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*John K*

**U. S. Department of Energy**  
 Los Alamos Area Office, MS A316  
 Environmental Restoration Program  
 Los Alamos, New Mexico 87544  
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Date: November 9, 1998  
 Refer to: EM/ER:98-442

Mr. Benito J. Garcia  
 HRMB-NMED  
 P.O. Box 26110  
 Santa Fe, New Mexico 87502

**SUBJECT: RESONSE TO SEPTEMBER 18, 1998, LETTER FROM HRMB AND  
 SUBSEQUENT MEETING REGARDING THE REQUIREMENT FOR A  
 CLASS 2 MODIFICATION FOR THE POTENTIAL OPERATIONAL  
 DEVIATIONS FROM THE MDA-P CLOSURE PLAN**

Dear Mr. Garcia:

The purpose of this letter is to provide the Hazardous and Radioactive Materials Bureau (HRMB) additional information on the technical issues identified in the letter to Los Alamos National Laboratory dated September 18, 1998, from HRMB. In addition, this letter provides a summary of the meeting held with representatives of the HRMB and the Department of Energy (DOE) Oversight Bureau on October 5, 1998, and includes additional information, as requested by HRMB after the meeting. This information is included as Enclosure 1. Further, the Laboratory requests concurrence in writing that substituting the alternative treatment standard for hazardous debris for the verification standard currently contained in the approved Closure Plan does not constitute a modification of the plan.

The September 18, 1998, letter from HRMB indicates that the changes specified in the Laboratory's letter dated July 22, 1998, regarding potential operational deviations from the Material Disposal Area P (MDA-P) Closure Plan were considered "unexpected events occurring during closure of the site." HRMB appears to be referring to safety and waste management operational issues regarding detonatable pieces of high explosive (HE) to be remediated within the MDA-P Area of Contamination (AOC). Although the size and concentration of detonatable pieces of HE prompted changes regarding operational safety, these changes have not altered the Laboratory's ability to meet the closure performance standard. The Laboratory believes that finding detonatable pieces of HE within the AOC was not unexpected as the following language in the approved Closure Plan explicitly refers to the presence of HE at the site. The plan states "One safety officer, employed by the contractor, will be responsible for general safety. The second safety officer, employed by Laboratory Technical Area (TA) 16 operations, will be responsible for evaluation of **any HE** [emphasis added] contamination in the excavated material."



RED LANE TA-16 '98  
 TA 16

*TC*

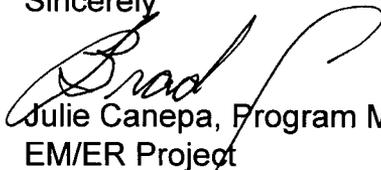
Further, Section 6.1.1.4 of the approved Closure Plan indicates that "No changes in unit operating plans or design are expected that would require amendment of the closure plan." This section also describes an unexpected event as something that "would include the discovery of hazardous waste or mixed-waste residuals that cannot be removed or decontaminated to meet the closure performance standard or additional excavation and sampling that may be required (e.g., removing contaminants in cracks or fractures)." Finally, Table H-8 of the approved Closure Plan in Appendix H lists specific HE analytes relative to Method 8330 which will be used for verification sampling of waste generated during closure activities. In summary, the Laboratory concludes that there is ample language in the approved Closure Plan to support the proposition that the presence of HE in the AOC was not an "unexpected" event. Thus, the Laboratory believes that a class 2 modification of the approved Closure Plan is not required and consequently, should not be submitted.

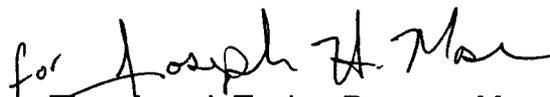
The Laboratory does recognize that any change in the schedules provided in Figures 6-2 and 6-3 of the approved Closure Plan would require an amendment to the plan pursuant to 20 NMAC 4.1, Subpart VI, [40 CFR 265.112] and Section 6.1.2.2 of the approved Closure Plan.

As indicated by Lee Winn of HRMB, in the October 7, 1998, telephone conversation, it does not appear that the Laboratory is required to submit a Class 2 modification of the approved Closure Plan.

If you desire to discuss the subject of this letter, please contact Dave McInroy at (505) 667-0819 or Joe Mose at (505) 667-5808.

Sincerely

  
Julie Canepa, Program Manager  
EM/ER Project

for   
Theodore J. Taylor, Program Manager  
DOE/LAAO

JC/TT/HWB/dm

Enclosures: Response to Technical Issues  
Flow Diagrams  
MDA-P Site Map  
Waste Analysis Plan for Barium-Contaminated Soil

Mr. Benito Garcia  
EM/ER:98-442

-3-

November 9, 1998

Cy: K. Bostick, EES-15, MS J495  
B. Crizwell, Roy F. Weston, MS M992  
S. Den-Baars, IT Corporation, MS K490  
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J. Parker, NMED-HRMB  
G. Saums, NMED-SWQB  
S. Yanicak, NMED-AIP, MS J993  
EM/ER File (CT# 546), MS M992  
EM/ER File, MS M992  
RPF, MS M707

**Enclosure 1**  
**Response to Technical Issues**

Responses to specific technical issues raised in the letter from HRMB dated September 18, 1998 are addressed below. To facilitate review of this response, the wording on technical issues in HRMB's September 18, 1998, letter is included verbatim in italics. The Laboratory's response follows each HRMB comment.

## RESPONSE TO TECHNICAL ISSUES

1. *All proposed changes to the closure plan to include high explosive (HE) handling processes shall be clarified using process flow diagrams and narrative summaries that illustrate and describe all waste streams and their ultimate disposal.*

Although process flow diagrams of waste management operations were not required in the approved Closure Plan, the following are included as Enclosure 2 for your information.

- Excavation Process Flow
- Process Flow for Soils
- Process Flow for Debris

The Laboratory previously provided this information during a presentation on June 17, 1998, prior to submittal of our July 22, 1998, letter. Laboratory representatives also escorted a representative from the DOE Oversight Bureau of New Mexico Environmental Department (NMED) through the site on September 2, 1998, to view the area and an updated map of the site first hand.

2. *Up to date figures illustrating the proposed new processes shall be included.*

The only "new process" proposed in our July 22, 1998, letter was the proposal to reclaim decontamination water and water generated during waste management operations within the AOC, such as excavation de-watering and run-off (collected in sumps) from staged soil or debris. However, due to operational considerations, the reclamation of decontamination water and the use of a filtration system associated with that process will not be implemented. Hence, no new processes are being proposed.

Waste segregation (i.e., segregating detonable pieces of HE from soil within MDA-P is not considered treatment: it is segregation. The Federal Register dated March 8, 1990 (55FR, 8759) indicates that if RCRA standards were applied to each movement of waste already in a unit, "...virtually no operational activities could occur at any RCRA land disposal unit containing hazardous waste without pretreatment of any waste disturbed by the operation: clearly an infeasible approach." Waste segregation is a common practice at RCRA corrective action sites and is necessary to facilitate final disposition of generated waste streams from these sites (i.e., to meet the receiving facility's waste acceptance criteria).

