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TRANSMITTAL OF COMMENT RESPONSE PACKAGE FOR THE THORIUM/PLANT 9 IMPLEMENTATION PLAN

04/04/97

DOE-07776-97
DOE-FEMP EPAS
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RESPONSES

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APR 4 1997
DOE-0776-97

Mr. James A. Saric, Remedial Project Director
U.S. Environmental Protection Agency
Region V-SRF-5J
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

Mr. Tom Schneider, Project Manager
Ohio Environmental Protection Agency
401 East 5th Street
Dayton, Ohio 45402-2911

Dear Mr. Saric and Mr. Schneider:

TRANSMITTAL OF COMMENT RESPONSE PACKAGE FOR THE THORIUM/PLANT 9 IMPLEMENTATION PLAN

Reference: **Letter, J.A. Saric to J.W. Reising, "Thorium/Plant 9 Complex Implementation Plan," dated February 13, 1997.**

Letter, T.A. Schneider to J.W. Reising, "DOE-FEMP MSL 531-0297 Hamilton County, Comments Draft Plant 9 Implementation Plan," dated March 7, 1997.

The purpose of this letter is to transmit to the U.S. Environmental Protection Agency (U.S. EPA) and Ohio Environmental Protection Agency (OEPA) the enclosed comment response package which provides the Department of Energy (DOE) responses to comments from the regulatory agencies, as referenced above, and changes made to the draft Thorium/Plant 9 Complex Implementation Plan for Above-Grade Decontamination and Dismantlement.

Specifically, the comment response package is organized into three sections and includes: 1) DOE responses to each of the U.S. EPA and OEPA comments (Section 1); 2) a table that identifies additional, significant DOE enhancements made to clarify or improve the implementation plan (Section 2); and 3) implementation plan pages showing affected text in redline/strikeout form (Section 3). Section 3 also contains as an enclosure the preliminary draft copy of the Radiological Requirements Plan provisions, as requested by the OEPA. The pages of revised text in Section 3 of the response package reflect the draft final status of the implementation plan.

cc w/enc:

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A. Murphy, DOE-FEMP
G. Jablonowski, USEPA-V, 5HRE-8J
R. Beaumier, TPSS/DERR, OEPA-Columbus
T. Schneider, OEPA-Dayton (3 copies total of enc.)
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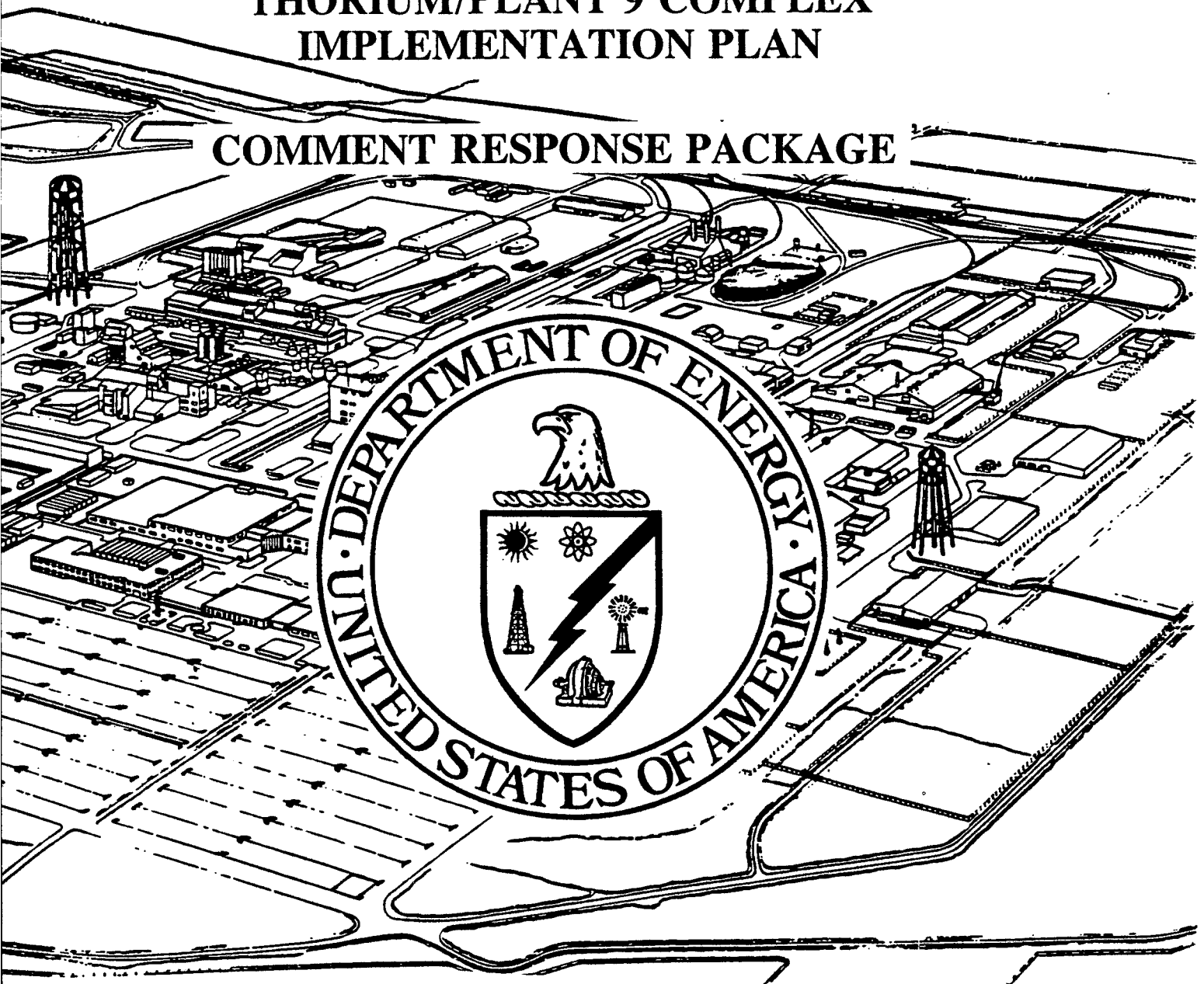
OPERABLE UNIT 3
INTEGRATED REMEDIAL ACTION

