Donald R. Gibbons, "R-Site Radioactive Contamination Survey," June 18, 1965, p. 3.

LASL 1965e: Los Alamos Scientific Laboratory memo to S.E. Russo from Carl Buckland, "Radioactive Contamination Survey: R-Site Structures," June 21, 1965.

LASL 1965f: Los Alamos Scientific Laboratory memo to Distribution from LASL Engineering Department, "Material Disposal Areas--Revised Drawing ENG-R-102, (Rev 12)," April 12, 1965.

LASL 1966a: Los Alamos Scientific Laboratory, "Health Inspection," Feb. 2, 1966.

LASL 1966b: Los Alamos Scientific Laboratory, GMX-11 Monitoring Sheet, April 26, 1966.

LASL 1967: Los Alamos Scientific Laboratory, GMX-11 Monitoring Sheet, April 4, 1967.

LASL 1969: Los Alamos Scientific Laboratory, H-5 Sample Sheet for GMX-11, Sheet 50 of laboratory book 1432," April 17, 1969.

LASL 1970: Los Alamos Scientific Laboratory memo to R.W. Drake from Eric L. Peterson, "J-Division Shots at R-Site," Aug. 6, 1970.

LASL 1971: Los Alamos Scientific Laboratory memo to C. Christenson from E.L. Miller, "Effluent from Plant Cooling Towers," July 30, 1971, p. 5.

TABLE STATUS OF SITES AT TA-15, R-SITE

TA15-1-CA-1-HW/RW (Firing Sites)

Background--The first installations at R-Site were completed in 1944 and consisted of a central control building, a laboratory, a trimming building, a few hutments and small magazines, and several firing points (LASL 1947a).

A 1944 report describes a firing point 3/8 mile from the control building to use with charges up to about 50 lbs and a second firing point 1/2 mile distant with a large barricade, camera base, and subsurface instrument room (LASL 1944a). Engineering drawing R-5110 indicates that firing platforms TA-15-176 and -177 were removed in 1947. Whether they are the two firing points referred to above and where they were located is not known.

In 1944, a blast test was reported in "the Gulch" 1 mile below R-Site. Charges of up to 300 lb of Composition B and 500 lb of ammonium ~~nitrate~~ picrate were set off (LASL 1944b). Apparently, no further tests were done here.

In 1945, 2,500-lb shots were reported for TA-15 (LASL 1945). Then in 1946, the decision was made to designate the site a permanent location for firing explosives experiments involving charges up to as much as 2 tons. A series of small, permanent firing chambers and a new, large-scale firing site with an underground, timber control building were constructed (LASL 1947a).

In 1947, Group M-6 was using firing points A, B, C, and D at TA-15 and Group M-6 was using the "recently completed firing points E and F," (LASL 1947b).

Firing point A was located southwest of existing building TA-15-183 and was designated TA-15-14 on the ENG-R-131 location plan, dated 1951. Firing point B was a

few hundred yards southwest of point A and was designated TA-15-74 on the same location plan.

According to a former employee, by 1957 neither of these firing points was being used. In 1965, a contamination survey indicated detectable levels of both high explosive and radionuclides at TA-15-14 and -74 (LASL 1965a, b). However, during a field survey, an employee remembered uranium contamination being found and soil being removed in the area that was, from his description, probably site A. No further documentation on decommissioning has been found. During the field survey, it was noted that the x-unit chamber firing points and associated structures are no longer at the site. Engineering drawings also indicate their absence.

Firing point C is identified as TA-15-35 on location plan ENG-R130. It was at the junction of the road to E-F-Site, according to ENG-R-31, dated 1957. Firing point D, TA-15-34, was on the south side of the road between existing structures TA-15-41 and firing point C, as shown on ENG-R-131.

ENG-R-130 shows C and D to have been abandoned by the mid-1950s. A 1949 report does not mention C or D being active; thus they probably had discontinued operation even by that date (LASL 1949a). A field survey indicated that today, there are no remaining structures. No written documentation on decommissioning has been found.

In a 1983 interview, a former employee mentioned that south of the road going to E-F-Site is an area along the road "that may have contamination from various tests (El 1983). The reference is probably to firing sites C and D.

Firing points E and F have been two of the major firing sites since the 1940s at TA-15. ENG-R-131, dated 1957, shows firing point E, TA-15-26, on the north and F, TA-15-36, on the south in the general area around control building TA-15-27, which remains in place today. The site is near the north rim of Potrillo Canyon. By the

1950s, x-unit chambers TA-15-36 and -26 were noted to have been removed, according to drawing ENG-R-5110, dated 1983. A large, central site with "round walls" was apparently built and remained in operation until a few years ago. It was referred to as E-F. At the time of the field survey, E-F was indicated to be inactive.

Many materials have been fired at E-F, including steel, aluminum, lithium hydride, uranium, mercury, lead, beryllium, boron, cadmium, gold, and possibly tritium. The types of high explosive that have been used include HMX, RDX, TNT, PETN, "Cycotal," and Baratol, an explosive containing barium (LASL 1973). Thorium was also fired (H-Div 1950a). Several 10,000s of kilograms of uranium are believed to have been fired at this site. A former employee stated that E-F Site and Site R-44 shared "equally in the amount of uranium expended at inactive sites at TA-15." He also said that E-F, R-44, and R-45 were the three major sites for beryllium shots and that each probably fired similar amounts. CEARP files show many shots, some of which involved kilogram quantities of beryllium, to have been fired at TA-15.

Concentrations of the residues fired in surrounding soils at E-F site have been studied for a number of years. As early as 1948, samples of beryllium in soil were being taken. The background was found to be .13-.15 micrograms/gm sand for beryllium, with concentrations of up to 2.9 micrograms/gm sand after a shot (Hayes 1948 a, b). These data are believed to come from E-F-Site, but they could be from another. One report mentions that "an appreciable quantity of beryllium was found at a distance of 2,000 ft from the firing point," (H-Div 1958). The firing point is not identified, however.

In 1976, a survey of E-F firing points was made for radionuclides using a Phoswich meter. Berms on both sides of the firing point were found to be highly contaminated with uranium. Nowhere in the immediate area was there less than 10,000 c/m, and most of the area was more than 100,000 c/m (LASL 1976a). During another

survey, uranium greater than 3,000 micrograms/g soil was found in some areas in surface soil at E-F-Site (LASL 1976b).

A memo discussing recent unpublished work by HSE-12 indicates that 1) beryllium is present in the E-F surface soils at slightly elevated levels, but is probably not present in soluble form, 2) lead is present in the surface soil at levels bordering on phy-to-toxic levels, and 3) uranium is present at the several thousand ppm level in the surface soil and is of concern as a toxic heavy metal. The uranium is oxidizing into a soluble form, is being mobilized, and is moving downward into the lower soils (LANL 1985).

By 1949, in addition to firing points A, B, E, and F, firing points G and H were in use (LASL 1949b). On ENG-R-131, G, TA-15-28, is shown just north of existing building TA-15-9. This facility was removed in 1967, according to engineering record ENG-R-5110. No documentation on decommissioning was found. Firing site H, TA-15-17, was just northwest of the present Pulse High Energy Radiographic Machine Emitting X Rays (PHERMEX) facility. It must have been removed in the late 1950s when PHERMEX was built (ENG 1960). Again, no documentation on decommissioning was found.

By 1949, firing points I and J were also in operation. At that time, they were designated TA-15-32 and -31. They were transferred to Kappa Site for groups to use there and are now included in that site; hence, these firing areas are not included with TA-15.

By 1954, TA-15-44 and -45 had been built. During a field survey, R-44 was seen to be currently used for ballistic studies, and a gun is located at the site. Site R-45 was not active at the time of the field survey, but there were indications that small shots may be fired in the near future. These two sites, although somewhat 'younger' than E-F, appear to have been the location at which large quantities of uranium and beryllium were fired, with the same materials indicated for E-F.

However, the environmental studies performed at E-F have not included these two major firing sites. One would expect soil concentrations of beryllium and heavy metals to be elevated above background at these sites the same as as they are at E-F. A 1957 report indicates up to 1.7 micrograms beryllium/gm soil at R-44 (LASL 1957). In 1965, dirt around R-44 was sampled for 238-uranium and tritium; elevated levels were found (LASL 1965c).

Although extensive field surveys have not been made for R-44 and R-45, a great deal of shrapnel is believed to be at the sites.

CERCLA Finding--Uncertain for FFSDIF, PA, and PSI; therefore, there is not sufficient information to calculate MHRS and HRS Migration Mode Scores.

Planned Future Action--A CEARP Phase I supplemental study will be conducted to determine the presence or absence of hazardous substances and the potential for groundwater contamination. Based on the results of this study, appropriate action will be taken.

TA15-2-CA-A-HW/RW (Firing Sites)

Background--TA-15 has two large firing sites in use at the moment; the PHERMEX machine and associated firing pad and the ECTOR (a proper name, not an acronym) machine and associated firing facilities.

The PHERMEX, TA-15-184, is used for radiographic studies of explosives and explosive-driven metal systems; thus, the experiment itself is 'exploded' on the pad next to PHERMEX. The facility was built in the early 1960s and is on the south rim of Potrillo Canyon (Mader et al. 1980a). Materials studied--and therefore fired--include aluminum, copper, nickel, mercury, lead, thorium, uranium, and beryllium (Mader et al. 1980b). Large amounts of uranium have been involved in the shots, and one memo indicates that small amounts of gallium were also fired (LASL 1966a).

1975

In 1965, an upgrade for PHERMEX was undertaken. The instructions were, "Prior to any work in areas contaminated with 238-uranium and beryllium in front of the PHERMEX building, R-184, Zia should clean the immediate area of debris and 2-4 inches of loose surface soil and sand, and remove all metal plates," (LASL 1975). Where this material was taken is not known. Cleaning to remove plutonium contamination was noted at building 186, part of PHERMEX, in 1967 (LASL 1967).

ECTOR is a more recent machine. It is in TA-15-280 with firing point chamber TA-15-276. The same type of studies are done here as at the PHERMEX facility. Very little data appear to exist on the extent of contamination in the areas surrounding PHERMEX and ECTOR. At present, gun ballistic studies are being performed at R-44, a field survey revealed.

CERCLA Finding--Positive for FFSDIF, PA, and PSI. The site's uranium was ranked and gave an HRS Score of 12.3 and a MHRS Score of 1.4. Contamination in the surface water did not contribute to the score because no use is made of the surface water within 3 miles.

Planned Future Action--A CEARP Phase I supplemental reconnaissance field study will be conducted to determine the presence of hazardous substances and potential for groundwater contamination. Based on the results of this study, appropriate action will be taken.

TA15-3-CA-I-HW/RW (Holes)

Background--A series of holes, TA-15-264, -265, -270, -271, -272, and -273 is on the north side of the site near Three Mile Canyon. They are believed to be quite deep. In 1970, 4,000 lbs of TNT was fired in one hole. Later, at least one shot involving tritium took place (LASL 1970).

During the field survey, these holes were not carefully inspected to see whether adequate covers are being used and proper warning signs and/or fences are in place.

CERCLA Finding--Uncertain for FFSDIF, PA, and PSI; therefore, there is not sufficient information to calculate an HRS Migration Mode Score.

Planned Future Action--A CEARP Phase I supplemental study will be conducted to determine the presence or absence of hazardous substances and the potential for groundwater contamination. Based on the results of this study, appropriate action will be taken.

TA15-4-CA-I-HW/RW (Burning Area)

Background--A 1950 report states, "A test was conducted at R-Site to determine the feasibility of collecting by flypaper uranium oxide particles that had been dispersed into the air by burning the tuballoy (uranium) with gasoline and HE," (H-Div 1950b).

In 1979, small-scale burn tests of uranium turnings in contact with uranium rods took place near E-F-Site (LASL 1979a, b). Oil-soaked natural uranium turnings and scrap were also burned (LASL 1980).

During a field survey, one former employee recalled two occasions on which oil/uranium mixtures were burned 100-150 yards west of E-F-Site and others on which uranium was burned at E-F-Site west.

CERCLA Finding--Uncertain for FFSDIF, PA, and PSI; therefore, MHRS and HRS Migration Mode Scores cannot be calculated.

Planned Future Action--A CEARP Phase I study will be conducted to determine the quantity and distribution of hazardous substances. Based on the results of this study, appropriate action will be taken.

TA15-5-CA-OD-I-HW/RW (Dumping by E-F into the Canyon and Other Areas)

Background--In 1954, a bulldozer was noted at the E-F point firing pit, apparently attempting to prepare a new pit after an old shot. Soil samples for uranium in this area

showed concentrations of .1 percent, and beryllium was also present in concentrations high enough to require a respirator for the bulldozer operator (LASL 1954).

In 1955, a report said that the pit area was watered, the ground was broken with a chisel, and dirt was removed by a clam shovel to dump trucks and dumped over the edge of the canyon about 150 yards southeast of the pit. All workers wore respirators, which, when analyzed, showed beryllium in a truck driver's and in a bulldozer operator's filter (LASL 1955). The quantity of dirt removed was reported to be approximately 100 cubic yards (H-Div 1955). Whether dirt was also dumped at other times is not known.

In 1965, there was a report of a large, concrete chamber that had exploded on the edge of the rim of the canyon, approximately 500 ft south of E point. It was contaminated with 1 mR/h beta-gamma, and 7,000 cpm alpha was reported. Metal frames and boxes on the edge of the rim of the canyon, approximately 400 ft south of E point, showed 300-500 cpm alpha. Other debris in the two areas gave up to 5,000 cpm alpha (LASL 1965d). A CEARP field survey has not yet covered E-F-Site; therefore, the present status of open dumping at the site is not known.

In 1959, a note stated that it was all right for the contractor for the PHERMEX facility to use "the area known as the Contractors' Dump." Where it was located is not known (LASL 1959a). It may be Area M.

In 1983, the discovery was made that the people at TA-15 "had not followed their SOPs and depleted uranium was disposed of in several areas including a chemical waste disposal area and in trash on the canyon edge," (LANL 1983). What is meant by 'several areas' and where they may be is not known. Area Z might be that referred to as 'on the canyon edge.'

TA-15 also includes waste disposal sites Areas Z and N. In the field survey, a small amount of concrete and building debris was found to have been dumped behind R-22. More information on these areas is given in the section on waste disposal sites.

CERCLA Finding--Positive for FFSDIF, PA, and PSI; however, there is not enough information to calculate MHRS and HRS Migration Mode Scores.

Planned Future Action--A CEARP Phase I reconnaissance field study will be conducted to determine the quantity and distribution of hazardous substances. Based on the results of this study, appropriate action will be taken.