3. *The filtration system and sorting pad shall meet the requirements for temporary units as defined in 20 NMAC 4.1, 40 CFR 264.553-temporary units, and 40 CFR 270.42 Appendix I.D.3.e-requirements for a Class 2 permit modification.*

As previously stated, the reclamation of decontamination water and the use of a filtration system associated with that process will not be implemented.

The sorting pad is contained within the AOC at MDA-P and is shown in the map provided as Enclosure 3. The Laboratory believes that the process of segregating pieces of HE from soil excavated at MDA-P clearly does not constitute treatment because it does not alter the chemical or physical characteristics of the waste streams generated (e.g., detonable pieces of HE retain their chemical and physical composition and contaminated soil retains its chemical and physical composition). These waste streams must be segregated because they are subject to different treatment standards and will be managed at different facilities. Environmental Protection Agency (EPA) policy allows repositioning of waste within the AOC without being considered newly generated and thus, the waste is not regulated as stored hazardous waste. In addition, Section 6.2.4 of the approved Closure Plan allows for segregation of waste materials. The excavation process flow diagram is provided in Enclosure 2. The Laboratory will not be operating a temporary unit to treat or store hazardous remediation waste and so a class 2 modification to the approved Closure Plan is not needed.

4. *The state of New Mexico has not adopted the new land disposal requirements (LDR's) and therefore the more conservative concentration for barium still apply.*

The Laboratory originally raised the subject of Land Disposal Restriction (LDR) treatment standards because the standard for barium recently changed as of May 26, 1998, (63 FR, 28555) and the Laboratory is proposing to conduct generator treatment of barium contaminated soil excavated from MDA-P. As part of the newly promulgated Phase IV LDR treatment standards, EPA re-evaluated available treatment performance data from wastes containing significant concentrations of barium. (The barium concentration in soil proposed for generator treatment at MDA-P ranges from 100 to 2,500 mg/L.) As a result, EPA changed the barium treatment standard from 7.6 mg/L to 21 mg/L because it "better reflects the diversity of metal-containing waste streams and their treatment." In addition, the Phase IV LDR treatment standards added the requirement to identify underlying hazardous constituents (UHCs) reasonably expected to be present in metal-bearing wastes. Phase IV indicates that "the more stringent HSWA portion of this rule will become effective at the same time in all states."

HRMB has indicated that the Laboratory is required to comply with the "more conservative concentration for barium". Although the treatment standard for barium in 20 NMAC 4.1, Subpart VIII is 7.6 mg/L (which is more conservative than Phase IV), it is also less stringent than Phase IV because it does not require the identification of UHCs for metal-bearing waste. To further complicate the issue, the Laboratory's site-wide background for barium in soil is 295 mg/kg. Thus, it would be exceedingly difficult for the Laboratory to meet the LDR treatment standard of 7.6 mg/L for native uncontaminated soil.

Since the Laboratory cannot meet HRMB's LDR treatment standard of 7.6 mg/L, we are requesting HRMB's use of discretionary authority to invoke a "no longer contained in" determination that would essentially adopt EPA's newly promulgated treatment standard of 21mg/L and UHCs. That is, soil treated to meet the Phase IV LDR treatment standard of 21 mg/L and UHCs would be determined to no longer contain the characteristic hazardous waste (D005-barium at 100mg/L). This option would allow the

Laboratory to manage the waste as New Mexico special waste and meet off-site waste acceptance criteria and the federal regulatory requirement without compromising protection of human health or the environment. An example of EPA codifying the "contained in rule" for characteristic hazardous waste is provided at 40 CFR 261.3(f) which allows the Regional Administrator to determine when the debris is no longer contaminated with hazardous waste.

5. *If the proposed hand-sorting pad is constructed over an existing potential release site then using this area for baseline sampling is not acceptable.*

The intent of sampling any contaminated location (i.e., those areas that overlap existing SWMUs) was simply to determine whether the closure activities to be conducted at MDA-P affected the area, above or beyond existing contamination derived from nearby Laboratory operations that are not related to MDA-P (refer to section 4.1.2 of the approved Closure Plan).

6. *LANL shall include waste analysis plans (WAP's) for all waste streams including filters and soil generated from the sorting operation. A WAP may not be necessary for the decon water used in steam cleaning the debris if all LDR requirements for debris alternative treatment standards are met. These WAP's shall include sampling for underlying constituents and radioactivity.*

The approved Closure Plan does not require waste analysis plans for all waste streams generated as part of closure activities at MDA-P. Uncontaminated soil is not considered a solid waste in the sense of being abandoned, recycled, or inherently waste-like as those terms are defined in the regulations, but rather is an environmental medium. EPA policy interprets its regulations to require that environmental media which contains hazardous waste must be managed as hazardous waste. Soil segregated as part of the excavation process will be field screened for volatile organic compounds, radionuclides, asbestos, barium and quantitatively analyzed for HE using approved or proposed SW-846 methodologies including 8515 for nitroaromatics [TNT and nitroamines] and 8510 for RDX. NOTE: Method 8510 is a proposed SW-846 method that may not be approved until spring of 1999. These qualitative and quantitative screening techniques will be utilized to initially segregate hazardous waste soil (D005 and/or D003) from non-hazardous waste soil. Segregated soil is not expected to be considered an explosive characteristic hazardous waste (D003); however, initial quantitative screening and fixed laboratory analysis (Method 8330) will confirm this determination. All stained soil will be segregated and managed separately.

A WAP is provided as Enclosure 4 in accordance with 20 NMAC 4.1, Subpart VIII [40 CFR 268.7(a)(5)] for generator treatment of barium-contaminated soil. The WAP includes language on waste generating activities, describes the waste to be treated in a less-than-90-day accumulation area, describes the treatment process, and includes verification sampling and analysis to ensure that the treated waste meets LDR standards. WAPs should not be required for generated waste excavated from MDA-P unless subsequent treatment will be conducted, as in the case of barium-contaminated soil.

The Laboratory concurs that a WAP would not be required if the Laboratory chose to invoke the alternative treatment standards for hazardous debris specified in 20 NMAC

4.1, Subpart VIII, [40 CFR 268.45]. However, the Laboratory requests concurrence in writing that substituting this alternative treatment standard for the verification standard currently contained in the approved Closure Plan for debris does not constitute a modification of the plan.

7. *Closure performance standards of SAL's or risk based clean up levels shall be met. If limited excavation of the tuff is proposed, additional sampling shall be proposed where contamination is below SAL's or risk based Clean up levels is left in place.*

The Laboratory will meet the closure performance standards as specified in the approved Closure Plan. Section 6.2.4 of the approved Closure Plan states "After the waste pile is removed, excavation will continue into the underlying subsoils and tuff. ...Excavation will continue until the closure standards are thought to have been reached. This over excavation is estimated to be approximately 2 ft deep....Some areas will be excavated to different depths than others." The Laboratory did not propose limited excavation of tuff, but rather indicated that the presence of highly welded tuff underlying MDA-P may make "over excavation" of the tuff difficult. Further, the Laboratory included a description of "clean fill" in the July 22, 1998, letter to identify fill materials used during the initial construction of the 387 Burn Pad. The morphology of MDA-P cannot simply be viewed as the extent of the waste pile, therefore, our description was meant to inform HRMB of the revision of the conceptual model.