THORIUM/PLANT 9 COMPLEX
IMPLEMENTATION PLAN

COMMENT RESPONSE PACKAGE



APRIL 1997

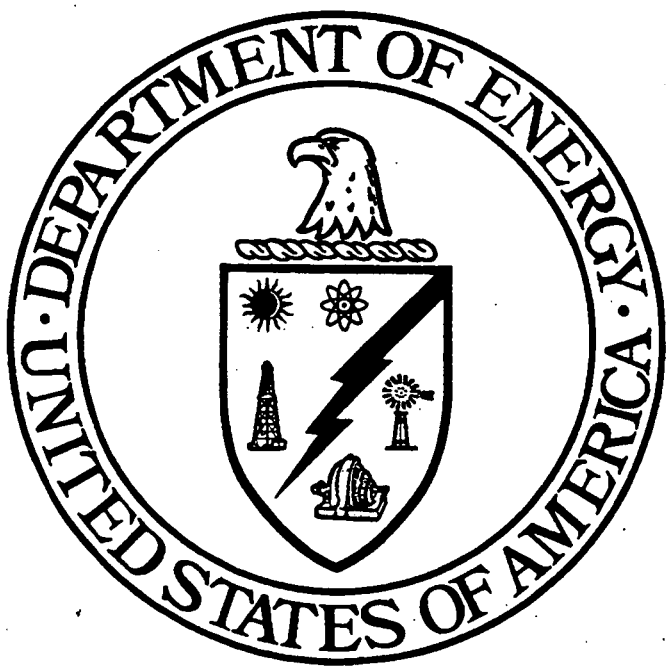
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO

U.S. DEPARTMENT OF ENERGY
FERNALD AREA OFFICE

OPERABLE UNIT 3
INTEGRATED REMEDIAL ACTION

THORIUM/PLANT 9 COMPLEX
IMPLEMENTATION PLAN

COMMENT RESPONSE PACKAGE



APRIL 1997

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO

U.S. DEPARTMENT OF ENERGY
FERNALD AREA OFFICE

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INTRODUCTION

United States Department of Energy (DOE) comment responses have been provided on the following pages to address United States Environmental Protection Agency (U.S. EPA) and Ohio EPA comments to the January 1997 draft Thorium/Plant 9 Complex Implementation Plan for Above-Grade Decontamination and Dismantlement. The U.S. EPA comments, dated February 13, 1997 (received by DOE on February 18), include three General Comments and 22 Specific Comments. Ohio EPA comments, dated March 7, 1997 (received on March 9, 1997), include a total of 14 comments.