TA15-6-~~CH~~ CA-1-HW/RW (Decommissioned Building Areas))

Background--The site had many buildings that are no longer present, according to engineering document R-5110 dated 1983. Except for the date removed, no information was found for decommissioned the following structures:

Structure	Use	Date of Removal
TA-15-175	Equipment Platform	1945
TA-15-176	Firing Platform	1947
TA-15-197	Firing Platform	1947
TA-15-24	Storage	1951
TA-15-79	Underground Tank	1952
TA-15-6	Control Chamber 'A'	1959
TA-15-3	Storage	1955
TA-15-4	Storage	1955
TA-15-5	Trimming Building	1962
TA-15-1	Laboratory and Shops	1962
TA-15-7	Office and Darkroom	1962
TA-15-11	Magazine	1967
TA-15-12	Magazine	1967
TA-15-13	Magazine	1967

Whether drains, sumps, and the like from the laboratory and shops, and the office and darkroom were removed and what their state of contamination is, is not known. Also unknown is the status of contamination in the source building.

A mercury spill is known to have occurred in building 7 (H-Div 1952). Thorium contamination was found in building 1 (LASL 1950). Mercury was used in experiments in building 1 (LASL 1966).

On a 1948 topo map, what appears to be a bunker is shown near the present disposal area, N. Engineering records from 1957, ENG-R#130 and R#131, indicate this structure was no longer present.

Early in 1965, the following structures were surveyed and found to be free of high explosive and radionuclide contamination: TA-15-2, warehouse; TA-15-10, magazine; TA-15-15, control room; TA-15-16, instrument chamber; TA-15-21, -38, -68, -69, magazines; TA-15-71, plate barricade; TA-15-76 and -77, personnel shelters; TA-15-78, septic tank; TA-15-80, camera chamber; TA-15-98, control chamber; and TA-15-135, storage (LASL 1965a, b).

In addition, structures TA-15-18, a magazine, and TA-15-34, -35, control chambers, were monitored and found to be free of radionuclides later in 1965 (LASL 1965d). These structures were all removed in 1967.

In 1965, R-71, a plate barricade, R-125, a manhole, and R-126, a manhole, were found to be contaminated and the recommendation was to remove them to the contaminated dump (LASL 1965e). ENG-R-5110, ~~dated 1967~~, notes all were removed prior to 1967

Although no documentation on the decommissioning of buildings at TA-15 has been found, disposal area N is noted to be "a pit located east of buildings D-23, TA-15, containing remnants of several structures from R-Site, which had been exposed to

field survey, it was found that underground storage tank TA-15-266 is used to store oil for the Marx generators for PHERMEX. The survey indicated underground tank TA-15-287 was empty at the moment. Some confusion exists about these two underground tanks and their status (i.e.,-287 may be in use, and not -266).

CERCLA Findings??

Planned Future Action--A CEARP Phase I supplemental study will be conducted to determine the presence or absence of hazardous substances and the potential for groundwater contamination. Based on the results of this study, appropriate action will be taken.

TA15-11-CA-1/A-HW (PCBs)

Background--A broken capacitor containing PCBs was reported for TA-15-183 in 1961 (LASL 1961). During the field survey, all capacitors in TA-15-183 were found to contain PCBs.

CERCLA Finding??

Planned Future Action--A CEARP Phase I supplemental study will be conducted to determine the presence or absence of hazardous substances and the potential for groundwater contamination. Based on the results of this study, appropriate action will be taken.

TA15-12-CA-1-HW (Vacuum Pump Oil)

Background--Reports say that in the early days, used vacuum pump oil was dumped on the ground whenever it was deemed convenient to do so. ~~(Employee interview not in files regarding this--John's citation--might omit--Betty).~~

LASL 1955: Los Alamos Scientific Laboratory memo to H.F. Schulte from M. Chain Robbins and B.C. Eutsler, "Removal of Beryllium from the Firing Pit of E-F Point at R-Site," March 18, 1955.

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LASL 1970: Los Alamos Scientific Laboratory memo to R.W. Drake from Eric L. Peterson, "J-Division Shots at R-Site," Aug. 6, 1970.

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LASL 1972: Los Alamos Scientific Laboratory memo to Harry Jordan from Dean Miller, "Radioactive Contaminated Septic Tanks," Jan. 28, 1972.

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LASL 1975: Los Alamos Scientific Laboratory, ENG-9, "Conceptual Design Report for PHERMEX Enhancement Program," ENG-9 CDR-75.03, Dec. 10, 1975, p. 12.

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explosives or chemical contamination." (LASL 1965f). Unless the pit was left open, disposal area N must contain only buildings removed before 1965. Where the buildings removed during the 1967 work were put is not known.

CERCLA Finding--Uncertain for FFSDIF, PA, and PSI; therefore, an HRS Migration Mode Score cannot be calculated.

Planned Future Action--A CEARP Phase I study will be conducted to determine the quantity and distribution of hazardous substances. Based on the results of this study, appropriate action will be taken.

TA15-7-CA-1-RW/HW (Bunkers and Other Structures Still Standing)

Background--The dirt bunkers, TA-15-44 and -45, and E firing points are noted to contain low levels of uranium (LANL 1986). Cleaning up beryllium in building R-233, the now-inactive betatron building, was noted in 1969 (LASL 1969). Beryllium contamination of the oil in diffusion pumps is reported for R-50 (LASL 1961a).

CERCLA Finding---

Planned Future Action--

TA15-8-S/ST/O-1-HW/RW (Inactive) (Sumps, Drains, Outfalls, Septic Tanks)

Background--As mentioned, in TA-15-4 section, there is no information on drains from buildings 1, 5, and 7. In a field survey, there was an indication that building R-23, inactive, has a septic tank, but that the tank is probably not contaminated with high explosive. This may be tank 80, noted on ENG-R-5110 to be abandoned.

ENG R-716 indicates that in 1958, the sanitary sewer from the camera firing point in building 92, removed in 1967, went to the edge of the canyon either with a seepage field or outfall. Whether this drain was contaminated with chemicals or high explosive and whether it was removed is not known.

ENG-R-692 indicates that in 1958, building 8, a shop, was served by septic tank 147, which is still in place. The tank does not appear to be active. In a 1972 survey, this tank was noted to have possible high explosive contamination (LASL 1972). ENG-R-694, dated 1958, shows building 20, an assembly building, to have a drain connection that appears to go to a canyon outfall, in addition to having a drain to septic tank 51, the effluent from which also drained to a canyon outfall.

In 1958, The septic tank from tank 63 serving building 40 appears to have gone to an outfall, as shown on ENG-R-694, dated 1958. Also that year, building 27, a control unit firing at E-F, was served by septic tank 72, (see ENG-R-709) which may have drained to a canyon outfall. This system is no longer active and the possibility of contamination in the system and drainage area is not known. ENG-R-709 shows this site.

In the 1960s, building R-194 had a vapor degreaser and strip tanks (LASL 1961b). Besides the degreaser, solutions included H_2SO_4, chromate, and hydrochloric acid. In 1978, plans were drawn for a dry well approximately 4 ft in diameter and 50 ft deep to connect to the existing drain at R-194. Whether the well was constructed is not known (LASL 1978).

In the 1960s, building R-50 was noted to have two acid draining tanks and the drains to go to a sump "located at the edge of canyon," (LASL 1960). Another memo indicated that the drain might go into the canyon (LASL 1959b). In a field survey, R-50 was found to be used at present as a shop, and the sinks have been removed. The drain from the sinks was found to be still in place, to exit the building, and apparently to connect with the drainage ditch, which goes into the canyon. The building was also found to have floor drains. Building 203 used to have several sources that discharged cooling water to the canyon; it was not investigated during the field survey.

In the field survey, a hole covered by a lid was found; liquid was moving into the hole. This may be the dry well that was designed for TA-15-194, or a sump for TA-15-50, or some other sump. No one at the time of the field survey knew the origin of the

liquid flowing into the hole. 9/An old, undated NPDES map indicates that there were two outfalls at building 40. The northwest outfall included photo wastes, whereas the outfall to the northeast was for cooling water. Cooling water discharge from R-44 is also shown.

CERCLA Finding??

Planned Future Action---

TA15-9-S/ST/O-A-HW/RW (Sumps, Drains, Outfalls, Septic Tanks) active

Background--The write-up on inactive sumps, drains, and the like, mentioned that during a field survey near TA-15-144, a hole was found with liquid flowing into it. The source of the liquid is not known. Near building TA-15-144 is building TA-15-203, in which a compressor is located. Its cooling water is routed to a drainage ditch outside the building. The ditch runs to the edge of the canyon.

The chemical drains in building TA-15-183, including one down which developer is poured, were found to go to an outfall behind the building. During a field survey, the building was found to have floor drains through which cooling water was routed; however, their destination is unknown.

In the PHERMEX facility, floor drains from the buildings are routed to an outside ditch. An oil spill in the facility resulted in oil discharging to the ditch. Routinely, cooling water discharges to the floor drains, and therefore, also to the ditch. This facility is also served by a wet cooling tower. In 1971, the volume of blowdown from the tower was indicated to be 360,000 gpy; organo chelates were being used to control dissolved solids (LASL 1971).

Building TA-15-263 was found during the field survey to house a laser that apparently uses once-through cooling water, which discharges to a ditch.

The ECTOR facility includes water-cooled lasers. The water goes to a ditch, which drains into the canyon--it was indicated during the field survey.

Active Septic tanks ~~here~~ at TA-15 include TA-15-51 and -61, the overflow goes to a seepage pit; TA-15-62, the overflow goes to a drain line and appears to go to the canyon (information from ENG R-699 and a 1981 Zia report); TA-15-63, the ~~outfall~~ overflow goes to a seepage pit; TA-15-195, the overflow goes to a seepage pit, requires pumping and has a scum layer, which may be the result of 'nonsanitary waste' being dumped in it; TA-15-205 and -282, the overflow goes to leach fields; and TA-15-~~282~~ 213, the overflow goes to a seepage pit (Pan Am 1986).

The fate of septic tank 284, which may have served TA-15-233, the betatron building, and of -286, which probably served TA-15-285, the confinement and test facility, is not known. Although they are not on Pan Am's list, ENG-R-5110 indicates that they are probably still being used.

A 1972 survey indicated that tank TA-15-51 was possibly contaminated with high explosive (LASL 1972). In 1981, the tank was found to be 'daylighting' (surfacing) to the canyon. Samples were taken, and no high explosive was detected (Zia 1981). Over the years of operation, whether chemicals were released to sanitary systems is not known. Thus whether drainage & seepage pits, & leach fields have become contaminated is not known.

<u>CERCLA Finding</u>--Uncertain for FFSDIF, PA, and PSI; therefore, there is not sufficient information to calculate an HRS Migration Mode Score.

<u>Planned Future Action</u>--A CEARP Phase I supplemental study will be conducted to determine the presence or absence of hazardous substances and the potential for groundwater contamination. Based on the results of this study, appropriate action will be taken.

TA15-10-UST-A-PP (Underground Storage Tanks)

Background--On ENG-R-5110, underground fuel tank TA-15-48 is shown near the old shop, and underground fuel tank TA-15-52 near old assembly building, TA-15-20. During a field survey, it was found that underground storage tank TA-15-266 used to store oil for the Marx generators for PHERMEX. The survey indicated underground tank TA-15-287 was empty at the moment. Some confusion exists about these two underground tanks and their status (i.e.,-287 may be in use, and not -266).

CERCLA Findings??

Planned Future Action--A CEARP Phase I supplemental study will be conducted to determine the presence or absence of hazardous substances and the potential for groundwater contamination. Based on the results of this study, appropriate action will be taken.

TA15-11-CA-I/A-HW (PCBs)

Background--A broken capacitor containing PCBs was reported for TA-15-183 in 1961 (LASL 1961c). During the field survey, all capacitors in TA-15-183 were found to contain PCBs.

CERCLA Finding??

Planned Future Action--A CEARP Phase I supplemental study will be conducted to determine the presence or absence of hazardous substances and the potential for groundwater contamination. Based on the results of this study, appropriate action will be taken.

TA15-12-CA-I-HW (Vacuum Pump Oil)

Background--Reports say that in the early days, used vacuum pump oil was dumped on the ground whenever it was deemed convenient to do so. (Employee interview not in files regarding this--John's citation--might omit--Betty).

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TA-15 - R-SITE

CURRENT OPERATIONS

R-Site is occupied by two groups, Hydrodynamics (M-4) and Explosives Applications (M-8). R-Site has principally been a firing site since it came into being and is still used as a firing site for various hydrodynamic studies. Many old buildings are being used for storage. In addition to firing activities, lasers are used in several buildings. Branch shops exist to meet local needs for machining. There is a film developing facility in TA-15-183 where used fixers are picked up by a recycling firm and spent developers are discharged to the environment under the NPDES permit. In the bunker area, some high explosive wastes are generated in trimming operations in TA-15-242. These wastes are treated at TA-16.

There are two main machines at TA-15, both operated by Group M-4, to make radiographs of exploding or imploding systems. These are PHERMEX (Pulse High Energy Radiographic Machine Emitting X Rays) and ECTOR (a given name and not an acronym). Materials expended at PHERMEX, in addition to the high explosive, have included uranium, thorium, steel, nickel, aluminum, copper, beryllium, lead, mercury, magnesium, plastics, tantalum, tritium, tungsten, gold, and lithium hydride. After any recovery operations, the spheres are taken to TA-54 for disposal.

There are numerous drains, sumps, and discharges of fluids, including cooling water, to the environment. A number of these discharges are covered by the current NPDES permit. It appears that not all discharges are covered and that some authorized discharges, which are no longer needed, should be removed from the list. The present Laboratory program to check discharges and to update the NPDES permit needs to be applied at TA-15.

Used vacuum pump oil is held for recycling or disposal.

There are six deep test holes (TA-15-264, -265, -270, -271, -272, -273) that were drilled for tests but only one or two were used. These holes are presently covered.

POTENTIAL CERCLA/RCRA SITES

TA-15, R-Site, has a long history, beginning in 1944 when the first installations were completed. It consisted of a control building, a laboratory, a trimming building, a few butments and small magazines, and several firing points (LASL 1947a:11). Experiments and tests involving explosives and radionuclides were performed at many locations at this site through the years, and firing sites and firing chambers were built--and abandoned--as needed. Documentation on decommissioning these sites is incomplete. Some of the possible contaminants include beryllium, uranium, high explosive, mercury, lead, boron, cadmium, and tritium.