As agreed in the meeting on October 5, 1998, verification that the MDA-P closure performance standard has been met pursuant to the approved Closure Plan is part of Phase 2 and will be negotiated through future meetings with HRMB, as appropriate. The approved Closure Plan states "The Laboratory will obtain NMED approval for the number and location of boreholes to be used to define the vertical extent of contamination."

8. *LANL shall provide an adequate sampling and analysis plan which addresses depth (e.g. every 2 feet), location, and percentage of full suite analysis, to confirm the identified clean fill area. This sampling and analysis shall be performed in Phase 1. If contamination is found above the performance standards the removal procedure shall be described. Rather than perform a detailed sampling and analysis plan of the clean fill it may be economically beneficial for LANL to choose to remove the clean fill and dispose of appropriately.*

Determination of whether the closure performance standard has been met is a Phase 2 activity that will be conducted in accordance with section 4.2.1 of the approved Closure Plan. The Laboratory has previously indicated that there is a large volume of clean fill that composes the morphologic feature of MDA-P. Once all debris and obviously contaminated soil or tuff has been removed from MDAP, confirmatory samples will be collected from the exposed surface and downslope from the former waste pile to assess whether the concentrations of the remaining soil (i.e. the "clean fill") and tuff are below acceptable levels and the closure performance standard has been met.

The Laboratory believes that the approved Closure Plan adequately covers sampling and analysis of the "clean fill"; therefore, an additional sampling and analysis plan will

not be submitted, and the sampling and analysis will not be performed in Phase 1. Section 1.1.2 of the approved Closure Plan outlines a contingent approach that may be followed if any remaining Appendix VIII constituent concentrations equal or exceed the criteria specified in the plan that allows soil and or tuff to be left in place. The Laboratory will address any Phase 2 issues, as appropriate, through future meetings with HRMB.

During a telephone conversation on October 7, 1998, with the Laboratory representative, Holly Wheeler-Benson and Lee Winn of HRMB, additional information was requested by Ms. Winn on behalf of HRMB. The following issues raised by Ms. Winn are addressed in the Laboratory's response to the September 18, 1998, letter from HRMB provided in the text above.

- Provide a response to items #1 and 2 in the September 18, 1998 letter from HRMB.
- Reiterate that a change in schedule regarding closure activities at MDA-P would require modification of the approved Closure Plan.
- Indicate how the Laboratory knows that segregated soil would not be explosive characteristic hazardous waste (D003).

The following additional issues raised by Lee Winn are address below.

- Provide clarification regarding generator treatment. Indicate when the less-than-90-day start date begins.
- Indicate how the clean and treated soil and debris waste will be containerized at the staging area(s).
- Discuss de-watering of barium contaminated soil (presumably during generator treatment).
- Include characterization information regarding process waste streams generated.
- Indicated how barium sands will be managed.

Generator treatment will occur at Staging Area 1 identified in Figure 2-4 of the approved Closure Plan in accordance with 20 NMAC 4.1, Subpart V, [40 CFR 264, Subpart I]. Although the approved Closure Plan indicates that on-site treatment of contaminated soils will be conducted in tanks meeting the requirements of 20 NMAC 4.1, Subpart V [40 CFR 264.192 through 264.199] it goes on to describe the treatment process as follows: "The soil will be loaded into a hopper and placed in a mixer. It is expected that 12-yd<sup>3</sup> batches will be mixed using mix equipment similar to a Maxon Paddle Mixer or possibly a 10-yd<sup>3</sup> cement mixer truck. The mixer will be placed in a secondary containment system consisting of an 80-mil HDPE liner with 4-in. curbing made of wood. The equipment will be supported with a concrete pad." This description of the mix equipment fits the definition of a container, as it is a portable device, rather than a tank meeting 40 CFR 264.192 through 264.199 standards. The less-than-90-day start date for generator treatment of barium-contaminated soil at a less-than-90-day accumulation area will begin when the waste leaves the AOC, which is currently designated as the "exclusion zone boundary" on the map provided as Enclosure 3. The Laboratory will remove all debris and obviously contaminated soil associated with operations at MDA-P as part of Phase I, even if it is found outside of the exclusion zone boundary identified in Enclosure 3. Additional information regarding the proposed

generator treatment of barium contaminated soils is included in the Laboratory's response to #6 above and in Enclosure 4.

Non-hazardous waste soil, treated formerly characteristic hazardous waste, and debris will be staged on a 80-mil high-density polyethylene (HPDE) liner overlain by a protective layer of soil and gravel and bermed to contain any liquids. Non-hazardous waste soil and treated formerly characteristic hazardous waste will be covered with a tarp or other appropriate cover until verification sampling results are received and the waste is placed in dump trucks for off-site disposal.

At the point when these waste streams are staged outside of the AOC (for non-hazardous waste soil and debris) and after generator treatment of barium-contaminated soil, the waste would be considered "solid waste" pursuant to 20 NMAC 9.1, Section 105BV. Non-hazardous waste soil and debris staged outside of the AOC is considered "construction and demolition debris" pursuant to 20 NMAC 9.1, Section 105.T and does not require containerization. On October 27, 1998, Alex Puglisi of the Hazardous and Solid Waste Group contacted Charles Hules of the Solid Waste Bureau requesting a determination of whether treated formerly characteristic hazardous waste could be staged on a HPDE liner overlain by a protective layer of material, bermed to contain liquids and covered with a tarp or other appropriate cover. Mr. Hules indicated that the Laboratory could use provisions similar to those provided for petroleum contaminated soil to stage this waste stream prior to off-site disposal, provided that it was protective of the environment and the public health, welfare and safety and provided that it could not be discharged to surface water and would not be disbursed into the air (thus, the cover).

Section 6.2.6 of the approved Closure Plan indicates the treated barium-contaminated soil is expected to produce a moisture-free stabilized soil that will pass the paint filter test. Both treatment equipment and the treated formerly characteristic hazardous waste soil will be covered with tarps or other appropriate cover to prevent storm-water infiltration. Treatment and subsequent staging of the treated soil will be on a HPDE liner overlain by a protective layer of soil and bermed to contain water. Generator treatment of barium contaminated soil is described in the Waste Analysis Plan provided as Enclosure 4.

Process waste such as sludge or sedimentation generated from storage of decontamination water or storm-water will be characterized once it is generated. Decontamination water will be collected, sampled, and analyzed as specified in Sections 4.3.1 and 4.7.1 of the approved Closure Plan. As specified in Section 6.2.6 of the approved Closure Plan, water run-off will be collected, sampled, and analyzed for the waste constituents present in the waste pile as discussed in Section 4.7.1. All process waste streams will be managed based on sampling results.