This comment response document is divided into three sections, which are described below:

Section 1: Includes a reiteration of U.S. EPA and Ohio EPA comments to the draft Thorium/Plant 9 Complex Implementation Plan, each of which is followed by a DOE response and description of action taken.

Section 2: Identifies significant DOE enhancements made to the implementation plan.

Section 3: Includes the redline/strikeout change pages of the implementation plan, which were prepared as a result of U.S. EPA/Ohio EPA comments and significant DOE enhancements. These change pages represent the draft final version of the document. Upon approval of the revisions provided in this comment response package, the implementation plan will be prepared in final form for distribution.

Additionally, an attachment is provided after Section 3 in response to Ohio EPA Comment #1.

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SECTION 1

U.S. EPA Comments on the Draft Thorium/Plant 9 Complex Implementation Plan and DOE Comment Responses

U.S. EPA GENERAL COMMENTS

U.S. EPA General Comment #1

Text in this section [Section 2.3.4] provides information regarding material management associated with the Thorium/Plant 9 Complex. However, limited information is provided regarding the planned interim storage locations and planned duration of interim storage for the Thorium/Plant 9 Complex materials (see Original Specific Comment 9). The text also contains limited information on the tracking of Thorium/Plant 9 material before final disposition and the reporting of information on the material using the Sitewide Waste Information, Forecasting and Tracking System (SWIFTS) database (see Original Specific Comment 10). The text in this section should be revised to address these issues.

DOE Response

Agree. At this time it is anticipated that all materials generated from the decontamination and dismantlement of the Thorium/Plant 9 Complex that are eligible for disposition in the On-Site Disposal Facility (OSDF), with the exception of structural steel, will be placed in interim storage at the Plant 1 Pad. The current strategy for interim storage of structural steel is to place it in bulk form on the Plant 9 concrete slab; however, placement on other storage pads or slabs with adequate engineering controls may be performed as needed. Accessible metals, inaccessible metals, painted light-gauge metals, and concrete from Buildings 64 and 65, which are currently assumed to be potentially contaminated with thorium, will be containerized in covered roll-off boxes and will likely be placed on the Building 64/65 pads. The duration of interim storage for materials generated from this project will depend on the OSDF material placement schedule. Materials generated that do not meet the OSDF waste acceptance criteria are expected to be dispositioned off-site within six months of generation. Section 2.3.4 has been revised to address this comment on Pages 19 (lines 8-27) and 20 (lines 1-7). Table 2-1 was also revised to reflect the new information regarding Building 64/65 materials.

Regarding the limited information on SWIFTS, DOE revised Section 3.3.2.2 of the November 1996 draft OU3 Integrated RD/RA Work Plan (Segregation, Containerization, Tracking) to address the same detail that is requested in this comment. That revision was made in response to U.S. EPA Specific Comment #3 to the draft RD/RA work plan. In the revision, greater detail regarding material tracking and reporting using SWIFTS was discussed. Since the Thorium/Plant 9 Complex project implementation strategy for material tracking and reporting does not differ from the strategies laid out in the OU3 Integrated RD/RA Work Plan, the proper references to the revised work plan text are provided in the implementation plan. DOE has added the appropriate references in the implementation plan on Page 20 (lines 8-12), which is included in Section 3 of this document. For specific revisions made to the OU3 Integrated RD/RA Work Plan, please refer to the DOE Comment Response Package (Section 3) submitted to the U.S. EPA on March 7, 1997 which adds text to Pages 3-55 (lines 4-19, 25-30) and 3-56 (lines 1-5) regarding SWIFTS tracking and reporting.