Reports of preparing firing points by bulldozing debris from previous shots into canyons and near the edge of canyons exist. Although dumping is often mentioned, most reports are vague as to exactly where possibly contaminated debris was disposed of. Equally incomplete is the information on buildings that were removed. Details of their decommissioning have not been located, and little but rumor is known about spills of pollutants and/or contamination of structures and related pipes, septic tanks, outfalls, and underground storage tanks.

The following table presents what is known about potential CERCLA/RCRA sites at this location. Phase I investigations have not been concluded, and the table may not be complete. CEARP findings are presented based on a negative, positive, or uncertain finding for FFSDIF, PA, SI, and HRS evaluation. HRS and MHRS Migration Mode Scores were calculated for sites with positive findings, but because sufficient information was generally lacking, most sites have not yet been scored. Most are also rated for supplemental Phase I investigation.

FIGURES

Figure TA-15-1: Structure Location Plan for TA-15 - R-Site (1983)
Figure TA-15-2: Structure Location Plan for TA-15 - R-Site (1957)

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TABLE TA-15 - POTENTIAL CERCLA/RCRA SITES

TA15-1-CA-1-HW/RW (Firing Sites)

Background--A 1944 report describes a firing point 3/8 mile from the control building to use for charges up to about 50 lbs and a second firing point 1/2 mile distant with a large barricade, camera base, and subsurface instrument room (LASL 1944a). Engineering drawing R-5110 indicates that firing platforms TA-15-176 and -177 were removed in 1947. Whether they are the two firing points referred to above and where they were located is not known.

In 1944, a blast test was reported in "the Gulch" 1 mile below R-Site. Charges of up to 300 lb of Composition B and 500 lb of ammonium picrate were set off (Linschitz1944i2). Apparently, no further tests were done here.

In 1945, 2,500-lb shots were reported for TA-15 (Bradbury 1945). Then in 1946, the decision was made to designate the site a permanent location for firing explosives experiments involving charges up to as much as 2 tons. A series of small, permanent firing chambers and a new, large-scale firing site with an underground, timber control building were constructed (LASL 1947a).

In 1947, Group M-6 was using firing points A, B, C, and D at TA-15 and Group M-6 was using the "recently completed firing points E and F," (LASL 1947b:10-12).

Firing point A was located southwest of existing building TA-15-103 and was designated TA-15-14 on the ENG-R-131 location plan, dated 1951. Firing point B was a few hundred yards southwest of point A and was designated TA-15-74 on the same location plan.

According to a former employee, by 1957 neither of these firing points was being used. In 1965, a contamination survey indicated nondetectable levels of both high explosive and radionuclides at TA-15-14 and -74 (Courtright 1965, Buckland 1965a). However, during a field survey, an employee remembered uranium contamination being found and soil being removed in the area that was, from his description, probably site A. No further documentation on decommissioning has been found. During the field survey, it was noted that the x-unit chamber firing points and associated structures are no longer at the site. Engineering drawings also indicate their absence.

Firing point C is identified as TA-15-35 on location plan ENG-R130. It was at the junction of the road to E-F-Site, according to ENG-R131, dated 1957. Firing point D, TA-15-34, was on the south side of the road between existing structures TA-15-41 and firing point C, as shown on ENG-R131.

ENG-R130 shows C and D to have been abandoned by the mid-1950s. A 1949 report does not mention C or D being active; thus they probably had discontinued operation even by that date (LASL 1949). A field survey indicated that today, there are no remaining structures. No written documentation on decommissioning has been found.

In a 1983 interview, a former employee mentioned that south of the road going to E-F-Site is an area along the road "that may have contamination from various tests (El 1983). The reference is probably to firing sites C and D.

Firing points E and F have been a major firing site since the 1940s at TA-15. ENG-R131, dated 1957, shows firing point E, TA-15-26, on the north and F, TA-15-36, on the south in the general area around control building TA-15-27, which remains in place today. The site is near the north rim of Potrillo Canyon. By the 1950s, x-unit chambers TA-15-36 and -26 were noted to have been removed, according to drawing ENG-R5110, dated 1983. A large, central site with two mounds walls was apparently built and remained in operation until a few years ago. It was referred to as E-F. At the time of the field survey, E-F was indicated to be inactive.

Many materials have been fired at E-F, including steel, aluminum, lithium hydride, uranium, mercury, lead, beryllium, boron, cadmium, gold, and possibly tritium. The types of high explosive that have been used include HMX, RDX, TNT, PETN, "Cycotol," and Baratol, an explosive containing barium (Schlager 1973). Thorium was also fired (H-Div 1950a). Several 10,000s of kilograms of uranium are believed to have been fired at this site. The DOE Onsite Discharge Information System as of July 12, 1982 lists the total amount of natural uranium expended at TA-15 as 13,050 Ci and of 238-uranium as 11,085 Ci.

A former employee stated that E-F-Site and Site R44 shared "equally in the amount of uranium expended at inactive sites at TA-15." He also said that E-F, R44, and R-45 were the three major sites for beryllium shots and that each probably fired similar amounts. CEARP files show many shots, some of which involved kilogram quantities of beryllium, to have been fired at TA-15.

Concentrations of the residues from shots in surrounding soils have been studied for a number of years. As early as 1948, samples of beryllium in soil were being taken. The background was found to be .13-.15 micrograms/gm sand for beryllium, with concentrations of up to 2.9 micrograms/gm sand after a shot (Hayes 1948 a, b). These data are believed to come from E-F-Site, but they could be from another. One report mentions that "an appreciable quantity of beryllium was found at a distance of 2,000 ft from the firing point," (H-Div 1958:5). The firing point is not identified, however.

In 1976, a survey of E-F firing points was made for radionuclides using a Phoswich meter. Berms on both sides of the firing point were found to be highly contaminated with uranium. Nowhere in the immediate area was there less than 10,000 c/m, and most of the area was more than 100,000 c/m (Elliott 1976). During another survey, uranium greater than 3,000 micrograms/g soil was found in some areas in surface soil at E-F-Site (Hanson and Miera 1976:31-32).

A memo discussing recent unpublished work by HSE-12 indicates that 1) beryllium is present in the E-F surface soils at slightly elevated levels, but is probably not present in soluble form, 2) lead is present in the surface soil at levels bordering on phototoxic levels, and 3) uranium is present at the several thousand ppm level in the surface soil and is of concern as a toxic heavy metal. The uranium is oxidizing into a soluble form, is being mobilized, and is moving downward into the lower soils (Cokal 1985).

By 1949, in addition to firing points A, B, E, and F, firing points G and H were in use (Reider 1949). On ENG-R131, G, TA-15-28, is shown just north of existing building TA-15-9. This facility was removed in 1967, according to engineering record ENG-R5110. No documentation on decommissioning was found; however, an M Division employee feels that there should have been no contamination. Firing site H, TA-15-17, was just northwest of the

present Pulse High Energy Radiographic Machine Emitting X Rays (PHERMEX) facility. It must have been removed in the late 1960s when PHERMEX was built (Engineering 1960). No documentation on decommissioning has yet been obtained. The control room for it still exists.

By 1949, firing points I and J were also in operation. At that time, they were designated TA-15-32 and -31. They were transferred to Kappa Site for groups to use there and are now included in that site; hence, these firing areas are not included with TA-15.

By 1954, TA-15-44 and -45 had been built. During a field survey, R-44 was seen to be currently used for ballistic studies, and a gun is located at the site. Site R45 was not active at the time of the field survey, but there were indications that small shots may be fired in the near future. These two sites, although somewhat 'younger' than E-F, appear to have been the location at which large quantities of uranium and beryllium, and the same materials indicated for E-F, were fired.

However, the environmental studies performed at E-F have not included these two major firing sites. One would expect soil concentrations of beryllium and heavy metals to be elevated above background at these sites the same as as they are at E-F. A 1957 report indicates up to 1.7 micrograms beryllium/gm soil at R-44 (GMX-4 1957). In 1985, dirt around R-44 was sampled for 238-uranium and tritium; elevated levels were found (Gibbons 1985a).

Although extensive field surveys have not been made for R-44 and R-45, a great deal of shrapnel is believed to be at the sites.

CERCLA Finding--Uncertain for FFSDIF, PA, and PSI; there is not sufficient information to calculate MHRS and HRS Migration Mode Scores.

Planned Future Action--Much more information should be gathered from the literature available and from interviews during Phase I on the decommissioning of all the firing sites. Samples should be taken at all the inactive sites and analyzed for those materials known to have been used at the sites. An assessment should be made of the extent of contamination and probable impact on the environment. Special attention should be given to T-44 and -45. Future action cannot be planned without this information.

TA15-2-CA-A-HW/RW (Firing Sites)

Background--TA-15 has two large firing sites in use at the moment; the PHERMEX machine and associated firing pad and the ECTOR (a proper name, not an acronym) machine and associated firing facilities.

The PHERMEX, TA-15-184, is used for radiographic studies of explosives and explosive-driven metal systems; thus, the experiment itself is 'exploded' on the pad next to PHERMEX. The facility was built in the early 1960s and is on the south rim of Potrillo Canyon (Mader, Neal, and Dick 1980:1). Materials studied--and therefore fired--include aluminum, copper, nickel, mercury, lead, thorium, uranium, and beryllium (Mader, Neal, and Dick 1980:22, 29). Large amounts of uranium have been involved in the shots, and one memo indicates that small amounts of gallium were also fired (LASL 1966).

Cleaning to remove plutonium contamination was noted at building 186, part of PHERMEX, in 1967 (GMX-11 1967). In 1975, an upgrade for PHERMEX was undertaken. The instructions

were, "Prior to any work in areas contaminated with 238-uranium and beryllium in front of the PHERMEX building, R-184, Zia should clean the immediate area of debris and 2-4 inches of loose surface soil and sand, and remove all metal plates," (Engineering 1975:12). Where this material was taken is not known.

Another machine, ECTOR was imported from England. The field survey determined it was installed and used in the early 1980s at a site used earlier. It is in TA-15-280 with firing point chamber TA-15-276. The same type of studies are done here as at the PHERMEX facility. Very little data appear to exist on the extent of contamination in the areas surrounding PHERMEX and ECTOR. At present, gun ballistic studies are being performed at R-44, a field survey revealed.

CERCLA Finding--Positive for FFSDIF, PA, and PSI. The site's uranium was ranked and gave a HRS Score of 12.3 and a MHRS Score of 1.4. Contamination in the surface water did not contribute to the score because no use is made of the surface water within 3 miles.

Planned Future Action--The firing sites and the areas surrounding them ought to be sampled and the types and extent of hazardous substances at them determined. The potential for these substances to pollute the environment should be evaluated. This Phase I work should lead to a plan of future action for the sites.

TA15-3-CA-1-HW/RW (Holes)

Background--A series of holes, TA-15-204, -205, -270, -271, -272, and -273 is on the north side of the site near Three Mile Canyon. They are believed to be quite deep. In 1970, 4,000 lbs of TNT was fired in one hole. One experiment may have used tritium (Peterson 1970). The DOE Onsite Discharge Information System as of July 12, 1982 lists as decayed through December 1981 23,444,992 Ci of tritium expended at TA-15.

During the field survey, these holes were not carefully inspected to see whether adequate covers are being used and proper warning signs and/or fences are in place.

CERCLA Finding--Uncertain for FFSDIF, PA, and PSI; there is not sufficient information to calculate HRS and MHRS Migration Mode Scores.

Planned Future Action--Before anything else, covers ought to be put over the holes and warnings posted in the area. During Phase I, the depth and diameter of the holes should be measured, and all of them sampled for possible contaminants they might contain. An evaluation should be made of their potential to pollute the environment. Future action would be based on this work.

TA15-4-CA-1-HW/RW (Burning Area)

Background--A 1950 report states, "A test was conducted at R-Site to determine the feasibility of collecting by flypaper uranium oxide particles that had been dispersed into the air by burning the tuballoy (uranium) with gasoline and HE," (H-Div 1950b:12).

In 1979, small-scale burn tests of uranium turnings in contact with uranium rods took place near E-F-Site (LASL 1979, Elder and Tinkle 1979). Oil-soaked natural uranium turnings and scrap were also burned (Ahlquist 1980).

During a field survey, one former employee recalled two occasions on which oil/uranium mixtures were burned 100-150 yards west of E-F-Site and others on which uranium was burned at E-F-Site itself.

CERCLA Finding--Uncertain for FFSDIF, PA, and PSI; there is not sufficient information to calculate MHRS and HRS Migration Mode Scores.

Planned Future Action--The burning area should be sampled for residual contamination during Phase I. The results would indicate needed action at the site. The results of the flypaper experiment could prove interesting and should be sought.

TA15-3-CA/OD-1-HW/RW (Dumping by E-F into the Canyon and Other Areas)

Background--In 1954, a bulldozer was noted at the E-F point firing pit, apparently attempting to prepare a new pit after an old shot. Soil samples for uranium in this area showed concentrations of .1 percent, and beryllium was also present in concentrations high enough to require a respirator for the bulldozer operator (Robbins 1954).

In 1955, a report said that the pit area was watered, the ground was broken with a chisel, and dirt was removed by a clam shovel to dump trucks and dumped over the edge of the canyon about 150 yards southeast of the pit. All workers wore respirators, which, when analyzed, showed beryllium in a truck driver's and in a bulldozer operator's filter (Robbins and Eutsler 1955). The quantity of dirt removed was reported to be approximately 100 cubic yards (H-Div 1955:20). Whether dirt was also dumped at other times is not known.

In 1965, there was a report of a large, concrete chamber that had exploded on the edge of the rim of the canyon, approximately 500 ft south of E point. It was contaminated with 1 mlt/h beta-gamma, and 7,000 cpm alpha was reported. Metal frames and boxes on the edge of the rim of the canyon, approximately 400 ft south of E point, showed 300-500 cpm alpha. Other debris in the two areas gave up to 5,000 cpm alpha (Gibbons 1965b). A CEARP field survey has not yet covered E-F-Site; therefore, the present status of open dumping at the site is not known.

In 1950, a note stated that it was all right for the contractor for the PHERMEX facility to use "the area known as the Contractors' Dump." Where it was located is not known (Engineering 1950). It may be Area M.

A report was made in 1983 that someone discovered "depleted uranium was disposed of in several areas including a chemical waste disposal area and in trash on the canyon edge," (LANL 1983:1). What is meant by 'several areas' and where they may be is not known. Area Z might be that referred to as 'on the canyon edge.'

In the field survey, a small amount of concrete and building debris was found to have been dumped behind R-22. TA-15 also includes waste disposal sites Areas Z and N. More information on these areas is given in the section on waste disposal sites.

CERCLA Finding--Positive for FFSDIF, PA, and PSI; however, there is not enough information to calculate MIIRS and IIRS Migration Mode Scores.