Any residues from previously burned barium sands, historically disposed within MDA-P, would not be discernable from other soil.

**Enclosure 2  
Flow Diagrams**

Mr. Taylor and Mr. Browne  
March 26, 1998  
Page 2

cc: T. Baca, LANL EM, MS J591  
J. Canepa, LANL EM/ER, MS M992  
J. Davis, NMED SWQB  
B. Garcia, NMED HRMB  
K. Hill, NMED HRMB  
M. Johansen, DOE LAAO, MS A316  
J. Kieling, NMED HRMB  
S. Kruse, NMED HRMB  
M. Leavitt, NMED GWQB  
H. LeDoux, DOE LAAO, MS A316  
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D. Neleigh, EPA, 6PD-N  
J. Parker, NMED DOE OB  
J. Vozella, DOE LAAO, MS A316  
S. Yanicak, NMED DOE OB, MS J993  
File: HSWA LANL 3/1082/16/16-003(k) & 16-021(c)  
Track: LANL, Doc date, NA, DOE/LANL, HRMB/Dinwiddie, RE, File



GARY E. JOHNSON  
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DEPUTY SECRETARY

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March 26, 1998

Mr. Theodore Taylor, Project Manager  
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Department of Energy  
528 35th Street  
Los Alamos, New Mexico 87544

Mr. John Browne, Director  
Los Alamos National Laboratory  
P.O. Box 1663, MS A100  
Los Alamos, New Mexico 87545

RE: Approval  
16-003(k) and 16-021(c) RCRA Facility Investigation Report  
Los Alamos National Laboratory  
NM0890010515

Dear Mr. Taylor and Mr. Browne:

The RCRA Permits Management Program (RPMP) of the New Mexico Environment Department has reviewed and approves the 16-003(k) and 16-021(c) RCRA Facility Investigation (RFI) Report (LA-UR-96-502 dated September 1996). The approved document includes the RFI Report, Response to Supplemental Information (EM/ER:97-476 dated November 14, 1997), and the Response to Conditional Approval (EM/ER:98-056 dated February 26, 1998).

Should you have any questions regarding this letter, please contact me or Mr. John Kieling, RPMP's LANL Facility Manager, at (505) 827-1558.

Sincerely,

  
Robert S. ("Stu") Dinwiddie, PhD, Manager  
RCRA Permits Management Program  
Hazardous and Radioactive Materials Bureau

RSD:kth

Post-it™ Fax Note	7671	Date	4/02	# of pages	2
To	Don Hickmott	From	J. Mose		
Co./Dept.		Co.			
Phone #		Phone #			
Fax #	5-4632	Fax #			

TABLE 5.2.9-1

## STATUS OF LATERAL BOUNDING FOR PRS 16-021(c)

COPC	OUTFALL	100 FT	200 FT	300 FT	400 FT	500 FT	600 FT
Barium	Yes	Yes	No	No	No	Yes	No
DNT	Yes	Yes	No	Yes	No	Yes	Yes
HMX	Yes	Yes	Yes	Yes	Yes	Yes	Yes
RDX	Yes	Yes	No	No	Yes	Yes	No
TNB	Yes	Yes	Yes	Yes	Yes	Yes	Yes
TNT	Yes	Yes	No	Yes	Yes	Yes	Yes
Anthracene	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bis(2-ethylhexyl) phthalate	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Lateral traverses at the outfall, 100 ft, and 500 ft are bounded with more certainty for all COPCs. Traverses at 300 ft and 400 ft have COPCs at levels only slightly greater than SALs for barium, RDX, and DNT in lateral bounding samples. These traverses are bounded relative to EPA Region 9 industrial PRGs. Traverses at 200 and 600 ft have RDX in lateral bounding samples at levels significantly greater than SALs and EPA Region 9 industrial PRGs. Phase II sampling will focus on these traverses.

The extent of COPCs due to releases at PRS 16-021(c) to surface and groundwater is also unknown, and will be investigated as described in the Phase II sampling and analysis plan.

#### 5.2.10 Conclusions and Recommendations

PRS 16-021(c) is contaminated with several constituents at levels that present a risk to human health and the environment. BMPs have been implemented at the PRS to minimize migration of COPCs to surface and groundwater.

COPCs identified in the screening assessment include: barium, lead, vanadium, 1,3-dinitrobenzene, DNT, HMX, RDX, TNB, TNT, anthracene, and bis(2-ethylhexyl)phthalate. Of these COPCs, barium, DNT, HMX, RDX, and TNT are widely distributed along the centerline of the drainage at PRS 16-021(c) from the outfall for at least a distance of 600 ft downgradient. The other COPCs are present in localized zones. The contaminated zone ranges up to 25 ft wide in traverses where bounding relative to SALs was achieved. At 200 ft and 600 ft the zone may be greater than 25 ft wide. Vertical bounding and knowledge the extent of contamination of downgradient surface and groundwater were not achieved in the Phase I sampling.