U.S. EPA General Comment #2

[Re: Section 2.4] The Thorium/Plant 9 Complex implementation plan does not address how specific environmental monitoring results will be presented in the project completion report to be

submitted for U.S. Environmental Protection Agency (U.S. EPA) review (see Original Specific Comment 11). The implementation plan also contains insufficient detail regarding environmental monitoring activities associated with decontamination and dismantlement (D&D) of the complex (see Original Specific Comment 12). The text in this section should be revised to address these issues.

DOE Response

Agree. Section 2.4 (Environmental Monitoring) has been revised to provide greater detail regarding environmental monitoring and to specify the appropriate level of reporting for environmental monitoring in the project completion report. Please see the redline/strikeout text shown on Pages 20 (lines 27-28), 21 (entire page), 22 (entire page), and 23 (line 1), which are included in Section 3 of this document. Further detail has also been added to that text and other text in Section 2.4 as a result of other U.S. EPA and Ohio EPA comments.

It should be noted that the Thorium/Plant 9 Complex project only includes project-specific air monitoring and monitoring of washwater from interior decontamination activities and that the project completion report will summarize the results of those activities. For project-specific air monitoring, the project completion report will identify each of the air monitoring stations; the minimum, maximum, and average radiological activity readings at each of those locations; and the highest maximum value at site-wide ambient monitoring stations during the project period in relation to DOE Order 5400.5 limits.

Regarding wastewater discharge, a summary of the results from sampling and analysis of decontamination washwater prior to its discharge into the FEMP wastewater treatment system (WWTS) will be provided in the project completion report. Since project-generated surface water is being monitored by the Aquifer Restoration Project to ensure compliance with applicable National Pollutant Discharge Elimination System (NPDES) requirements, all reporting for wastewater following discharge into the FEMP WWTS is handled under Operable Unit 5 reporting for the Aquifer Restoration Project. Project-specific groundwater monitoring will only be performed when warranted (see Section 3.6.2.3 of the draft OU3 Integrated RD/RA Work Plan). Groundwater monitoring and reporting are not expected to be applicable to this project.

In response to the second half of U.S. EPA General Comment #2, which concerns insufficient detail for environmental monitoring activities, please refer to the response provided for U.S. EPA Specific Comment #12.

U.S. EPA General Comment #3

The Thorium/Plant 9 Complex components discussed in the text and shown in the drawings in Appendix D do not clarify if any of the buildings to be demolished have basements. The text should be revised to clarify if any of the buildings have basements. If basements are present, the text should include plans for D&D activities associated with the basements. Information regarding sealing entrances to the basements should also be included. The issue of basements should also be addressed in implementation plans for other complexes.

DOE Response

Agree. Should any OU3 above-grade decontamination and dismantlement project involve

basements or other at- and below-grade activities, the implementation plans will provide such detail; however, components included in the above-grade remediation project for the Thorium/Plant 9 Complex do not have basements. Please note that at- and below-grade remediation is not included in this project, as noted on Page 1 (lines 7-8) of the draft implementation plan, and has been deferred to the Soil Characterization and Excavation Project, as discussed in Section 3.4.3.4 of the November 1996 draft OU3 Integrated RD/RA Work Plan. Specifically, the draft OU3 Integrated RD/RA Work Plan states that at-and below-grade activity will be detailed in the appropriate remedial action plans specified for that project.

U.S. EPA SPECIFIC COMMENTS

U.S. EPA Specific Comment #1

The text [Section 1.2 and Figure 1-1; p. 2, lines 20-22] lists railroad tracks, process trailers, and pipe bridges as components of the Thorium/Plant 9 Complex. However, these components are not clearly shown in Figure 1-1. Figure 1-1 should be revised to show all components of the Thorium/Plant 9 Complex.

DOE Response

Agree. Although railroad tracks and pipe bridges were labelled, the copy quality of Figure 1-1 in the draft implementation plan did not allow a clear view of them. Figure 1-1 was updated to be consistent with recent Request For Proposal revisions and was revised to clearly identify all items included in the project and is included in Section 3 of this document.