Planned Future Action--E-F firing site should be surveyed and sampled during Phase I to locate the areas where possibly contaminated dirt and debris, as well as chemicals, were dumped, and the "contractors' dump" should be identified. Open dumping at the site ought to be investigated as well. Interviews could help pinpoint past practices here. The survey should include the canyons below the site. Future action necessary at this location would be based on these findings.

TA15-0-CA-1-HW/RW (Decommissioned Building Areas)

Background--The site had many buildings that are no longer present, according to engineering document R-5110 dated 1983. Except for the date removed, no information was found for decommissioning the following structures:

Structure	Use	Date of Removal
TA-15-175	Equipment Platform	1945
TA-15-176	Firing Platform	1947
TA-15-197	Firing Platform	1947
TA-15-24	Storage	1951
TA-15-70	Underground Tank	1952
TA-15-0	Control Chamber 'A'	1950
TA-15-3	Storage	1955
TA-15-4	Storage	1955
TA-15-5	Trimming Building	1962
TA-15-1	Laboratory and Shops	1962
TA-15-7	Office and Darkroom	1962
TA-15-11	Magazine	1967
TA-15-12	Magazine	1967
TA-15-13	Magazine	1967
TA-15-33	Radioactive Source Building	1967

Whether drains, sumps, and the like from the laboratory and shops, and the office and darkroom were removed and their state of contamination is not known. Also unknown is the status of contamination in the source building.

A mercury spill is known to have occurred in building 7 (H-Div 1952:22). Thorium contamination was found in building 1 (Buckland 1950). Mercury was used in experiments in building 1 (LASL 1966).

On a 1948 topo map, what appears to be a bunker is shown near the present disposal area, N. Engineering records from 1957, ENG-R130 and R131, indicate this structure was no longer present.

Early in 1965, the following structures were surveyed and found to be free of high explosive and radionuclide contamination: TA-15-2, warehouse; TA-15-10, magazine; TA-15-15, control room; TA-15-16, instrument chamber; TA-15-21, -38, -68, -69, magazines; TA-15-71, plate

barricade; TA-15-76 and -77, personnel shelters; TA-15-78, septic tank; TA-15-80, camera chamber; TA-15-98, control chamber; and TA-15-135, storage (Courtright 1965, Buckland 1965a). In addition, structures TA-15-18, a magazine, and TA-15-34, -35, control chambers, were monitored and found to be free of radionuclides later in 1965 (Gibbons 1965b). These structures were all removed in 1967.

In 1965, R-71, a plate barricade, R-125, a manhole, and R-126, a manhole, were found to be contaminated and the recommendation was to remove them to the contaminated dump (Buckland 1965b). ENG-R5110, dated 1967, notes they were removed in 1967.

Although no documentation on the decommissioning of buildings at TA-15 has been found, disposal area N is noted to be "a pit located east of buildings R-23, TA-15, containing remnants of several structures from R-Site, which had been exposed to explosives or chemical contamination," (Engineering 1965). Unless the pit was left open, disposal area N must contain only buildings removed before 1965. Where the buildings removed during the 1967 work were put is not known.

CERCLA Finding--Uncertain for FFSDIF, PA, and PSI; there is not sufficient information to calculate HRS and MHRS Migration Mode Scores.

Planned Future Action--Information on decommissioning the structures listed above should be sought in the literature and from interviews during Phase I. A determination ought to be made about what happened to the drains and sumps from these and associated facilities. The source building, bunker, plate barricade, manhole, and disposal area N mentioned above should be traced and their status of contamination learned. The reason for the mercury and thorium contamination should be documented and the possibility of residual contamination examined. The future actions to be taken would be based on this information.

TA15-7-CA-1-RW/HW (Bunkers and Other Structures Still Standing)

Background--The dirt bunkers, TA-15-44 and -45, and E firing points are noted to contain low levels of uranium (Dale and Warren 1980:61). Cleaning beryllium in building R-233, the now-inactive betatron building, was noted in 1960 (LASL 1960). Beryllium contamination of the oil in diffusion pumps is reported for R-50 (LASL 1961a).

CERCLA Finding--Uncertain for FFSDIF, PA, and PSI; there is not sufficient information to calculate HRS and MHRS Migration Mode Scores.

Planned Future Action--Samples should be taken to determine whether any residual contamination remains from the materials listed. This Phase I work would determine the status of these structures.

TA15-8-S/ST/O-1-HW/RW (Inactive Sumps, Drains, Outfalls, Septic Tanks)

Background--As mentioned, in section TA-15-4, there is no information on drains from buildings 1, 5, and 7. In a field survey, there was an indication that building R-23, inactive, has a septic tank, but that the tank is probably not contaminated with high explosive. This may be tank 80, noted on ENG-R5110 to be abandoned.

ENG R710 indicates that in 1958, the sanitary sewer from the camera firing point, building 02, removed in 1967, went to the edge of the canyon either with a seepage field or outfall. Whether this drain was contaminated with chemicals or high explosive and whether it was removed is not known.

ENG-R602 indicates that in 1958, building 8, a shop, was served by septic tank 147, which is still in place. The tank does not appear to be active. In a 1972 survey, this tank was noted to have possible high explosive contamination (Miller 1972). ENG-R604, dated 1958, shows building 20, an assembly building, to have a drain connection that appears to go to a canyon outfall, in addition to having a drain to septic tank 51, the effluent from which also drained to a canyon outfall.

The overflow from septic tank 63 serving building 40 appears to have gone to an outfall, as shown on ENG-R604, dated 1958. Also that year, building 27, a control unit firing at E-F, was served by septic tank 72, which may have drained to a canyon outfall, see ENG R709. This system is no longer active and the possibility of contamination in the system and drainage area is not known.

In the 1960s, building R194 had a vapor degreaser and strip tanks (LASL 1961b). Besides the degreaser, solutions included H_2SO_4, chromate, and hydrochloric acid. In 1978, plans were drawn for a dry well approximately 4 ft in diameter and 50 ft deep to connect to the existing drain at R-194. Whether the well was constructed is not known (Roybal 1978).

In the 1960s, building R-50 was noted to have two acid cleaning tanks draining to a sump "located at the edge of canyon," (LASL 1960). Another memo indicated that the drain might go into the canyon (Westfall 1959). In a field survey, R-50 was found to be used at present as a shop, and the sinks have been removed. The drain from the sinks was found to be still in place, to exit the building, and apparently to connect with the drainage ditch, which goes into the canyon. The building was also found to have floor drains. Building 203 used to have several sources that discharged cooling water to the canyon; it was reported during the field survey.

In the field survey, a hole covered by a lid was found; liquid was moving into the hole. This may be the dry well that was designed for TA-15-194, or a sump for TA-15-50, or some other sump. No one at the time of the field survey knew the origin of the liquid flowing into the hole.

An old, undated NPDES map indicates that there were two outfalls at building 40. The northwest outfall included photo wastes, whereas the outfall to the northeast was for cooling water. Cooling water discharge from R-44 is also shown.

CERCLA Finding--Uncertain for FFSDIF, PA, and PSI; there is not sufficient information to calculate HRS and MHRS Migration Mode Scores.

Planned Future Action--The drains, septic tanks, wells, sumps, and outfalls about which little information has been obtained should be sampled and the history of their use and possible decommissioning compiled through a literature search and interviews. Specifically, sampling should be made for high explosive and radioactivity, and if it is positive, the drain fields must be sampled. The drains from building 20 and the industrial drain systems R-194 and R-50 should be found and sampled. Based on these Phase I findings, future action could be planned.

TA15-0-S/ST/O-A-HW/RW (Active Sumps, Drains, Outfalls, Septic Tanks)

Background--The write-up on inactive sumps, drains, and the like, mentioned that during a field survey near TA-15-144, a hole was found with liquid flowing into it. The source of the liquid is not known. Near building TA-15-144 is building TA-15-203, in which a compressor is located. Its cooling water is routed to a drainage ditch outside the building. The ditch runs to the edge of the canyon.

The chemical drains in building TA-15-183, including one down which developer is poured, were found to go to an outfall behind the building. During a field survey, the building was found to have floor drains through which cooling water was routed; however, their destination is unknown.

In the PHERMEX facility, floor drains from the buildings are routed to an outside ditch. An oil spill in the facility resulted in oil discharging to the ditch. Routinely, cooling water discharges to the floor drains, and therefore, also to the ditch. This facility is also served by a wet cooling tower. In 1971, the volume of blowdown from the tower was indicated to be 360,000 gpy; organo chelates were being used to control dissolved solids (Miller 1971:5).

Building TA-15-203 was found during the field survey to house a laser that apparently uses once-through cooling water, which discharges to a ditch.

The ECTOR facility includes water-cooled lasers. It was found during the field survey that the water goes to a ditch, which drains into the canyon.

Active septic tanks at TA-15 include TA-15-51 and -61, the overflow goes to a seepage pit; TA-15-62, the overflow goes to a drain line and appears to go to the canyon (information from (ENG R699 and a 1981 Zia report); TA-15-63, the overflow goes to a seepage pit; TA-15-195, the overflow goes to a seepage pit, requires pumping and has a scum layer, which may be the result of 'nonsanitary waste' being dumped in it; TA-15-205 and -282, overflow goes to leach fields; and TA-15-209, the overflow goes to a seepage pit (Pan Am 1980:2-3).

Septic tank 284 serves TA-15-233, the betatron building, and tank -286 serves TA-15-285, the confinement and test facility.,

A 1972 survey indicated that tank TA-15-51 was possibly contaminated with high explosive (Miller 1972). In 1981, the tank was found to be 'daylighting' (surfacing) to the canyon. Samples were taken, and no high explosive was detected (Stump, Paxton, and Gonzales 1981:6). Over the years of operation, whether chemicals were released to sanitary systems is not known. Thus, whether drains, seepage pits, and leach fields have become contaminated is not known.

CERCLA Finding--Uncertain for FFSDIF, PA, and PSI; there is not sufficient information to calculate HRS and MHRS Migration Mode Scores.

Planned Future Action--The outfalls and tanks should be sampled during Phase I after a check is made to determine what sampling has already been made. Needed future action would be based on these data.

TA15-10-UST-A-PP (Underground Storage Tanks)

Background--On ENG-R5110, underground fuel tank TA-15-48 is shown near the old shop, and underground fuel tank TA-15-52 near old assembly building, TA-15-20. During a field survey, it was found that underground storage tank TA-15-200 is used to store oil for the Marx generators for PHERMEX. The survey indicated underground tank TA-15-287 was empty at the moment. Some confusion exists about these two underground tanks and their status (i.e.,-287 may be in use, and not -200).

CERCLA Finding--Uncertain for FFSDIF, PA, and PSI; there is not sufficient information to calculate a HRS Migration Mode Score.

Planned Future Action--The tanks should be located and checked for leaks. The surrounding soil should be sampled for contamination. Based on the information gathered during Phase I, future action could be planned.

TA15-11-CA-1/A-HW (PCBs)

Background--A broken capacitor containing PCBs was reported for TA-15-183 in 1981 (LASL 1981d). During the field survey, all capacitors in TA-15-183 were found to contain PCBs.

CERCLA Finding--Negative for FFSDIF, PA, and PSI; a HRS Migration Mode Score is not calculated.

Planned Future Action--No further action is warranted.

TA15-12-CA-1-HW (Vacuum Pump Oil)

Background--Reports say that in the early days, used vacuum pump oil was dumped on the ground whenever it was deemed convenient to do so.

CERCLA Finding--Negative for FFSDIF, PA, and PSI; a HRS Migration Mode Score is not calculated.

Planned Future Action--No further action is warranted.

TA15-13-1-A-HW (High Explosive Detonation)

Background--The PHERMEX facility, TA-15-184, in addition to being used as a site for experiments, is also used for waste treatment. Waste scraps of high explosive are detonated there to dispose of them safely. This was found out during the field survey.

CERCLA Finding--Uncertain for FFSDIF, PA, and PSI; there is not sufficient information to calculate an HRS Migration Mode Score.

Planned Future Action--During Phase I, a determination should be made whether any scraps of high explosive were ever scattered and left on the ground. This problem is comparatively minor with respect to the experimental firing that was done here. Future action would depend on what is learned.

TA15-14-CA-A-HW (Bunkers)

Background--Bunkers TA-15-41 and -247 are used to store scrap high explosive for short periods of time until it can be disposed of safely. Quantities stored at one location never exceed 55 gallons.

CERCLA Finding--Uncertain for FFSDIP, PA, and PSI; there is not sufficient information to calculate an HRS Migration Mode Score.

Planned Future Action--The danger of possible contamination from storing high explosive in these bunkers should be assessed during Phase I. Based on the assessment, future action could be planned.

TA15-1-CA-1-HW/RW (Firing Sites)

Background--A 1944 report describes a firing point 3/8 mile from the control building to use for charges up to about 50 lbs and a second firing point 1/2 mile distant with a large barricade, camera base, and subsurface instrument room (LASL 1944a). Engineering drawing R-5110 indicates that firing platforms TA-15-176 and -177 were removed in 1947. Whether they are the two firing points referred to above and where they were located is not known.

In 1944, a blast test was reported in "the Gulch" 1 mile below R-Site. Charges of up to 300 lb of Composition B and 500 lb of ammonium picrate were set off (Linschitz1944:2). Apparently, no further tests were done here.

In 1945, 2,500-lb shots were reported for TA-15 (Bradbury 1945). Then in 1946, the decision was made to designate the site a permanent location for firing explosives experiments involving charges up to as much as 2 tons. A series of small, permanent firing chambers and a new, large-scale firing site with an underground, timber control building were constructed (LASL 1947a).

In 1947, Group M-6 was using firing points A, B, C, and D at TA-15 and Group M-6 was using the "recently completed firing points E and F," (LASL 1947b:10-12).

Firing point A was located southwest of existing building TA-15-183 and was designated TA-15-14 on the ENG-R-131 location plan, dated 1951. Firing point B was a few hundred yards southwest of point A and was designated TA-15-74 on the same location plan.

According to a former employee, by 1957 neither of these firing points was being used. In 1985, a contamination survey indicated nondetectable levels of both high explosive and radionuclides at TA-15-14 and -74 (Courtright 1985, Buckland 1985a). However, during a field survey, an employee remembered uranium contamination being found and soil being removed in the area that was, from his description, probably site A. No further documentation on decommissioning has been found. During the field survey, it was noted that the x-unit chamber firing points and associated structures are no longer at the site. Engineering drawings also indicate their absence.

Firing point C is identified as TA-15-35 on location plan ENG-R130. It was at the junction of the road to E-F-Site, according to ENG-R131, dated 1957. Firing point D, TA-15-34, was on the south side of the road between existing structures TA-15-41 and firing point C, as shown on ENG-R131.