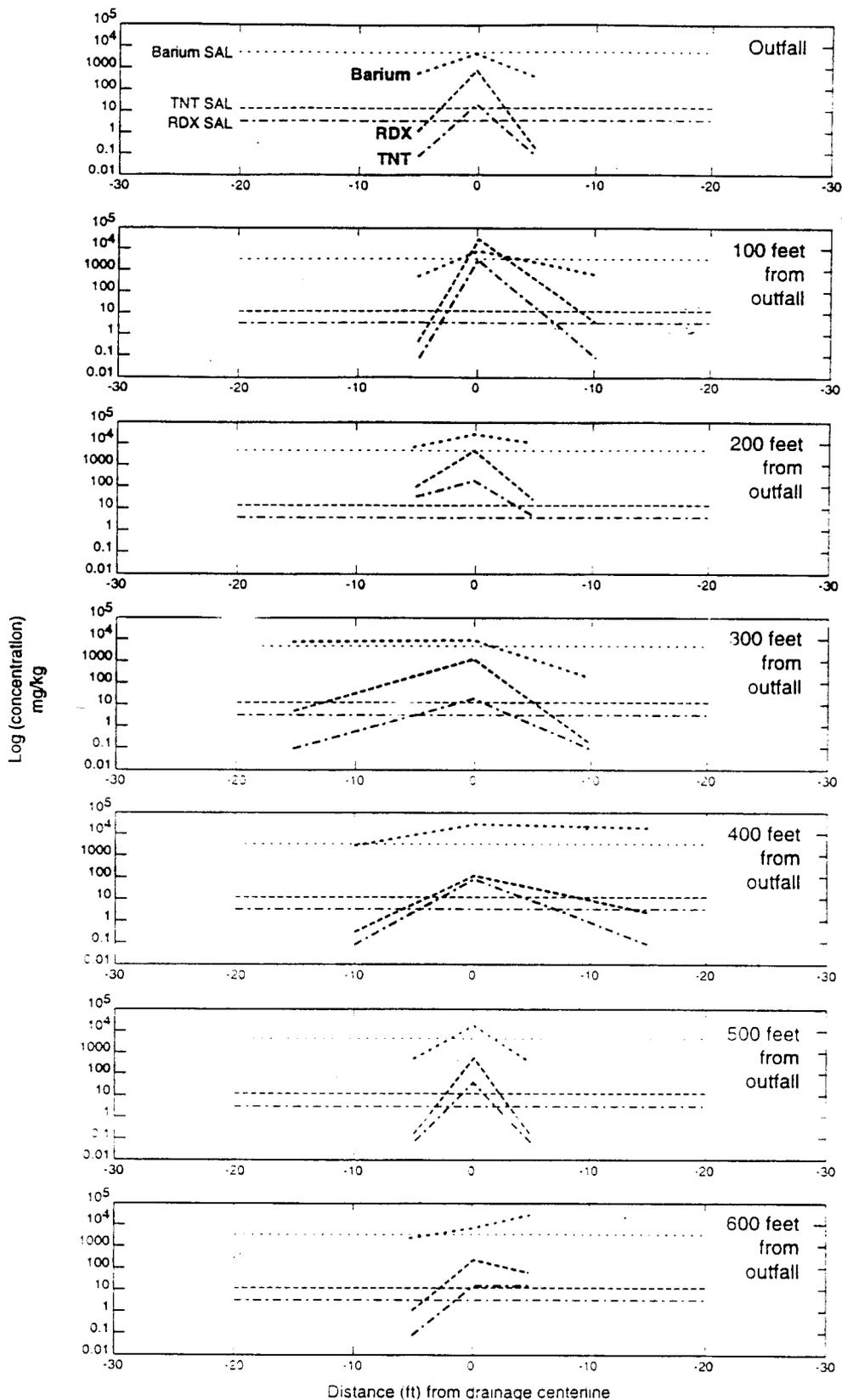
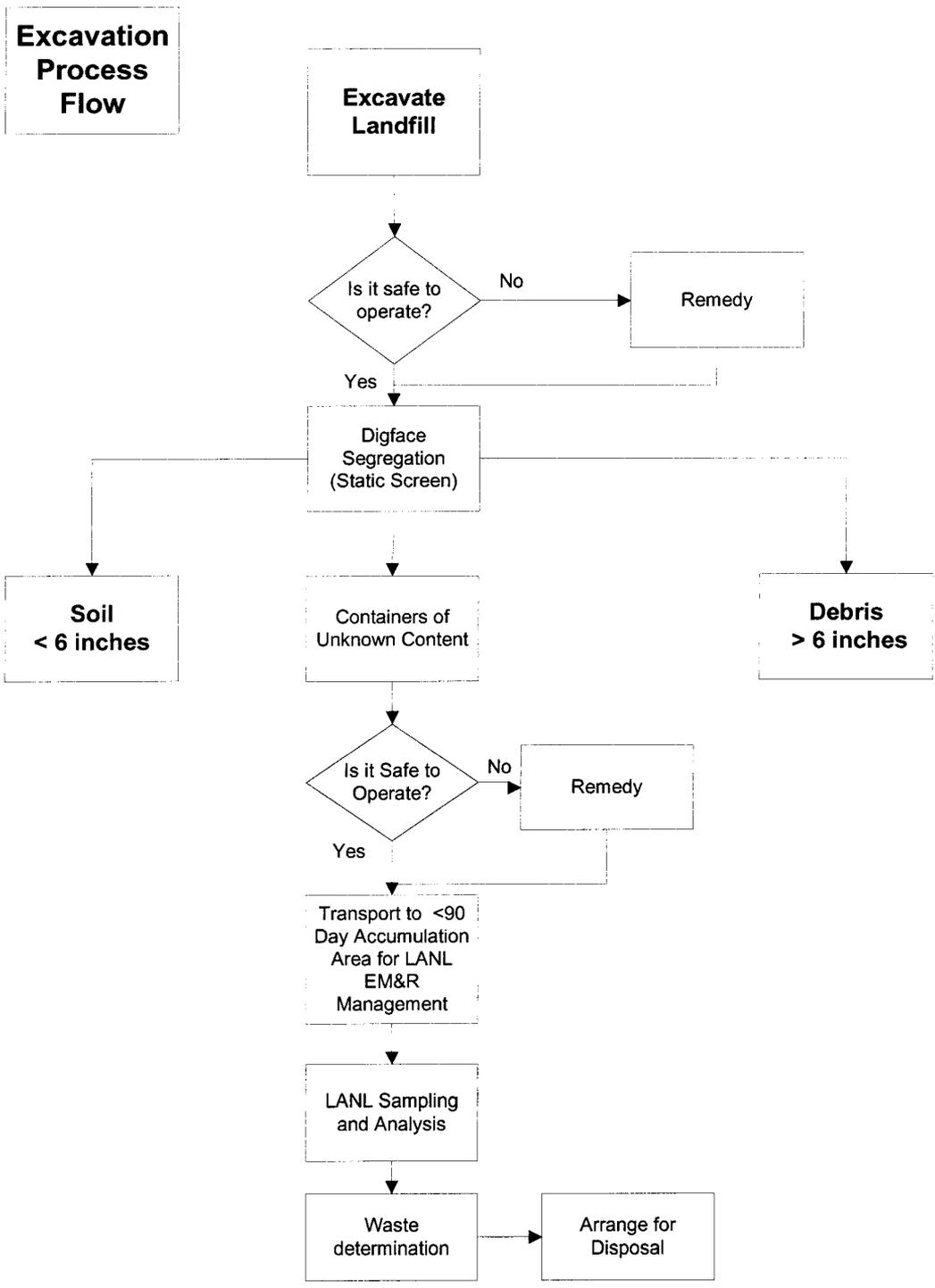