U.S. EPA Specific Comment #2

The text [Section 1.2; p. 3, lines 27, 28] states that substantive changes in the scope or intent of the implementation plan will require U.S. EPA and Ohio Environmental Protection Agency (OEPA) notification and approval before implementation. However, the text does not clarify the type of change in the scope or intent of the text should be revised to provide some examples of substantive changes in the scope or intent of the implementation plan.

DOE Response

Agree. Text has been added to Section 1.2 of the implementation plan which clarifies the meaning of scope and intent as discussed above. Please refer to the redline/strikeout text on Pages 3 (lines 21-29) and 4 (lines 1-10), which are included in Section 3 of this document.

Section 1.2 of the implementation plan (Scope of Work) defines the scope of the project. The scope includes performance of six major activities involving the 16 components identified in that section. Intent relates to the fulfillment of requirements and conditions specified in the OU3 Final Action ROD. A substantive change to the scope would include a change that results in either performing additional major activities, not performing any of the six that are listed, or the addition or deletion of components for a project. Substantive changes of intent would include deviations from remediation strategies which affect regulatory-based obligations such as the commitments defined in the OU3 Final Action ROD. An example of this case would be the deviation to Applicable or Relative and Appropriate Requirements (ARARs). Nonsubstantive, but otherwise significant deviations, as noted on page 3 (lines 29-30) of the draft version, refer to specific

methods or techniques described in the implementation plan which require notification to the regulatory agencies. Examples of such deviations would include the reduction of the number of air monitors for a project or revisions to the specifications (e.g., a modification of the allowable residual contamination levels for opening a building to the environment). These would be reported to the Agencies prior to implementation, and would be included in the project completion report.

U.S. EPA Specific Comment #3

[Re: Section 1.4; p. 4] Section 1.4 ends on Page 4, which is followed by Figure 1-1 and Page 7, indicating that Page 6 is missing. The document should be revised to include the missing page.

DOE Response

Please note that Page 5 was represented by Figure 1-1 while Page 6 represented the reverse side of that 11" x 17" page. Current duplex printing capabilities do not allow the reverse side of 11" x 17" z-folded pages to be printed.

U.S. EPA Specific Comment #4

[Re: Figure 1-1; p. 5] Figure 1-1 shows a site plan of the Thorium/Plant 9 Complex. Area F-3 of Figure 1-1 shows a cylindrical shed near the southwest corner of Building 9A and a building entitled "Building 9E" south of the southwest corner of Building 9A. However, the list of Thorium/Plant 9 Complex components on Page 2, Line 11, lists "Building 9E - Plant 9 Cylinder Shed," indicating that Building 9E and the cylindrical shed are the same. Either the text or Figure 1-1 should be revised to resolve this discrepancy.

DOE Response

Agree. The structure located and connected to the southwest corner of Building 9A is also a cylinder storage shed, although considerably smaller in dimensions. That structure is not listed as a separate OU3 component because it is attached to and considered part of Building 9A. The label for that Building 9A appendage was removed from the revised figure to avoid confusion. Please refer to the revised Figure 1-1 included in Section 3 of this document.

U.S. EPA Specific Comment #5

[Figure 1-1; p. 5] Area F-3 of Figure 1-1 shows a structure entitled "Tank Curb & Stairs" that is to be demolished. However, this structure is not listed on Page 2 as a component of the Thorium/Plant 9 Complex. Either the text or figure should be revised to resolve this discrepancy.

DOE Response

Agree. Figure 1-1 was revised to address this comment and is included in Section 3 of this document. The Tank Curb & Stairs are no longer shaded since they are considered at- or below-grade.

U.S. EPA Specific Comment #6

[Re: Section 2.1; p. 7] Section 2.1 discusses the remediation sequence. However, the sequence for remediating general components of the Thorium/Plant 9 Complex, such as the railroad tracks and process trailers, is not discussed in Section 2.1. Section 2.1 should be revised to include

the remediation sequence for general components of the Thorium/Plant 9 Complex.

DOE Response
The implementation plan and subcontract documents for the Thorium/Plant 9 Complex project specify a particular sequence for remediation of specific components that have scheduling constraints. Beyond the sequencing of those components, the subcontractor will be required to specify its proposed sequence and schedule for remediation of the remaining components.