ENG-R130 shows C and D to have been abandoned by the mid-1950s. A 1949 report does not mention C or D being active; thus they probably had discontinued operation even by that date (LASL 1949). A field survey indicated that today, there are no remaining structures. No written documentation on decommissioning has been found.

In a 1983 interview, a former employee mentioned that south of the road going to E-F-Site is an area along the road "that may have contamination from various tests (EI 1983). The reference is probably to firing sites C and D.

Firing points E and F have been a major firing site since the 1940s at TA-15. ENG-R131, dated 1957, shows firing point E, TA-15-26, on the north and F, TA-15-30, on the south in the general area around control building TA-15-27, which remains in place today. The site is near the north rim of Potrillo Canyon. By the 1950s, x-unit chambers TA-15-36 and -26 were noted to have been removed, according to drawing ENG-R5110, dated 1983. A large, central site with two mounds walls was apparently built and remained in operation until a few years ago. It was referred to as E-F. At the time of the field survey, E-F was indicated to be inactive.

Many materials have been fired at E-F, including steel, aluminum, lithium hydride, uranium, mercury, lead, beryllium, boron, cadmium, gold, and possibly tritium. The types of high explosive that have been used include HMX, RDX, TNT, PETN, "Cyeotol," and Baratol, an explosive containing barium (Schinger 1973). Thorium was also fired (H-Div 1950a). Several 10,000s of kilograms of uranium are believed to have been fired at this site. The DOE Quality Discharge Information System as of July 12, 1982 lists the total amount of natural uranium expended at TA-15 as 13,050 Ci and of 238-uranium as 11,085 Ci.

A former employee stated that E-F-Site and Site R44 shared "equally in the amount of uranium expended at inactive sites at TA-15." He also said that E-F, R44, and R-45 were the three major sites for beryllium shots and that each probably fired similar amounts. CEARP files show many shots, some of which involved kilogram quantities of beryllium, to have been fired at TA-15.

Concentrations of the residues from shots in surrounding soils have been studied for a number of years. As early as 1948, samples of beryllium in soil were being taken. The background was found to be .13-.15 micrograms/gm sand for beryllium, with concentrations of up to 2.9 micrograms/gm sand after a shot (Hayes 1948 a, b). These data are believed to come from E-F-Site, but they could be from another. One report mentions that "an appreciable quantity of beryllium was found at a distance of 2,000 ft from the firing point," (H-Div 1958:5). The firing point is not identified, however.

In 1976, a survey of E-F firing points was made for radionuclides using a Phoswich meter. Berms on both sides of the firing point were found to be highly contaminated with uranium. Nowhere in the immediate area was there less than 10,000 c/m, and most of the area was more than 100,000 c/m (Elliott 1976). During another survey, uranium greater than 3,000 micrograms/g soil was found in some areas in surface soil at E-F-Site (Hanson and Miern 1976:31-32).

A memo discussing recent unpublished work by HSE-12 indicates that 1) beryllium is present in the E-F surface soils at slightly elevated levels, but is probably not present in soluble form, 2) lead is present in the surface soil at levels bordering on phototoxic levels, and 3) uranium is present at the several thousand ppm level in the surface soil and is of concern as a toxic heavy metal. The uranium is oxidizing into a soluble form, is being mobilized, and is moving downward into the lower soils (Cokal 1986).

By 1949, in addition to firing points A, B, E, and F, firing points G and H were in use (Reider 1949). On ENG-R131, G, TA-15-28, is shown just north of existing building TA-15-9. This facility was removed in 1967, according to engineering record ENG-R5110. No documentation on decommissioning was found; however, an M Division employee feels that there should have been no contamination. Firing site H, TA-15-17, was just northwest of the

double underline

By 1954, TA-15-44 and -45 had been built. During a field survey, R-44 was seen to be currently used for ballistic studies, and a gun is located at the site. Site R45 was not active at the time of the field survey, but there were indications that small shots may be fired in the near future. These two sites, although somewhat 'younger' than E-F, appear to have been the location at which large quantities of uranium and beryllium, and the same materials indicated for E-F, were fired.

However, the environmental studies performed at E-F have not included these two major firing sites. One would expect soil concentrations of beryllium and heavy metals to be elevated above background at these sites the same as as they are at E-F. A 1957 report indicates up to 1.7 micrograms beryllium/gm soil at R-44 (LASL 1957). In 1985, dirt around R-44 was sampled for 238-uranium and tritium; elevated levels were found (LASL 1985c).

Although extensive field surveys have not been made for R-44 and R-45, a great deal of shrapnel is believed to be at the sites.

<u>CERCLA Finding</u>--Uncertain for FFSDIF, PA, and PSI; therefore, there is not sufficient information to calculate MIIRS and HRS Migration Mode Scores.

<u>Planned Future Action</u>--A CEARP Phase I supplemental study will be conducted to determine the presence or absence of hazardous substances. Based on the results of this study, appropriate action will be taken.

<u>TA15-2-CA-A-HW/RW (Firing Sites)</u>

<u>Background</u>--TA-15 has two large firing sites in use at the moment; the PHERMEX machine and associated firing pad and the ECTOR (a proper name, not an acronym) machine and associated firing facilities.

The PHERMEX, TA-15-184, is used for radiographic studies of explosives and explosive-driven metal systems; thus, the experiment itself is 'exploded' on the pad next to PHERMEX. The facility was built in the early 1960s and is on the south rim of Potrillo Canyon (Mader et al. 1980:1). Materials studied--and therefore fired--include aluminum, copper, nickel, mercury, lead, thorium, uranium, and beryllium (Mader et al. 1980:22, 20). Large amounts of uranium have been involved in the shots, and one memo indicates that small amounts of gallium were also fired (LASL 1966a).

Cleaning to remove plutonium contamination was noted at building 180, part of PHERMEX, in 1967 (LASL 1967). In 1975, an upgrade for PHERMEX was undertaken. The instructions were, "Prior to any work in areas contaminated with 238-uranium and beryllium in front of the PHERMEX building, R-184, Zia should clean the immediate area of debris and 2-4 inches of loose surface soil and sand, and remove all metal plates," (LASL 1975:12). Where this material was taken is not known.

ECTOR is a more recent machine. It is in TA-15-280 with firing point chamber TA-15-276. The same type of studies are done here as at the PHERMEX facility. Very little data appear to exist on the extent of contamination in the areas surrounding PHERMEX and ECTOR. At present, gun ballistic studies are being performed at R-44, a field survey revealed.

CERCLA Finding--Positive for FFSDIF, PA, and PSI. The site's uranium was ranked and gave an HRS Score of 12.3 and a MHRS Score of 1.4. Contamination in the surface water did not contribute to the score because no use is made of the surface water within 3 miles.

Planned Future Action--A CEARP Phase 2 reconnaissance field study will be conducted to determine the presence of hazardous substances. Based on the results of this study, appropriate action will be taken.

TA15-3-CA-1-HW/RW (Holes)

Background--A series of holes, TA-15-264, -265, -270, -271, -272, and -273 is on the north side of the site near Three Mile Canyon. They are believed to be quite deep. In 1970, 4,000 lbs of TNT was fired in one hole. Later, at least one shot involving tritium took place (LASL 1970).

During the field survey, these holes were not carefully inspected to see whether adequate covers are being used and proper warning signs and/or fences are in place.

CERCLA Finding--Uncertain for FFSDIF, PA, and PSI; therefore, there is not sufficient information to calculate HRS and MHRS Migration Mode Scores.

Planned Future Action--A CEARP Phase 1 supplemental study will be conducted to determine the presence or absence of hazardous substances. Based on the results of this study, appropriate action will be taken.

TA15-4-CA-1-HW/RW (Burning Area)

Background--A 1950 report states, "A test was conducted at R-Site to determine the feasibility of collecting by flypaper uranium oxide particles that had been dispersed into the air by burning the tuballoy (uranium) with gasoline and HE," (H-Div 1950b:12).

In 1979, small-scale burn tests of uranium turnings in contact with uranium rods took place near E-F-Site (LASL 1979a, b). Oil-soaked natural uranium turnings and scrap were also burned (LASL 1980).

During a field survey, one former employee recalled two occasions on which oil/uranium mixtures were burned 100-150 yards west of E-F-Site and others on which uranium was burned at E-F-Site itself.

CERCLA Finding--Uncertain for FFSDIF, PA, and PSI; therefore, MHRS and HRS Migration Mode Scores cannot be calculated.

Planned Future Action--A CEARP Phase 1 study will be conducted to determine the quantity and distribution of hazardous substances. Based on the results of this study, appropriate action will be taken.

present Pulse High Energy Radiographic Machine Emitting X Rays (PHERMEX) facility. It must have been removed in the late 1950s when PHERMEX was built (Engineering 1960). No documentation on decommissioning has yet been obtained. The control room for it still exists.

By 1949, firing points I and J were also in operation. At that time, they were designated TA-15-32 and -31. They were transferred to Kappa Site for groups to use there and are now included in that site; hence, these firing areas are not included with TA-15.

By 1954, TA-15-44 and -45 had been built. During a field survey, R-44 was seen to be currently used for ballistic studies, and a gun is located at the site. Site R45 was not active at the time of the field survey, but there were indications that small shots may be fired in the near future. These two sites, although somewhat 'younger' than E-F, appear to have been the location at which large quantities of uranium and beryllium, and the same materials indicated for E-F, were fired.

However, the environmental studies performed at E-F have not included these two major firing sites. One would expect soil concentrations of beryllium and heavy metals to be elevated above background at these sites the same as as they are at E-F. A 1957 report indicates up to 1.7 micrograms beryllium/gm soil at R-44 (GMX-4 1957). In 1965, dirt around R-44 was sampled for 238-uranium and tritium; elevated levels were found (Gibbons 1965a).

Although extensive field surveys have not been made for R-44 and R-45, a great deal of shrapnel is believed to be at the sites.

CERCLA Finding--Uncertain for FFSDIF, PA, and PSI; there is not sufficient information to calculate MHRS and HRS Migration Mode Scores.

Planned Future Action--Much more information should be gathered from the literature available and from interviews during Phase I on the decommissioning of all the firing sites. Samples should be taken at all the inactive sites and analyzed for those materials known to have been used at the sites. An assessment should be made of the extent of contamination and probable impact on the environment. Special attention should be given to T-44 and -45. Future action cannot be planned without this information.

B.P. identify firing areas extensive sampling is needed.

TA15-2-CA-A-HW/RW (Firing Sites)

Background--TA-15 has two large firing sites in use at the moment; the PHERMEX machine and associated firing pad and the EC'TOR (a proper name, not an acronym) machine and associated firing facilities.

The PHERMEX, TA-15-184, is used for radiographic studies of explosives and explosive-driven metal systems; thus, the experiment itself is 'exploded' on the pad next to PHERMEX. The facility was built in the early 1960s and is on the south rim of Potrillo Canyon (Mader, Neal, and Dick 1980:1). Materials studied--and therefore fired--include aluminum, copper, nickel, mercury, lead, thorium, uranium, and beryllium (Mader, Neal, and Dick 1980:22, 20). Large amounts of uranium have been involved in the shots, and one memo indicates that small amounts of gallium were also fired (LASL 1960).

Cleaning to remove plutonium contamination was noted at building 186, part of PHERMEX, in 1967 (GMX-11 1967). In 1975, an upgrade for PHERMEX was undertaken. The instructions

were, "Prior to any work in areas contaminated with 238-uranium and beryllium in front of the PHERMEX building, R-184, Zia should clean the immediate area of debris and 2-4 inches of loose surface soil and sand, and remove all metal plates," (Engineering 1975:12). Where this material was taken is not known.

Another machine, ECTOR was imported from England. The field survey determined it was installed and used in the early 1980s at a site used earlier. It is in TA-15-280 with firing point chamber TA-15-276. The same type of studies are done here as at the PHERMEX facility. Very little data appear to exist on the extent of contamination in the areas surrounding PHERMEX and ECTOR. At present, gun ballistic studies are being performed at R-44, a field survey revealed.

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CERCLA Finding--Positive for FFSDIF, PA, and PSI. The site's uranium was ranked and gave a HRS Score of 12.3 and a MHRS Score of 1.4. Contamination in the surface water did not contribute to the score because no use is made of the surface water within 3 miles.

Planned Future Action--The firing sites and the areas surrounding them ought to be sampled and the types and extent of hazardous substances at them determined. The potential for these substances to pollute the environment should be evaluated. This Phase I work should lead to a plan of future action for the sites.

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TA15-3-CA-1-HW/RW (Holes)

Background--A series of holes, TA-15-264, -265, -270, -271, -272, and -273 is on the north side of the site near Three Mile Canyon. They are believed to be quite deep. In 1970, 4,000 lbs of TNT was fired in one hole. One experiment may have used tritium (Peterson 1970). The DOE Onsite Discharge Information System as of July 12, 1982 lists as decayed through December 1981 23,444,902 Ci of tritium expended at TA-15.

During the field survey, these holes were not carefully inspected to see whether adequate covers are being used and proper warning signs and/or fences are in place.

CERCLA Finding--Uncertain for FFSDIF, PA, and PSI; there is not sufficient information to calculate HRS and MHRS Migration Mode Scores.

Planned Future Action--Before anything else, covers ought to be put over the holes and warnings posted in the area. During Phase I, the depth and diameter of the holes should be measured, and all of them sampled for possible contaminants they might contain. An evaluation should be made of their potential to pollute the environment. Future action would be based on this work.

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TA15-4-CA-1-HW/RW (Burning Area)

Background--A 1950 report states, "A test was conducted at R-Site to determine the feasibility of collecting by flypaper uranium oxide particles that had been dispersed into the air by burning the tuballoy (uranium) with gasoline and HE," (H-Div 1950b:12).

In 1979, small-scale burn tests of uranium turnings in contact with uranium rods took place near E-F-Site (LASL 1979, Elder and Tinkle 1979). Oil-soaked natural uranium turnings and scrap were also burned (Ahlquist 1980).

During a field survey, one former employee recalled two occasions on which oil/uranium mixtures were burned 100-150 yards west of E-F-Site and others on which uranium was burned at E-F-Site itself.

CERCLA Finding--Uncertain for FFSDIF, PA, and PSI; there is not sufficient information to calculate MHRS and HRS Migration Mode Scores.

Planned Future Action--The burning area should be sampled for residual contamination during Phase I. The results would indicate needed action at the site. The results of the flypaper experiment could prove interesting and should be sought.