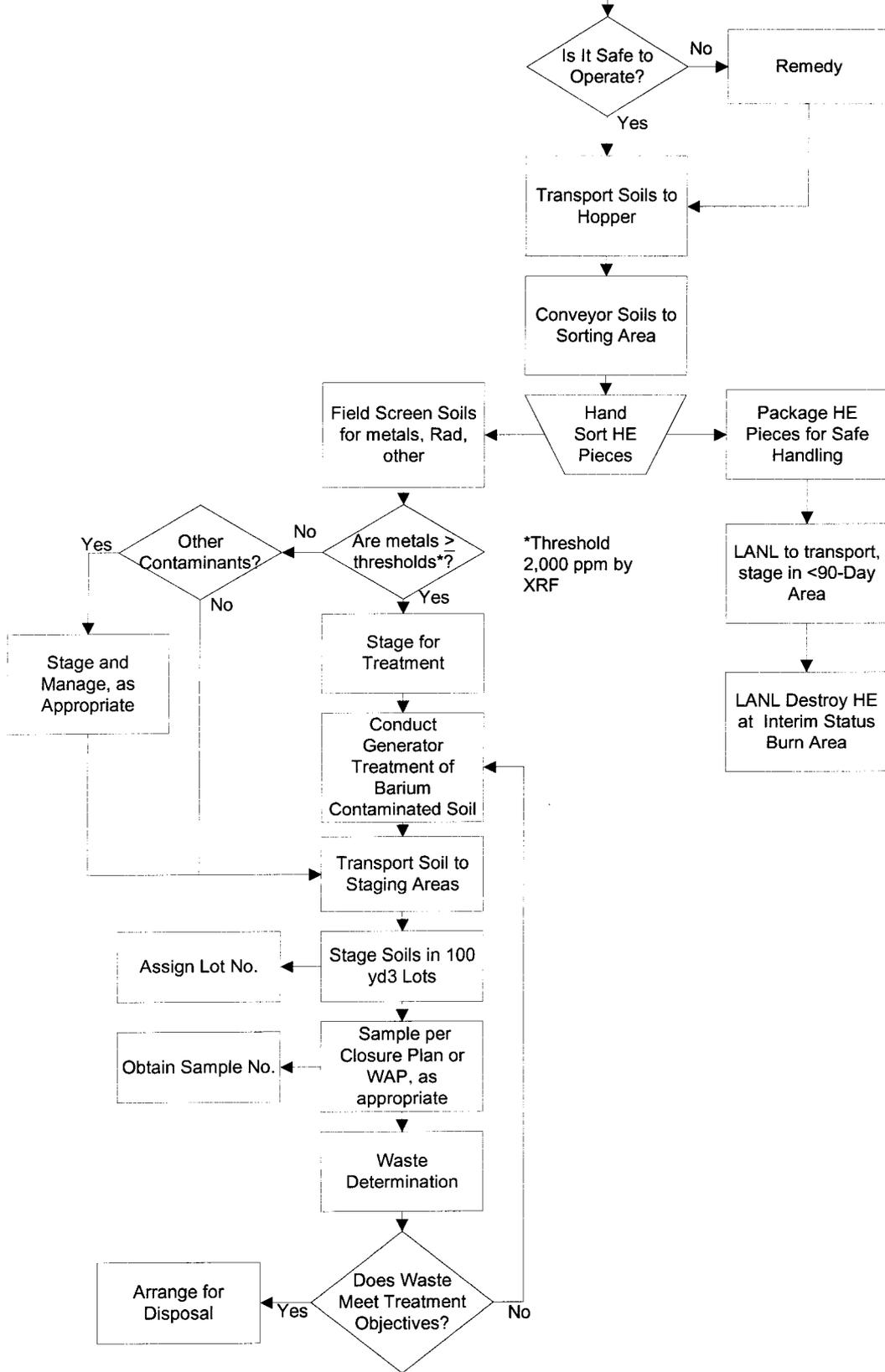
Fig. 5.2.9-1. Centerline and lateral bounding sample concentrations for barium, RDX, and TNT at PRS 16-021(c).