U.S. EPA Specific Comment #7
The text [Section 2.3.2; p. 11, 13-14] states that water used for dust suppression will be disposed of in the storm sewer. The dust-containing water may be considered a hazardous or radioactive waste, depending on the concentrations of contaminants absorbed onto the dust particles. The text should be revised to provide more detail regarding the management of the dust-containing water.

DOE Response
The referenced statement in the draft implementation plan has been deleted since water that is used for dust suppression amounts to a minimal volume spread over a large surface area sufficient enough to only wet surfaces. Water applied in this manner does not generate any collectable runoff quantities. The text revision is shown in strikeout form on Page 13 (lines 19-20), which is included in Section 3 of this document.

To address U.S. EPA's concern for proper management of wastewater, any water that is collectable and subject to wastewater management strategies is outlined in the November 1996 draft OU3 Integrated RD/RA Work Plan. The RD/RA work plan sections referenced below provide wastewater management details as briefly described:

Draft OU3 Integrated RD/RA Work Plan:

- **Section 3.2.5 Surface Decontamination:** Wastewater collection and management strategies are discussed.

- **Section 3.3.3 Management of Secondary Waste:** The overall strategy for managing wastewater through the site wastewater treatment system is discussed (This section appears to provide the detail that is requested in this U.S. EPA comment.)

- **Section 3.5.2 Management of Contaminated Water:** References site procedure to be used for the evaluation and management of contaminated wastewater. This section adds further detail to the strategy outlines in Section 3.3.3.

SAP (Appendix D):

- **Section 2 General Sampling and Data Collection Approach:** The subsections in this section focuses on wastewater sampling, among other aspects of sampling.

- **Section 3 Specific Sampling Programs:** Sampling for disposition of wastes, including wastewater, is discussed. Determination of hazardous, radiological, and other waste characteristics is discussed.

The Thorium/Plant 9 Complex project is not expected to deviate from the strategies laid out in the referenced documents and therefore no further detail is provided in the implementation plan.

U.S. EPA Specific Comment #8

The text [Section 2.3.4; p. 13, lines 6-8] indicates that the locations of satellite accumulation areas (SAA) for hazardous wastes are to be determined. Because SAAs for hazardous wastes can be potential sources of contamination, their locations and construction details should be included in the revised implementation plan for U.S. EPA review.

DOE Response

DOE is unable to provide details at this time regarding the location of the SAA since that location is dependent on DOE approval of the subcontractor's waste handling work plan. The subcontractor is required, pursuant to Specification Section 01120, Part 3.1.B (see Rev. 1 provided with the March 7, 1997 submittal of the OU3 Integrated RD/RA Work Plan Comment Response Package) to submit for DOE approval a work plan that identifies a proposed location for the SAA. That submittal is scheduled during subcontractor premobilization, which is projected to occur in October-November 1997. The reference to "90-day RCRA storage area," which was the other option for relocation of potential hazardous wastes, has been corrected to read: "RCRA storage area, which is established and managed by FEMP Project Management under the FEMP Part B RCRA Permit Application".

It is necessary to establish the location for the SAA during premobilization to ensure coordination with the subcontractor's sequence of decontamination, dismantlement, and flow of other waste materials. Since the implementation plan is prepared and submitted to the regulatory agencies long before the subcontractor prepares the waste handling work plan, it is not possible to include the proposed SAA at this time. Such information will be made available upon request when it becomes available.

Text in the implementation plan has been revised to incorporate the basic points made in this response and to also further define the purpose of the "queuing area". Please refer to the redline/strikeout text shown on Page 18 (lines 3-7, and 13-20), which is included in Section 3.

U.S. EPA Specific Comment #9

The text [Section 2.3.4; p. 17, lines 1-4] states that the Plant 1 storage pad, other existing storage pads, and foundations of dismantled buildings will be used for interim storage of Thorium/Plant 9 Complex material. The text should be revised to specifically identify the locations to be used for interim storage of the Thorium/Plant 9 complex material and the expected duration of interim storage for the material.

DOE Response

Agree. Please refer to the DOE response for U.S. EPA General Comment #1 where this comment is also addressed.