TA16-5-CA/OD-1-HW/RW (Dumping by E-F into the Canyon and Other Areas)

Background--In 1954, a bulldozer was noted at the E-F point firing pit, apparently attempting to prepare a new pit after an old shot. Soil samples for uranium in this area showed concentrations of .1 percent, and beryllium was also present in concentrations high enough to require a respirator for the bulldozer operator (Robbins 1954).

In 1955, a report said that the pit area was watered, the ground was broken with a chisel, and dirt was removed by a clam shovel to dump trucks and dumped over the edge of the canyon about 150 yards southeast of the pit. All workers wore respirators, which, when analyzed, showed beryllium in a truck driver's and in a bulldozer operator's filter (Robbins and Eutsler 1955). The quantity of dirt removed was reported to be approximately 100 cubic yards (H-Div 1955:20). Whether dirt was also dumped at other times is not known.

In 1965, there was a report of a large, concrete chamber that had exploded on the edge of the rim of the canyon, approximately 500 ft south of E point. It was contaminated with 1 mR/h beta-gamma, and 7,000 cpm alpha was reported. Metal frames and boxes on the edge of the rim of the canyon, approximately 400 ft south of E point, showed 300-500 cpm alpha. Other debris in the two areas gave up to 5,000 cpm alpha (Gibbons 1965:3). A CEARP field survey has not yet covered E-F-Site; therefore, the present status of open dumping at the site is not known.

In 1950, a note stated that it was all right for the contractor for the PHERMEX facility to use "the area known as the Contractors' Dump." Where it was located is not known (Engineering 1950). It may be Area M.

A report was made in 1983 that someone discovered "depleted uranium was disposed of in several areas including a chemical waste disposal area and in trash on the canyon edge," (LANL 1983:1). What is meant by 'several areas' and where they may be is not known. Area Z might be that referred to as 'on the canyon edge.'

In the field survey, a small amount of concrete and building debris was found to have been dumped behind R-22. TA-16 also includes waste disposal sites Areas Z and N. More information on these areas is given in the section on waste disposal sites.

CERCLA Finding--Positive for FFSDIF, PA, and PSI; however, there is not enough information to calculate MHRS and HRS Migration Mode Scores.

Planned Future Action--E-F firing site should be surveyed and sampled during Phase I to locate the areas where possibly contaminated dirt and debris, as well as chemicals, were dumped, and the "contractors' dump" should be identified. Open dumping at the site ought to be investigated as well. Interviews could help pinpoint past practices here. The survey should include the canyons below the site. Future action necessary at this location would be based on these findings.

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TA15-8-CA-1-HW/RW (Decommissioned Building Areas)

Background--The site had many buildings that are no longer present, according to engineering document R-5110 dated 1983. Except for the date removed, no information was found for decommissioning the following structures:

Structure	Use	Date of Removal
TA-15-175	Equipment Platform	1946
TA-15-176	Firing Platform	1947
TA-15-197	Firing Platform	1947
TA-15-24	Storage	1951
TA-15-79	Underground Tank	1952
TA-15-0	Control Chamber 'A'	1950
TA-15-3	Storage	1955
TA-15-4	Storage	1955
TA-15-5	Trimming Building	1962
TA-15-1	Laboratory and Shops	1962
TA-15-7	Office and Darkroom	1962
TA-15-11	Magazine	1967
TA-15-12	Magazine	1967
TA-15-13	Magazine	1967
TA-15-33	Radioactive Source Building	1967

Whether drains, sumps, and the like from the laboratory and shops, and the office and darkroom were removed and their state of contamination is not known. Also unknown is the status of contamination in the source building.

A mercury spill is known to have occurred in building 7 (H-Div 1952?22). Thorium contamination was found in building 1 (Buckland 1950). Mercury was used in experiments in building 1 (LASL 1966).

On a 1948 topo map, what appears to be a bunker is shown near the present disposal area, N. Engineering records from 1957, ENG-R130 and R131, indicate this structure was no longer present.

Early in 1965, the following structures were surveyed and found to be free of high explosive and radionuclide contamination: TA-15-2, warehouse; TA-15-10, magazine; TA-15-15, control room; TA-15-16, instrument chamber; TA-15-21, -38, -68, -69, magazines; TA-15-71, plate

barricade; TA-15-76 and -77, personnel shelters; TA-15-78, septic tank; TA-15-80, camera chamber; TA-15-98, control chamber; and TA-15-135, storage (Courtright 1965, Buckland 1965a). In addition, structures TA-15-18, a magazine, and TA-15-34, -35, control chambers, were monitored and found to be free of radionuclides later in 1965 (Gibbons 1965b). These structures were all removed in 1967.

In 1965, R-71, a plate barricade, R-125, a manhole, and R-126, a manhole, were found to be contaminated and the recommendation was to remove them to the contaminated dump (Buckland 1965b). ENG-R5110, dated 1967, notes they were removed in 1967.

Although no documentation on the decommissioning of buildings at TA-15 has been found, disposal area N is noted to be "a pit located east of buildings R-23, TA-15, containing remnants of several structures from R-Site, which had been exposed to explosives or chemical contamination," (Engineering 1965). Unless the pit was left open, disposal area N must contain only buildings removed before 1965. Where the buildings removed during the 1967 work were put is not known.

Negative B.P. ?

CERCLA Finding--Uncertain for FFSDIF, PA, and PSI; there is not sufficient information to calculate HRS and MHRS Migration Mode Scores.

Planned Future Action--Information on decommissioning the structures listed above should be sought in the literature and from interviews during Phase I. A determination ought to be made about what happened to the drains and sumps from these and associated facilities. The source building, bunker, plate barricade, manhole, and disposal area N mentioned above should be traced and their status of contamination learned. The reason for the mercury and thorium contamination should be documented and the possibility of residual contamination examined. The future actions to be taken would be based on this information.

check

TA15-7-CA-1-RW/HW (Bunkers and Other Structures Still Standing)

Background--The dirt bunkers, TA-15-44 and -45, and E firing points are noted to contain low levels of uranium (Balo and Warren 1980:61). Cleaning beryllium in building R-253, the now-inactive betatron building, was noted in 1969 (LASL 1969). Beryllium contamination of the oil in diffusion pumps is reported for R-50 (LASL 1961a).

Negative ? B.P.

CERCLA Finding--Uncertain for FFSDIF, PA, and PSI; there is not sufficient information to calculate HRS and MHRS Migration Mode Scores.

Planned Future Action--Samples should be taken to determine whether any residual contamination remains from the materials listed. This Phase I work would determine the status of these structures.

check

TA15-8-S/ST/O/1-HW/RW (Sumps, Drains, Outfalls, Septic Tanks)

Background--As mentioned, in section TA-15-4, there is no information on drains from buildings 1, 5, and 7. In a field survey, there was an indication that building R-23, inactive, has a septic tank, but that the tank is probably not contaminated with high explosive. This may be tank 80, noted on ENG-R5110 to be abandoned.

In the field survey, it was found that bldg 20 has floor drains. The area of discharge of these drains is not known. At one time the bldg was used for HE work an employee reported & there may be a small possibility of HE contamination.

ENG R710 indicates that in 1958, the sanitary sewer from the camera firing point, building 92, removed in 1967, went to the edge of the canyon either with a seepage field or outfall. Whether this drain was contaminated with chemicals or high explosive and whether it was removed is not known.

ENG-R692 indicates that in 1958, building 8, a shop, was served by septic tank 147, which is still in place. The tank does not appear to be active. In a 1972 survey, this tank was noted to have possible high explosive contamination (Miller 1972). ENG-R694, dated 1958, shows building 20, an assembly building, to have a drain connection that appears to go to a canyon outfall. In addition, ~~to having~~ to have a drain to septic tank 51, the effluent from which also drained to a canyon outfall.

The overflow from septic tank 63 serving building 40 appears to have gone to an outfall, as shown on ENG-R694, dated 1958. Also that year, building 27, a control unit firing at E-F, was served by septic tank 72, which may have drained to a canyon outfall, see ENG R700. This system is no longer active and the possibility of contamination in the system and drainage area is not known.

In the 1960s, building R194 had a vapor degreaser and strip tanks (LASL 1961b). Besides the degreaser, solutions included H_2SO_4, chromate, and hydrochloric acid. In 1978, plans were drawn for a dry well approximately 4 ft in diameter and 50 ft deep to connect to the existing drain at R-194. ~~Whether the well was constructed is not known~~ (Roybal 1978). The field survey found that the dry well located on the edge of the canyon is currently covered with dirt. The vapor degreaser & strip tanks are no longer in use.

In the 1960s, building R-50 was noted to have two acid cleaning tanks draining to a sump "located at the edge of canyon," (LASL 1960). Another memo indicated that the drain might go into the canyon (Westfall 1959). In a field survey, R-50 was found to be used at present as a shop, and the sinks have been removed. The drain from the sinks was found to be still in place, to exit the building, and apparently to connect with the drainage ditch, which goes into the canyon. The building was also found to have floor drains. Building 203 used to have several sources that discharged cooling water to the canyon; it was reported during the field survey.

In the field survey a septic system (probably TA-15-51) was found near ~~the tank~~ bldg 194. The tank

In ~~the field survey, a hole covered by a lid was found; liquid was moving into the hole. This may be the dry well that was designed for TA-15-194, or a sump for TA-15-50, or some other sump. No one at the time of the field survey knew the origin of the liquid flowing into the hole.~~ It appears to have a drain field at the edge of the canyon.

An old, undated NPDES map indicates that there were two outfalls at building 40. The northwest outfall included photo wastes, whereas the outfall to the northeast was for cooling water. Cooling water discharge from R-44 is also shown.

CERCLA Finding--Uncertain for FFSDIF, PA, and PSI; there is not sufficient information to calculate HRS and MHRS Migration Mode Scores.

Planned Future Action--The drains, septic tanks, wells, sumps, and outfalls about which little information has been obtained should be sampled and the history of their use and possible decommissioning compiled through a literature search and interviews. Specifically, sampling should be made for high explosive and radioactivity, and if it is positive, the drain fields must be sampled. The drains from building 20 and the industrial drain systems R-194 and R-50 should be found and sampled. Based on these Phase I findings, future action could be planned.

B.P. did not indicate interviews & literature

TA15-9-S/ST/O-A-HW/RW (Active Sumps, Drains, Outfalls, Septic Tanks)

Background--The write-up on inactive sumps, drains, and the like, mentioned that during a field survey near TA-15-144, a hole was found with liquid flowing into it. The source of the liquid is not known. Near building TA-15-144 is building TA-15-203, in which a compressor is located. Its cooling water is routed to a drainage ditch outside the building. The ditch runs to the edge of the canyon.

The chemical drains in building TA-15-183, including one down which developer is poured, were found to go to an outfall behind the building. During a field survey, the building was found to have floor drains through which cooling water was routed; however, their destination is unknown.

In the PHERMEX facility, floor drains from the buildings are routed to an outside ditch. An oil spill in the facility resulted in oil discharging to the ditch. Routinely, cooling water discharges to the floor drains, and therefore, also to the ditch. This facility is also served by a wet cooling tower. In 1971, the volume of blowdown from the tower was indicated to be 360,000 gpy; organo chelates were being used to control dissolved solids (Miller 1971:5).

Building TA-15-263 was found during the field survey to house a laser that apparently uses once-through cooling water, which discharges to a ditch.

The ECTOR facility includes water-cooled lasers. It was found during the field survey that the water goes to a ditch, which drains into the canyon.

Active septic tanks at TA-15 include TA-15-51 and -61, the overflow goes to a seepage pit; TA-15-62, the overflow goes to a drain line and appears to go to the canyon (information from (ENG R699 and a 1981 Zia report); TA-15-63, the overflow goes to a seepage pit; TA-15-195, the overflow goes to a seepage pit, requires pumping and has a scum layer, which may be the result of 'nonsanitary waste' being dumped in it; TA-15-205 and -282, overflow goes to leach fields; and TA-15-293, the overflow goes to a seepage pit (Pan Am 1980:2-3).

Septic tank 284 serves TA-15-233, the betatron building, and tank -286 serves TA-15-285, the confinement and test facility.,

A 1972 survey indicated that tank TA-15-51 was possibly contaminated with high explosive (Miller 1972). In 1981, the tank was found to be 'daylighting' (surfacing) to the canyon. Samples were taken, and no high explosive was detected (Stump, Paxton, and Gonzales 1981:6). Over the years of operation, whether chemicals were released to sanitary systems is not known. Thus, whether drains, seepage pits, and leach fields have become contaminated is not known.

CERCLA Finding--Uncertain for FFSDIF, PA, and PSI; there is not sufficient information to calculate HRS and MHRS Migration Mode Scores.

Planned Future Action--The outfalls and tanks should be sampled during Phase I after a check is made to determine what sampling has already been made. Needed future action would be based on these data.

mostly by but this is yes B.P.

TA15-10-UST-A-PP (Underground Storage Tanks)

(found in the field survey)

not changed

Background--On ENG-R5110, underground fuel tank TA-15-48 is shown near the old shop, and underground fuel tank TA-15-52 near old assembly building, TA-15-20. During a field survey, it was found that underground storage tank TA-15-266 is used to store oil for the Marx generators for PHERMEX. The survey indicated underground tank TA-15-287 was empty at the moment. Some confusion exists about these two underground tanks and their status (i.e.,-287 may be in use, and not -266).

CERCLA Finding--Uncertain for FFSDIF, PA, and PSI; there is not sufficient information to calculate a HRS Migration Mode Score.

Planned Future Action--The tanks should be located and checked for leaks. The surrounding soil should be sampled for contamination. Based on the information gathered during Phase I, future action could be planned.

TB P
find 4 + [illegible]

TA15-11-CA-1/A-HW (PCBs)

Background--A broken capacitor containing PCBs was reported for TA-15-183 in 1981 (LASL 1981d). During the field survey, all capacitors in TA-15-183 were found to contain PCBs.

CERCLA Finding--Negative for FFSDIF, PA, and PSI; a HRS Migration Mode Score is not calculated.

Planned Future Action--No further action is warranted.

TA15-12-CA-1-HW (Vacuum Pump Oil)

Background--Reports say that in the early days, used vacuum pump oil was dumped on the ground whenever it was deemed convenient to do so.

CERCLA Finding--Negative for FFSDIF, PA, and PSI; a HRS Migration Mode Score is not calculated.

Planned Future Action--No further action is warranted.

TA15-13-1-A-HW (High Explosive Detonation)

Background--The PHERMEX facility, TA-15-184, in addition to being used as a site for experiments, is also used for waste treatment. Waste scraps of high explosive are detonated there to dispose of them safely. This was found out during the field survey.