**Enclosure 3  
MDA-P Site Map**

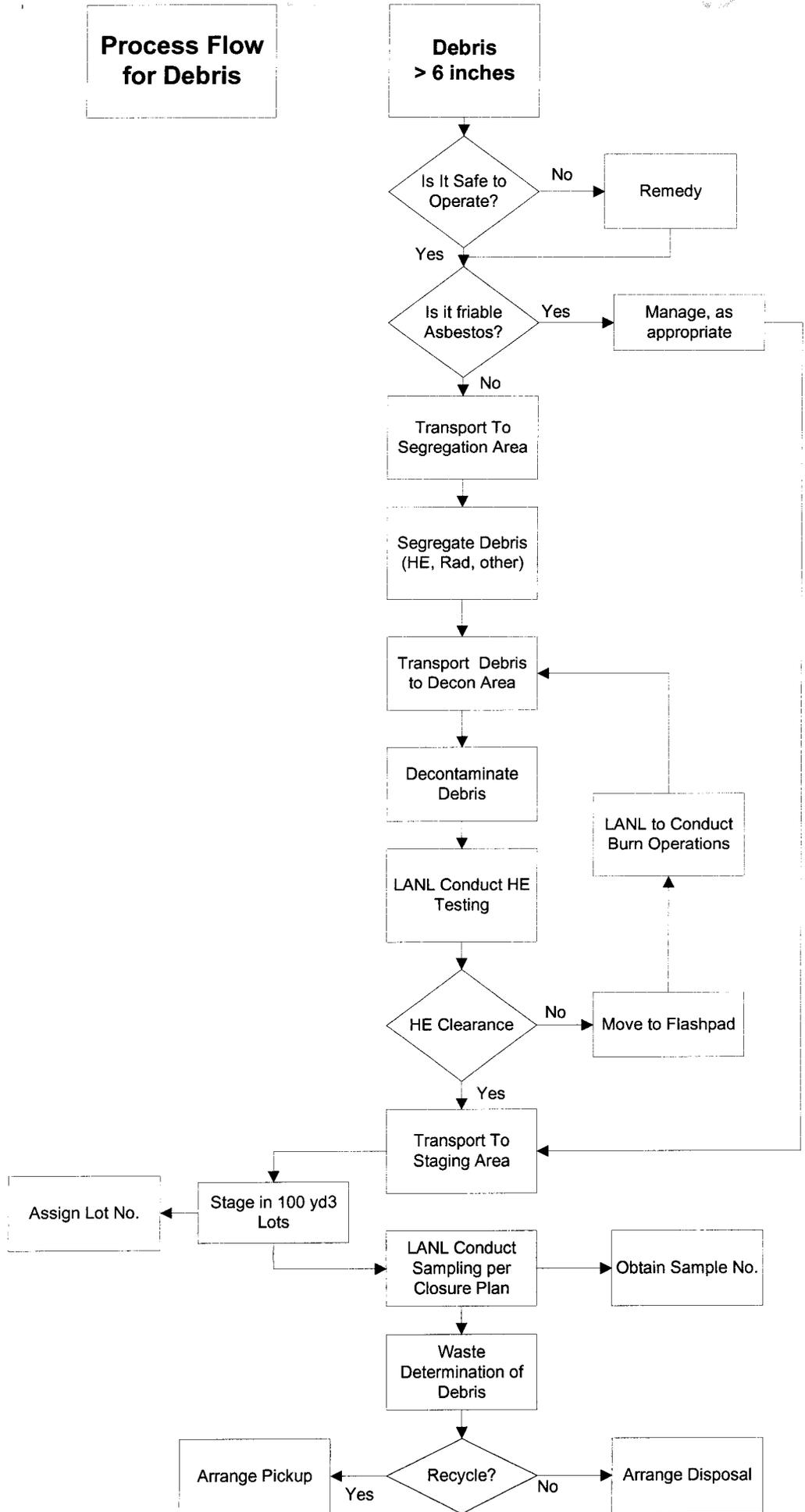


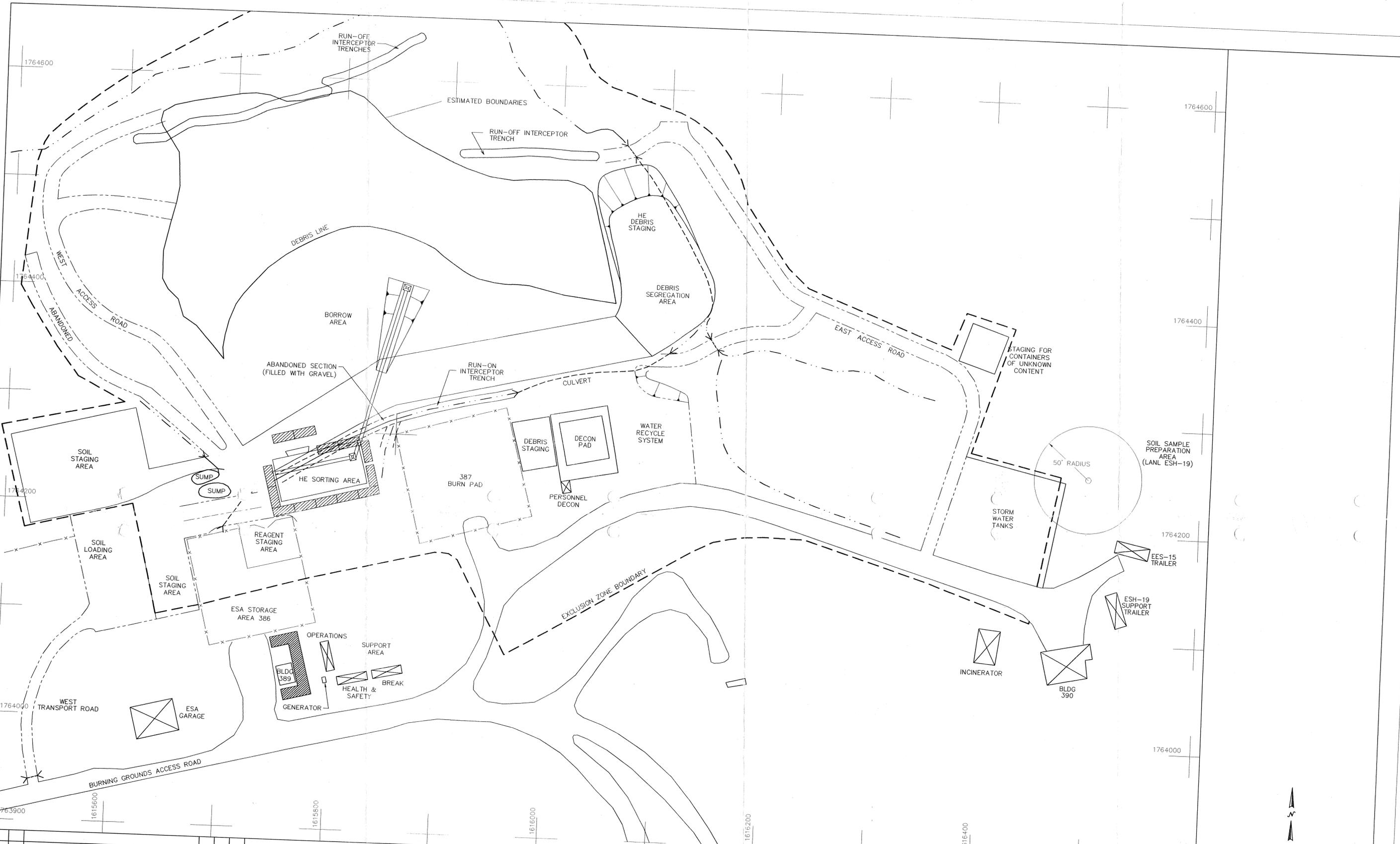
# Process Flow for Soils

Soil  $\leq 6$  inches



# Process Flow for Debris





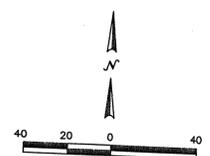
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CHECKED	DATE	CLIENT APPROVALS	DATE
DES. ENG.			
PROJ. ENG.			
PROJ. MGR.			
APPROVED			
APPROVED			



SITE LAYOUT - AS-BUILT  
 CLEAN CLOSURE MDA-P

DRAWN	EJS	DATE	10/17/98	DWG. NO.	1	REV. NO.	0
SCALE	1" = 40'	CONTRACT NO.	2982U0017-8M	SHT.	1	OF	3

**Enclosure 4**  
**Waste Analysis Plan for Barium-Containment Soil**

**Waste Analysis Plan**  
**For**  
**Barium-Contaminated Soil**  
**Treated in Less-Than 90 Day Storage**

**Generator:**  
**Los Alamos National Laboratory**  
**Environmental Restoration Project**  
**Technical Area-16**  
**Material Disposal Area P**

**November 2, 1998**

## **Introduction**

This waste analysis plan (WAP) presents information on the chemical and physical nature of waste soils to be treated at Los Alamos National Laboratory's (LANL) Technical Area 16 (TA-16), Material Disposal Area P (MDA-P). This plan is designed to fulfill the requirements listed in Title 20 of the New Mexico Administrative Code, Chapter 4, Part 1 (20 NMAC 4.1), Subpart VIII and 40 CFR 268.7 (a) (5). These regulations specify that a generator treating prohibited waste in tanks or containers must develop and follow a written plan as regulated under 20 NMAC 4.1, Subpart III and 40 CFR 262.34.

The MDA-P at TA-16 was operated as a disposal site for rubble and debris from 1950 to 1984. The majority of disposed materials consisted of residues and noncombustible debris resulting from burning high explosives (HE) and HE-contaminated equipment, building materials, and other trash. After burning, the material was pushed over the edge of the south wall of Canon de Valle. This accumulated material is the waste pile undergoing remediation. It is currently estimated that MDA-P contains 11,000 cubic yards (yd<sup>3</sup>) of waste materials, including soil and debris. All waste materials will be removed in their entirety in accordance with the Closure Plan approved by the New Mexico Environment Department in February of 1997.

The waste to be treated in a <90-day area will be composed primarily of soil contaminated with barium and potentially contaminated with debris less than 60 millimeters (mm) and residual HE compounds. Debris will consist of native rock, concrete, wood, metal, and friable or non-friable asbestos. Treatment will be accomplished using the best-demonstrated available technology (BDAT) for barium contaminated soil. The waste analysis information described in this WAP is specific to the generator treatment requirements for the waste soil generated and treated at MDA-P. Specific waste analysis requirements include the following:

- identification of hazardous or mixed waste under management, based on detailed chemical analyses of representative samples (note – no radiological contamination has been detected to date);
- pre- and post-treatment waste characterization;
- information necessary to treat the waste in accordance with 40 CFR 268.7 (a) (5); and
- verification of compliance with treatment objectives.