U.S. EPA Comments on the Draft Thorium/Plant 9 Complex Implementation Plan and DOE Comment Responses (Continued)

U.S. EPA Specific Comment #10

The text in this section [Section 2.3.4] provides limited information on the tracking of Thorium/Plant 9 material before final disposition and the reporting of information on the material using the Sitewide Waste Information, Forecasting and Tracking System (SWIFTS) database. The text in this section should be revised to address this issue.

DOE Response

Agree. Please refer to the DOE response to U.S. EPA General Comment #1, which specifically addresses this comment.

U.S. EPA Specific Comment #11

The text in this section [Section 2.4; p. 17, lines 1-4] provides information regarding environmental monitoring activities to be conducted as part of the Thorium/Plant 9 Complex D&D project. The text provides no information regarding how results of environmental monitoring activities will be incorporated in the project completion report to be submitted for U.S. EPA review. The text in this section should be revised to provide this information.

DOE Response

Agree. Reporting of project-specific environmental monitoring results was discussed in the DOE response provided for U.S. EPA General Comment #2.

U.S. EPA Specific Comment #12

The text [Section 2.4; p. 17, lines 19-21] states that Thorium/Plant 9 Complex surface water and groundwater monitoring is addressed in the Operable Unit (OU) 3 Integrated Remedial Design/Remedial Action (RD/RA) Work Plan. No additional information is provided regarding surface water and groundwater monitoring for the D&D of this complex. The text should be revised to provide detailed information regarding monitoring activities that will be conducted to ensure that the generation and management of wash water, wastewater, and storm water do not adversely impact groundwater and nearby surface water.

DOE Response

Additional wastewater monitoring strategy detail has been added to Section 2.4 by including the appropriate references to the OU3 Integrated RD/RA Work Plan, which were listed earlier in the DOE response to Specific Comment #7. Please refer to the redline text added to Pages 21 (lines 18-31) and 22 (lines 1-6).

All wastewater generated by the Thorium/Plant 9 Complex project will be evaluated and treated through the FEMP wastewater treatment system prior to discharge. Since the strategies for implementing the collection, evaluation, treatment, and discharge of wastewater for D&D projects are provided in the OU3 Integrated RD/RA Work Plan, no additional details beyond those now referenced in Section 2.4 are provided.

As noted in the DOE response to U.S. EPA General Comment #2, project-generated wastewater is being monitored by the Aquifer Restoration Project (ARP) to ensure compliance with applicable NPDES requirements. Details regarding the specifics of NPDES monitoring and other wastewater management strategies beyond those under the control of the Thorium/Plant 9 Complex project

are presented in OU5 RA documentation for the ARP. As stated in the DOE response to General Comment #2, project-specific groundwater monitoring will not be performed for this project unless warranted (see Section 3.6.2.3 of the draft OU3 Integrated RD/RA Work Plan).

Project-specific stormwater management is governed by the FEMP Stormwater Pollution Prevention Plan (DOE 1996) and any monitoring associated with that program is performed by the ARP. To ensure that the applicable requirements of that plan are followed during the Thorium/Plant 9 Complex project, Specification Section 01515 (Part 1.5.A.1.c) requires that the subcontractor provide for FEMP approval the plans to be employed to control stormwater runoff, migration of washwater, and erosion control. This discussion has been added to the implementation plan. Please refer to redline text added to Page 21 (lines 3-9), which is included in Section 3 of this package.

U.S. EPA Specific Comment #13

The text [Section 2.4; p. 17, lines 21-24] refers to the current site-wide air monitoring program as it is discussed in Section 3.6.2.1 of the OU 3 Integrated RD/RA Work Plan. The current site-wide air monitoring program is undergoing review and modification and the changes will be incorporated in the revised Integrated Environmental Monitoring Plan to be submitted for U.S. EPA review in the near future. The text should be revised to address this issue.

DOE Response

Agree. The subject text has been revised to specifically reference the March 1997 submittal of the draft final version of the IEMP. Please refer to the redline text provided on Page 22 (lines 20-22), which is included in Section 3 of this document.

U.S. EPA Specific Comment #14

The text [Section 2.4; p. 18, lines 1-9] states that computer modeling results of potential emissions from the Thorium/Plant 9 Complex area were used to determine the location of maximally exposed individuals. However, the text does not provide details concerning the computer modeling, nor does it refer to a document that contains such details. The implementation plan should be revised to either provide computer modeling details or to refer to a document that contains such details.