CERCLA Finding--Uncertain for FFSDIF, PA, and PSI; there is not sufficient information to calculate an HRS Migration Mode Score.

Planned Future Action--During Phase I, a determination should be made whether any scraps of high explosive were ever scattered and left on the ground. ~~This problem [illegible] unknown with respect to the experimental firing that was done here.~~ Future action would depend on what is learned.

TA15-14-CA-A-HW (Bunkers)

Background--Bunkers TA-15-41 and -242 are used to store scrap high explosive for short periods of time until it can be disposed of safely. Quantities stored at one location never exceed 55 gallons.

Negative

CERCLA Finding--Uncertain for FFSDIF, PA, and PSI; there is not sufficient information to calculate an HRS Migration Mode Score.

Planned Future Action--The danger of possible contamination from storing high-explosive in these bunkers should be assessed during Phase I. Based on the assessment, future action could be planned.

modify language

See TA15-12

1

TA-15 [illegible]

TA-15-1-CH-I-HW/Bu (firing pads)

The first installations at TA-15 were completed in 1944 and consisted of a central control bldg, a laboratory, a housing bldg, a few buildings & assembly areas, and several firing pads (A Tech Maintenance Group Report on General Bldg Data Concerning the LASL Sequence for Planning Purposes LAB-A-5 Sept 11 1947 p11) LASL 1947a (12)

In a 1944 report the firing pads are described as a firing pad 3/8 mile from the control bldg for use with a large explosive and a second firing pad 1/2 mile distant with large barricade, camera house and pit entrance [illegible] rooms (E-5 Interim Report - June 1944) Eng. drawing, LASL 1944a (9) precedes LANL

R511a indicates that firing platforms TA-15-176 and firing platform TA-15-177 were planned in 1947. Whether these are the two firing pads referred to above and where these locations were are not known.

In 1944 a blast test on "The Dulch" (1 mile Yellow Route) is reported. Charges of up to 300 lb of Comp B + 500 lb of ammonium picrate were set off. (Henry Linscoitz "Terminal Observations Progress Report" July 28 1944 p 2) LASL 1944b (10)
No further tests were apparently done here.

In 1945 2500 lb shots are reported for TA-15 (to Deputy Committee from Cmdr N. E. Bradbury "Procedures for 2500 lb shots at R site" May 1945) LASL 1945 (11)

Then in 1946 it was decided to make the site a permanent location for firing explosives experiments involving charges up to one ton and a series of small permanent firing control chambers and a new large scale firing site with an underground firing control building were constructed. (A Technical Reference Firing Area on Pajarito Background Site Characteristics for LASL Required for Planning Purposes LASL 1947d p 11) (name on p.1)

In 1947 Group M-6 was firing tests A, B, C + D at TA-15 with Group M-7 using the "recently completed firing facilities" (A Technical Memorandum Group M-6 Background Data Concerning Organization, Space Occupancy & Building Requirements of the LASL Has Grown Rapidly for the Last Two Years 1947 pp 10-12) LASL 1947b. (13)

Firing point A was located southwest of the existing building TA-15-183 and is designated as TA-15-14 on the ENG-C131, 1957 Location plan and Firing point B was located just southwest of point A by a few hundred yards and is designated as TA-15-74 on the ENG-C131, 1957 Location plan.

By 1957, according to a former employee, a number of these firing pads were being used. In 1965a contamination survey for toxic HE and radioactivity indicated non detectable levels of both at TA-15-19 and TA-15-78. However during the field survey an employee remembered, unknown contamination being found in the area which was from his description, probably at TA and soil being removed. No further documentation or recommendations have been found. The field survey found that the x-ray chamber firing pads & associated structures are no longer at the site (as is also indicated in the orig drawings.)

(to S. E. Russo from W. C. Courtright, "Contamination survey" Jan 6 1965 LASL 1965a (24)

(to SE Russo from Carl Buckland "Radiation Survey: K Site Structures" Jan 18 1965 LASL 1965b (25)

Firing point C is identified as TA-15-35 on location plan E-R130 and was located at the junction of the road to E.F site according to ENG-R131 1957. Firing point D, TA-15-37 was located on the south side of the road between existing structure TA-15-81 and firing point C (See ENG-R131)

According to ENG-R130 both C & D had been abandoned by the mid fifties. The field survey indicated that today there are no remaining structures. No written documentation on decommissioning has been found.

A 1949 report dealt with operations C & D as active as they probably had discontinued operations earlier by that time (unused report Nov 10 1949) LASL 1949a (14)

In a 1983 interview a former employee mentioned that sculling the road going to EF was done in an area along the road "that may have contaminated from earlier tests" (EI Nov 16 1983) This probably refers to firing sites C & D EI 1983 (1)

Firing points E & F have been the major firing sites div of the since the 1950's at TA-15. Firing point E (TA-15-26) was on the northwest firing point F (TA-15-36) on the south, as indicated by ENG-R131, 1951, I saw the general area around control building TA-15-27, which remains in place today. The site is near the northern rim of Pajarito Canyon.

By the 1950s X-ray chambers TA-15-36 and TA-15-26 are noted to have been removed (ENG R510-1983). A large concrete "mound walls" apparently was built & removed in operation during the last few years. The site was referred to as E-F. At the time, the field survey E-F was referred to being inactive.

Many materials have been fired at E-F. These include steel, Al, titanium, magnesium, depleted uranium, mercury, lead, Be, B, Cd, Pb, Au, + various substitutions. The types of HE which have been used include HMX, RDX, TNT, PETN, "Cyclotol" and Comp B (which was known containing explosive), (to free from Keith & Rodriguez "Hydro Tests - Orientation Visit to R-Sites and Future Planning" H-DIV 1950a (36) LASL 1973 (4) Progress Report, covering Mar 20-April 20 1950 Aug 27 1973) (This has been fired ... It is believed that several 10,000's lbs/kg of HE have probably been fired at this site. A former employee stated that E-F sites and site R-14 shared "equally in the amount of ordnance expended at inactive sites of TA-15." For Be shots it is indicated that E-F, R-44, & R-45 were the three major sites for the material & probably each fired similar amounts. CEARP files show many shots, some of which involved the equivalent of Be fired at TA-15.

Concentrations of the residues found in surrounding areas of E-F site have been studied for a number of years. As early as 1948 samples of Be in soil were being taken. Background was found to be .13-.15 µg/gm sand for Be with concentrations of up to 2.9 µg/gm sand near a stack. It is believed that this data is probably from E F site, but could be from cumulative site.

from
letter from Howard Hayes University of Rochester School of Medicine & Dentistry, to H I Schulte, USSL (3) Hayes 1948a 1948b Sept 17 1948

letter from Howard Hayes (4) 30a
to H F Schulte USSL Sept 30 1948

The H-Division response indicated that at least a kilogram quantity of Tc (TCA-Pertechnetate) discharged was indicating that "an appreciable quantity of Tc was found in the drainage 2000 ft from the firing pond" (H-Div 1958 Progress Report April 20 - May 20 1958 p 5) No additional data is given as to the firing pond being referred to. (4)

Concerning radionuclides, in 1976 a survey of E-F pond was conducting at Rhodes Canyon. Barrels on both sides of the firing pond were found to be highly contaminated with uranium. No other on the mountain area was that less than 10,000 c/m and most of the area was over 100,000 c/m (Tom C. Cowright from Bob Elliott 1" Radiological Survey E-F Pond - Re-site" Nov 17 1976) LASL 1976a (37)

Another survey found uranium in some areas greater than 3000 pCi/gm in surface soil at E-F site (Wayne C Hansen, Felix R Herrera Jr Long-Term Ecological Effects of Exposure to Uranium, LA 6269 July 1976 pp 31, 32) LASL 1976b (38)

A memo dated recent unpublished work done by HSE-12 indicates that: 1) Be is present in the E-F surface soils at slightly elevated levels, that is probably not present in soluble form, 2) lead is present in the surface soil at levels approaching phytotoxic levels, + 3) uranium is present in the surface soil at appreciable ppm levels in the surface soil + is of concern as a heavy metal. The uranium is leaching into a soluble form + being mobilized +

moving downward into the lower rails (to John Rodgers
from E. J. Cokal, "Continuation of E-F Work
Following May Transfer.", March 27, 1985) LANL 1985 (c)

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By 1949 in addition to firing pads A, B, E, & F firing pads G & H were in use (to distribution from Troy Reider "R-site procedures" Nov 15 1949). LASL 1949b ENG-R131-1957 locates G (TA-15-28) as just north of existing building 9. This facility was removed in 1967 according to log records (ENG-R5110). No documentation on decommissioning was found. Firing site H (TA-15-17) was located just northwest of the present Phermex facility. This site must have been removed in the late 1950's for construction of the new Phermex facility (ENG-R131-1960). Again no documentation on ENG 1960 decommissioning was found. (15) (2)

(By 1949 firing pads I & J were also in operation at that time these were designated TA-15-32, TA-15-31. These have been transferred to new Eng Groups at Los Alamos & are now included in that site, hence these firing areas are not included with TA-15)

By 1951 TA-15-94 and TA-15-95 had been built. Currently R-44 is being used for ballistic studies, with a gun being located at the site. No area observed in the field survey. Site R-44 was not active at the time of the field survey, but is now indicated that small shots may be fired in the near future.

These two sites, which somewhat "synergize" from E-F appear to have had large quantities of uranium and Be fired along with the same materials as used for E-F. (see description of E-F). However the environmental studies which have been performed at E-F have not included these other two major firing sites. It would be expected that equal concentrations of Be + heavy metals would be elevated above background at these other sites as they are at E-F. Back in a 1957 survey which indicates up to 1.7 μg Be/gm soil at R-44. (G[illegible] 180 1564, 7/24/57). In 1965 that same LASL 1957 around R-44 were sampled for 238-Uranothitum. Elevated levels were found.

(to Dan Dwyer from Donald R. Jackson "Soil Samples at R-sites" Feb 4 1965) 26 LASL 1965c

While intensive field surveys have not been done for R-44 & R-45 it is believed that a good deal of disposal occurred at the sites.

TA-15-2-CA-A-HW/RW (firing sites)

TA-15 has two large firing sites in use at the moment: the PHERMEX machine & associated firing pad and the FCTOR machine & associated firing facilities.

The PHERMEX machine (TA-15-184) is used for radiographic studies of explosives and explosive driven metal systems and hence the experimental study is "imploded" on the pad next to PHERMEX. Mader et al. 1980 (41) a

The facility was built in the early 1960's & is in the center of Potrillo Canyon (Charles L. Mader, Timothy R. Neal, Richard J. Dick LASL PHERMEX Data Vol 1 Univ of Calif Press 1980, p1) Materials studied (and hence fired) include Al, Cu, Ni, Hg, Pb, Th, Uranium, Beryllium (Charles L. Mader et al. 1980b (CP) pp22, 29) Mader et al. 1980b also indicates that small amts of gallium have also been fired (Reactive meeting 3/2/66) LASL 1966 a (31)

In 1975 an upgrade for PHERMEX was undertaken. Instructions were, "Prior to any work in area contaminated with 238-Uranium & Beryllium dig from the PHERMEX bldg C-184, 3 in. should clean the immediate area of debris and 2-4 inches of loose surface soil and sand, and remove all coated rocks". Where the material was taken is not known (Conceptual Design Report for PHERMEX Enhancement Program LASL 1975 (37) ENG-9 CDR-75-05, LASL Dec 10 1975 p12) to 37a

Clearance to remove Pu contamination is noted at bldg 184 (part of PHERMEX) in 1967 (monitoring sheet GMX-11 4/9/67) LASL 1967 33

Page amended to uranium found when blasted in the 1970's

A more recent construct is FCTOR located at TA-15-280 with fumes pond chamber TA-15-276. The same type of studies are done here as at the PHERMEX facility.

There appears to be very little data on the effect of contaminates on the area surrounding PHERMEX and FCTOR.

Presently equipment studies are being performed at R-9 where found in the field survey.

TA-15 - 3 - CA - I - HW/EW (Holes)

These are a series of holes TA-15-264, 265, 270, 271, 272, & 273 on the north side of the site near Three Mile Canyon. These holes are believed to be quite deep. In 1970 4000 lbs of TNT was fired in one hole. Holes at least one shot involving tritium took place (to E.W. Drake LASL 1970 from Eric K Pederson "J-Div shots at R-Site", Aug 6 1970)

During the field survey these holes were not carefully inspected to see if adequate covers are being used & if proper warning signs &/or fences are in place.

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TA-15-4-CA-I-HW/RW (burning areas)

As reported in 1950, a test was conducted at R-Site to determine the feasibility of collecting by flypaper uranium oxide particles that had been dispersed into the air by burning the tuballoy (uranium) with gasoline and H.E." (H-Division Prog Rept May 20-1950 - June 20 1950 p12) (5) H-DIV 1950b

In 1979 small-scale burning tests of uranium turnings in contact with uranium rods took place near E-F site. (Memo Log Book - 3-14-79) (to Don Harper from John Elder & Marvin Tinkle "Standing Procedure for Burning about 1 kg of depleted Uranium Turnings," March 8 1979) (38) LASL 1979 (39) (two w/)

Oil soaked natural uranium turnings and scrap were also burned. (to Marvin Tinkle from A. John Aldquist "Air Sampling Results from Uranium Burn" April 2 1980) LASL 1980 (40)

During the field survey one former employee recalled two occasions where "Dirty area burning of enriched uranium cuttings 100-150 yards west of E-F site and other occasions in which uranium was burned at E-F site (dump)."

TA-15-5-CA-OD-I-HW/RW (dumping by E-F into the canyon & other areas)

In 1954 using a bulldozer at the E-F Pond tuff was moved, apparently just as an attempt to prepare a new pit after as red shot. Soil samples for measurement in this area showed concentrations of 190 m/m Be also present in high enough concentrations to require a respirator for the bulldozer operator. (to H.E. Schulte from M.C. Robbins "Beryllium Contamination of Tuff Pit at R site" Aug 12 1954) LASL 1954 (17)

Prior to 1955 it was reported that the pit area was cleared, ground was broken by a diesel & dust was removed by a clam shovel to dump trucks & dumped over the edge of the canyon about 150 yards southeast of the pit. All workers were respirator, which when analyzed showed Be in one of the truck driver's and the bulldozer operator's filters (to H.E. Schulte from M. Chan Robbins & B.C. Eutsler "Removal of Beryllium from the Tuff Pit of E-F Pond at R Site", March 18 1955) The quantity of dust removed is reported as approximately 100 cubic yards (H-Division Progress Report Feb 20 - March 20 1955 p 20) H-Div 1955 LASL 1955 (7) whether dust was dumped during other periods also is not known.