## **Waste Generating Activity**

The soil waste will be generated during closure activities at MDA-P. All materials in MDA-P will be excavated and screened to remove debris >6-inches in diameter. Debris greater than 6-inches in diameter will be decontaminated according to the approved Closure Plan. Soils and residual debris <6 inches in diameter will be transported via conveyor to a sorting area where all visible pieces of HE will be segregated by hand by trained, professional technicians. The soils will then be field screened for volatile organic compounds, radionuclides, asbestos, and quantitatively analyzed for HE and barium. The HE screen will comply with SW-846 methodologies 8515 and 8510 (proposed) for nitroaromatics, e.g., TNT, and nitramines, e.g., RDX, respectively. The barium screen will use a portable X-ray fluorescence (XRF) instrument. Any visible staining or other physical characteristics will be noted and the suspect soils segregated and sampled per the Closure Plan.

The field screening and XRF results will constitute the pre-treatment characterization of total barium concentration to determine which soils will be treated in a <90 day accumulation area. A correlation analysis established from analyses of barium contaminated soils from MDA-P, indicates that a total barium concentration of 3,400 parts per million (ppm) is approximately equivalent to 100 milligrams per liter (mg/L) of soluble barium as determined by the Toxic Leaching Characteristic Procedure (TCLP). For treatment purposes, soils containing more than 2,000 ppm of total barium by XRF (the maximum uncertainty of the XRF instrument is  $\pm 100$  ppm) will be separated for treatment. All soils will be segregated and staged in lined, bermed areas for treatment and subsequent sampling and verification analysis. Soil containing less than 2,000 ppm of total barium by XRF will be stockpiled nearby and managed as solid waste. Other soils suspected of being contaminated, based on results of field screening will be segregated and staged in a lined, bermed area. Final disposition of all soils will depend on verification analyses.

## **Description of Waste**

It is anticipated that approximately 3,000 yd<sup>3</sup> of soil will be excavated from MDA-P that exhibits the toxicity characteristic for barium (EPA hazardous waste code D005). Results of test pit sampling of MDA-P conducted in December 1997 indicated that barium concentrations in soil range from 10 to 2,300 mg/L by TCLP analysis. Laboratory analyses of samples collected from the test pits indicate that no underlying hazardous constituents (UHC) are present in concentrations that exceed the Universal Treatment Standards (Federal Register 28555 May 26, 1998; CFR Part 268.48). These results are consistent with prior sampling and analyses reported in the Closure Plan. Therefore, UHCs are not reasonably expected to be present in soils designated for treatment. These barium-contaminated soils are anticipated to consist of HE residue (< 1% by weight), fragments of non-friable asbestos, metal, concrete, wood, and native rock, and barium

contamination that ranges from 100 to 2,500 mg/L.

### **Soil Treatment Processes**

The selected treatment process for the barium-contaminated soil is stabilization of the barium by a dry treatment method. This will be accomplished by the addition and mixing of a reagent consisting of portland cement and calcium sulfate to the soil. A treatability study will be conducted on various concentrations of barium contaminated soils to find the optimum ratio of reagent to soil for treatment. The treatment process will consist of the following steps.

1. The soil will be screened with an XRF instrument to determine the barium concentration in the soil. Based on the XRF measurements, the barium-contaminated soils will be grouped into one of three groups. Groups I, II and III will contain total barium concentrations up to 10,000, 30,000 and 60,000 ppm, respectively.
2. All barium-contaminated soil will be transported to the treatment area by a wheel loader. Within this lined and bermed area, the soil will be screened to remove all debris and rocks >60 mm. The rocks and debris will follow the standard path of other debris from MDA-P. Soil stabilization treatment will take place in a trailer-mounted, auger-type mixer designed for soil mixing in distinct batches. Barium-contaminated soil and the appropriate amount of reagent will be placed into the equipment and thoroughly mixed. Treatment Groups I, II and III will be mixed with stabilization reagent of approximately 2 percent, 4 percent, and 6 percent reagent by weight, respectively.
3. After mixing, the material will be removed and transported to a lined, bermed staging area, placed in 100 cubic yard lots, and covered or sprayed with a surface stabilizer to prevent infiltration, runoff, and resuspension. Each lot of soil will be assigned a unique identifier number and labeled for management purposes.
4. Each lot of treated soil will be sampled for verification of the treatment process. Analyses will comply with specifications described below.
5. Upon receipt of the analytical data, a waste determination will be made for each lot of barium-contaminated soil. If the treated soils meet the treatment objectives, the lot of soil will be shipped offsite to an approved disposal facility. Treatment objectives will comply with treatment standards for hazardous wastes (40 CFR Part 26.40) as set forth in the Land Disposal Restrictions Phase IV: Final Rule Promulgating Treatment Standards for Metal Wastes and Mineral Processing Wastes (Federal Register 28555 May 26, 1998).

The site-specific health and safety plan (SSHASP) prepared for the MDA-P Closure includes tasks associated with generator treatment of barium-contaminated soils. The SSHASP evaluates all potential hazards to human health and the environment and describes mitigating measures to minimize or eliminate these hazards. All personnel

involved in the treatment activity will be trained in the SSHASP and a site safety officer will oversee treatment activity operations.

### **Waste Sampling and Analysis**

Each 100 cubic yard lot of treated soil will be sampled and analyzed to determine that the wastes meet final land disposal restrictions and the waste acceptance criteria of the receiving facility. Sampling will be conducted by LANL, ESH-19 personnel and conducted according to LANL standard operating procedures to ensure that a representative sample is collected. Each 100 cubic yard lot will be sampled and analyzed for TCLP, HE, radionuclides, and asbestos. The first and each subsequent fourth 100 cubic yard lot will be sampled for pH, flashpoint, free liquids, total volatile organic compounds, semi-volatile compounds, reactive cyanide and sulfide, organochlorine pesticides, polychlorinated biphenyls (PCBs), dioxin, and chlorinated herbicides. An accredited laboratory under contract to LANL will perform all analyses.

### **Waste Certification**

When it has been determined that the treated soils meet UTSs (Federal Register 28555 May 26, 1998) for land disposal, the treated, essentially decharacterized waste soils will be shipped off site to a landfill permitted to accept such special wastes. It is anticipated that most treated soils will go to the Waste Management Industrial Services Inc., facility at Rio Rancho, New Mexico. This facility can accept special wastes with non-friable asbestos, as well as friable asbestos less than 1 percent. If friable asbestos exceeds 1 percent, a disposal facility in Arizona may be used. Treated soils that do not meet the UTS may be shipped to a facility in California permitted to accept such wastes. Shipping manifests with analytical results will be provided for the transporter of the waste material to be submitted to the disposal facility.

A notice and certification will be prepared with information required under 20 NMAC 4.1, Subpart VIII, and 40 CFR 268.7 (a) (3) for the initial shipment of waste sent for land disposal. Subsequent shipments will include sample documentation and unique manifest numbers for each shipment of waste. A one-time notification and certification to the New Mexico Environmental Department will be submitted by the end of the calendar year. This submittal will include information specified in 20 NMAC 4.1, Subpart VIII, and 40 CFR 268.9 (d).

All analytical results completed in support of successful treatment of the waste and for LDR notification and certification will be retained in the project operating record and copies presented to the appropriate LANL Group.