In 1965 a large concrete exploded chamber located on the edge of the canyon rim, approximately 500' south of E pond & contaminated with 1 mR/hr β/γ & 7000 cpm α was removed. Metal framed boxes on the edge of the canyon rim approximately 200' south

of E pit showed 300-500 cpm alpha. Other debris in the two areas gave up to 3000 cpm alpha. (to Carl Buckland from Donald R Dahlman "R-site Radioactive Contamination Survey" LASL 1965d (27) June 18 1965 p 3) The field survey has not yet covered E-F site & hence the present status of open dumping is not known at E-F pit.

In 1959 there was a note that it is illegal for the contractor for the PHEHEX facility to make use of "the area known as the Contractors Dump". Where this was located is not known (to R.E. Dunning LAO from Eng Dept LASL "Contractors Dump" May 13 1959) This may possibly refer to Area M. LASL 1959a (19)

In 1983 it was found that the people at TA-15 had "not followed their SOPs and depleted uranium was disposed of in several areas including a chemical waste disposal area and in trench on the canyon edge". (Operations Waste Management Advisory Committee Minutes LANL 1983 July 22 1983 p1) What is meant by "several areas" & where these may be is not known. Area Z might be the one referred to as "on the canyon edge".

TA-15 also includes waste disposal sites Area Z, & Area N. More information on these areas is given in the section on waste disposal sites.

→ In detailed survey a small amount of concrete & bldg debris was found to have been dumped behind R-22.

TA-15-6-CH-I-HW/RW decommissioned building area

The site has had many buildings which are no longer present (source ENG-C5110 1983)

No information regarding dates of removal was found for the following structures:

Structure #	Use	Date of removal
TA-15-175	equipment platform	1945
176	fencing "	1947
197	" "	1947
24	storage	1951
79	underground tank	1952
6	control chamber "A"	1957
3	storage	1955
4	"	1955
5	training building	1962
1	laboratory shops	1962
7	office & dark room	1962
11	magazine	1967
12	"	1967
13	"	1967
33	radioactive source bldg	1967

Interior drains, sumps, etc from the laboratory shops, and other dark rooms were removed & staged for contamination [illegible] decision. [illegible] dumped [illegible] Status of contamination [illegible]

A mercury spill was known to have occurred in bldg 7 (H-Division Progress Report Aug 20 - Sept 20 1952 p 22) H-Div 1952 (6)

Thorium contamination was found in bldg 1 (to Charles H. Perry from Carl Beckland "Thorium survey, R-site", April 15 1950) LASL 1950 (16)

Mercury was used in experiments in bldg 1 monitoring sheet 10 GMX-11 April 26 1966) LASL 1966 (32)

On the 1948 topo map what appears to be a building is shown where the present Beryl was located. By the 1950's this structure was no longer present (ENG-R130, R131 1957)

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Early in 1965 the following structures were surveyed & found to be quite high radioactive contamination. TA-15-2 warehouse, TA-15-10 magazine, ~~TA-15-13 magazine~~, TA-15-15 control room, TA-15-16 radioactive storage, TA-15-21, [illegible] 38, 68, 69 magazines, TA-15-71 plate barricade, TA-15-[illegible] 76, -77 personnel shelters, TA-15-78 utility hut, TA-15-80 control chamber, TA-15-98 control chamber, TA-15-135 storage.

same as above

LASL 1965 b

(to R. E. Reeves from W. C. Cavanaugh "Contamination survey" Jan 6 1965) (to R E Reeves from Carl Buckland "Radiation survey: R-site Structures" Jan 18 1965) (two mss)

On addition structures TA-15-18 (magazine) TA-15-34, 35 (control chambers) were monitored & found full of radio nuclides later in 1965 (to Carl Buckland from Donald R. Dubbins, "R-Site Radioactive Contamination Survey," June 18 1965) 28

LASL 1965 d

In 1967 these structures were removed. ~~[illegible]~~ ~~[illegible]~~

In 1965 R-71 plate barricade, R-125 (magazine), & R-126 magazine were found to be contaminated & the recommendation was to remove them to the contaminated dump (to S. E. Reeves from Carl Buckland "Radioactive Contamination Survey, R-site Structures" June 21 1965) These were added & removed 1967 29 c

LASL 1965 f

While no documentation on decommissioning of buildings at TA-15 has been found, there was a "pit located east of building R-23, TA-15, containing remnants of wood structure from R site which had been used for explosives or chemical contamination" (to destruction from Engineering Dept. "Material Disposal Area - Removal Drawing ENG-R 102, (REV 12) LASL 1965 & April 12 1965) Unless the pit was left open during area N must contain only buildings removed before 1965. Where buildings removed during the 1967 activities were put is not known.

TA-15-70A - I - TW/HW (bunkers + other structures still standing)

The dust bunkers TA-15-94, 95, + E firing points are marked as containing low levels of uranium.
(Karen A Orta, Orta L Brown "Waste Management Site Plan" LA-UR-86990 March 1986 LANL → LA NM 87544 p61) LANL 1986

Cleaning of Be in the building R-233 (Rotation bldg new reactor) was noted in 1969
(H-5 sample sheet GMX-11, Sheet # 50 lab book 1932 4/17/69) GMX - 1969 = LASL 1969 (34)

Contamination of the oil in diffusion pumps with Be is reported for R-50 (survey sheet - R Sutton 2/19/61) (32)
survey 1961 = LASL 1961a

TA-15-8-S/ST/O-I-HW/TRU pumps, drains, outfalls, septic tanks

As mentioned in TA-15-9 Action There are no information on drains from bldg 1, 5, 27

In the field survey it was indicated that building E-23 (inactive) has a septic tank but that the tank is probably not HE contaminated. The maybe tank 80 noted as abandoned 1967 (ENG-R 5770)

Eng R-716 indicates that the sanitary sewer from bldg 92 (removed 1967) connected to a cesspool apparently west of the edge of the canyon and appears a cesspool or outfall. Possible HE contamination technically possible and known.

Eng R-692 indicates that in 1958 building 8, shop, was served by septic tank 147 which is still in place. This tank does not appear to be active. In a 1972 survey this tank is noted as having possible HE contamination (to Harry Soldon from Pearl Miller "Radioactive Contaminated Septic Tanks" Jan 28 1972) [ASL 1972]

In 1958 Eng R-692 shows bldg 20 (assembly bldg) (3C) having a drain connection which appears to go to a canyon outfall, in addition to having a drain which went to septic tank 51 which effluent also drained to a canyon outfall. Currently tank 51 goes to a cesspool (Pan Am Septic Tank Report Feb 28 1976 - p 2

~~In 1958 there is a septic system still in use. There appears to have been a drain in bldg 20 and the contaminated water may have had an outfall to the canyon (Eng R-692 1958)~~

In 1958 the septic system from tank 63 serving bldg 90 appears to have gone to an outfall (Eng R-692 1958)

Septic tank [illegible]

In 1958 bldg 27 (continued from pg E-15)
was served by septic tank 72 which drained, recently to a
canyon outfall. The system is no longer active & the
status of possible contamination in the western drainage area
is not known. (ENG-R-709)

In the 1960's building R-194 had a nonradioactive
strip tanks (Industrial Hygiene Group H-5, Plan Approval - March 3 1961) LASL 1961b (23)
Besides the degreasers solutions included H_2SO_4, chromate, and
HCl. In 1978 plans were drawn for a 4ft x 50' dry well to connect
to the existing drains at R-194. Whether this was constructed is not
known. (to M Z McCorkle from T Hughes, "E P A Task Force Support
Bldg R-194, TA-15, ES-4114" June 16 1978) LASL 1978 (37a)
Building R-50 was added in the 1960's as
housing two acid cleaning tanks which had drains to a
sump "located at the edge of canyon" (Industrial Hygiene (21)
Group H-5 Plan Approval 9/25/60). Another memo LASL 1960
indicates that the drains ran to the canyon. (20)
(to E.R. Tesche from C. G. Westfall "Installation for LASL 1959b
Soldering, Welding & Cleaning Facilities in Bldg R-50", Dec 16 1959)
In the field survey it was found that R-50 is presently
being used as a shop & the tanks have been removed. The
drains from the tanks were found to have been replaced
apparently just the bldg & connect to the drainage ditch
into the canyon. The bldg was also found to have
floor drains (Dig 20) and to have had general sewer connection
canyon or was adapted during the following
In the field survey a tank connected to a
and having liquid emanating out was found. This may be
the dry well which was designed for TA-15-194, or a sump for
TA-15-50 or some other sump. No one at the time of the field survey

show the origin of the liquid flowing in.
A la NPDES map (no dates) indicates that there were two outfalls at building 40. The NPDES included this waste whereas the one to the north was for cooling water.
Cooling water discharge from E44 is also shown.

TA-15-9-S)ST/D-A-HW/RW Sumps, drains, outfalls
Septic tanks

As mentioned in the section on inactive sumps, drains, etc a "hole" with liquid flowing in was found on the fuel railway near TA-15-194. Source of the liquid is said to come from near bldg TA-15-194 is bldg 203 in which a compressor is located which has its cooling water routed to a drainage ditch outside the bldg. This ditch runs to the edge of the canyon [illegible] down which drainage is poured.

The chemical drains from bldg 193 were found to go to an outfall behind the building. The bldg during the field survey was also found to have floor drains in which cooling water was routed. Where floor drains go is not known.

In the PHERMEX facility, buildings floor drains are routed to an outside ditch. An oil spill in the facility resulted in an oil discharge to the ditch (late summer). Routinely cooling water discharges to floor drains + hence to the ditch. This facility is also served by a wet cooling tower. In 1971 the volume of blowdown from the tower was indicated at 360,000 gpy with organo chlorates being used to control algal levels (to C. Anderson from C. E. Miller "Effluent from Plant Cooling Towers", July 30 1971 p 5) LASL 1971

(35)

Building 263 it was found in the field survey there was a large drain apparently since once through cooling water which discharges to a ditch.

The ECTOR facility includes water cooled loads. This water goes to a ditch which drains into the canyon, it was indicated during the field survey.

Septic tanks include

TA-15-51 (overflow goes to a seepage pit)

61 (" " " ")

TA-15-62 (overflow goes to a drain line and appears to go to the canyon from ENG- 1697 & 1981 site report)

63 (overflow goes to a seepage pit)

195 (overflow goes to a seepage pit - requires pumping - has a scum layer which may be the result of "non-cooling waste" discharge)

205 (overflow goes to a leach field)

282 (overflow goes to a leach field)

293 (overflow goes to a seepage pit) (43)

(Pan Am Septic Tank Report Feb 26 1986 p. 2-3) Pan Am 1986

The fate of septic tank 284 which probably served 233 which was the Detonation bldg, + 286 which probably served 285 confinement test facility is not known. While these are not on the Pan Am list Eng 2510 would indicate that they are probably still in use.

28

LASL 1972 - same as a book

A 1972 survey indicated that tank TA-15-51 was heavily contaminated with HE (to Harry Jordan from Dean Muller "Radioactive Contaminated Septic Tanks" Jan 28 1972). In 1981 the tank was found daylighting in the canyon. Samples were taken & no HE was detected (to R.A. Velasco Jr from John Stump, Carol Paxton, Roland Gonzales Jr "Septic Tank Aquatic Technical Area" 3/11/81 p6) Zia 1981 (44) over the period of operation

Possible chemical release to sanitary sewer was not known

TA-15-10-UST-A-PP - underground storage tanks
Underground fuel tank TA-15-48 is located near the old
Chaps. Underground fuel tank TA-15-52 is located near
Shield assembly bldg TA-15-20 (Eng 25110)
Underground storage tank TA-15-266, it was found
during the field survey used to store oil for the
Marx generators for DHECRAFX. There is also underground tank
TA-15-287 which the field survey indicated as empty
at the moment. There was some confusion on these
two underground tanks + their status may be reversed
(i.e. 287 may be being used not 266)

TA-15-11-CA-I/A-HW (PCB)

A broken capacitor containing PCBs is reported LASL 1961 for TA-15-183 in 1961. (Survey sheet CMx-11, March 5 1961)
The field survey found that all capacitors in TA-15-183 presently contains PCBs.

TA-15-12-CA-I-HW

It is reported that in early days used vacuum pump oil was dumped on the ground. No owner at was deemed convenient to do so (EI 1985)*

* to Marsi
I cannot find this - Jack put it in his report - is this only data we have - I suggest we leave out??

TA-15-4-CA-J-11W/KW (old bldg)

The site has had many buildings which are no longer present. These include:

Structure	Use	Removal Date	Checked on 65
TA-15-1	laboratory & shop	1962 Δ	
2	warehouse	1967	✓
3	storage	1955 Δ	
4	"	1955 Δ	
5	trimming building	1962 Δ	
6	control chamber "A"	1959 Δ	
7	Office & dust room	1962	
10	detonator magazine	1967	✓
11	magazine	"	
12	"	"	
13	"	"	
~~14~~	~~[illegible] chamber~~	"	
15	control room bldg K-5	"	✓
~~16~~	~~[illegible]~~	"	
17	instrument chamber	"	✓
18	magazine	"	
~~19~~	~~[illegible] house~~	1960	
21	magazine	67	✓
22	storage	51 Δ	
~~23~~	~~[illegible]~~	"	
~~24~~	~~[illegible]~~	52	
~~25~~	~~[illegible]~~	67	
~~26~~	~~barricade~~	"	

TA-15-32	X-unit chamber firing point	1967	
33	radioactive source bldg	"	
34	control chamber firing point	"	
35	" " " "	"	
~~36~~	~~X-unit chamber~~	~~1954~~	
38	magazine	1967	✓
~~39~~	~~road block~~	~~1951~~	
~~49~~	~~"~~	~~1959~~	
~~53~~	~~concrete~~	~~1959~~	
68	magazine	1967	✓
69	"	1967	✓
71	plate barricade	1967	✓
73	" "	1967	
~~75~~	~~[illegible]~~	~~"~~	
76	personnel shelter	"	✓
77	" "	"	✓
78	" "	"	✓
79	underground tank *	1952	
~~82~~	~~[illegible]~~	~~1965~~	
~~83~~	~~road block~~	~~50~~	
~~84~~	~~"~~	~~51~~	
85	"	62	
86	"	58	
91	barricade	61	
92	camera chamber	61	✓
~~93~~	~~barricade~~	~~59~~	

* no information on [illegible]

~~96~~	~~[illegible]~~	~~1951~~
~~97~~	~~"~~	~~67~~
98	control chamber	67
135	storage bldg	1967
175	equipment platform	1975
176	[illegible] platform	1977.5
177	" "	1977.5

The only information on decommissioning of these facilities was