DOE Response

Agree. The text has been revised to note that CAP88PC modeling was performed to determine potential dose impacts from this project. Additional background on this modeling method has been added to the discussion. The results of the modeling are summarized in the rest of the paragraph. Please refer to the redline/strikeout text shown on Page 23 (lines 2-30), which is included in Section 3 of this document.

U.S. EPA Specific Comment #15

The text [Section 2.4; p. 18, lines 10 and 11] states that five optimal project emissions receptor locations were identified for supplemental air monitoring. However, the text does not discuss the basis for selecting these locations. The text should be revised to provide justification for the locations selected.

U.S. EPA Comments on the Draft Thorium/Plant 9 Complex Implementation Plan and DOE Comment Responses (Continued)

DOE Response
Agree. The referenced text was revised to provide justification for the locations selected. Please refer to the redline text added to Page 24 (lines 2-8), which is included in Section 3.

U.S. EPA Specific Comment #16
[Re: Section 2.4; p. 18, lines 11-15] The test data collected from the Plant 1, 4, and 7 Complex Phase I D&D projects provide justification for selecting only five supplemental air monitoring locations. However, the text does not include the actual data, nature and method of data analysis, analysis results or a reference to a document containing such information. The implementation plan should be revised to either summarize this information or provide a reference to at least one document containing such information.

DOE Response
Agree. The implementation plan has been revised to reference the Plant 7 Dismantling Removal Action No. 19 Final Report (May 1995), and the Building 4A Project Completion Report (draft January 1997); the data from Plant 1 Complex - Phase I D&D will be summarized in the Project Completion Report for that project, although it has been reviewed internally while being collected during the implementation of the project. Please refer to the redline text added to Page 24 (lines 9-14), which is included in Section 3 of this document.

U.S. EPA Specific Comment #17
The text [Section 2.4; p. 18, lines 15-26] provides information regarding air sampling activities associated with the D&D of the Thorium/Plant 9 Complex. The text seems to imply that total suspended particulate samples will be collected and analyzed for total uranium. The text should be revised to confirm the type of samples to be collected, provide the complete list of parameters to be analyzed for, and justify the use of total uranium as the indicator parameter.

DOE Response
Agree. Text has been revised to identify total uranium as the primary radionuclide of concern and that total suspended particulates will also be collected and evaluated over the life of the project. Data will be continually evaluated and each building will be evaluated to ensure that no additional parameters are necessary from an environmental standpoint. Total uranium was identified as the primary constituent based on process knowledge and engineering evaluations. Upon turnover of Buildings 64 and 65 for D&D, following completion of the Thorium Overpacking Project and Thorium/Mixed Waste Stabilization Project, radiological assessments will be done on component surfaces to determine if potential thorium emissions are also a concern. Should thorium represent a potential environmental air emissions concern, the project-specific air monitoring program will be modified to provide the appropriate level of process feedback. Please refer to the revisions shown on Pages 24 (lines 22-32) and 26 (lines 1-14), which are included in Section 3 of this document.

U.S. EPA Specific Comment #18 (originally numbered as a second Comment #17)
[Re: Section 2.4; p. 18, lines 22-26] Line 22 states that the supplemental air monitors will be operated continuously. However, the text does not specify the total duration of supplemental air monitoring, including the monitoring period before remediation begins (referred to as the

000015

"representative period" in line 24). The text should be revised to provide the total and background supplemental air monitoring durations.

DOE Response

Agree. Background or baseline monitoring activities typically commence four to six weeks prior to the start of interior debris removal or equipment removal tasks. Monitoring continues throughout the life of the project until Completion of Field Activities (CFA). The baseline period allows enough time to establish average uranium concentrations per location to be used for comparison during the life of the project. Please refer to the revisions shown on Page 24 (lines 25-30), which is included in Section 3 of this document.

U.S. EPA Specific Comment #19 (originally numbered as Comment #18)

[Re: Figure 2-1] Figure 2-1 shows the proposed supplemental air monitoring locations for the Thorium/Plant 9 Complex. Figure 2-1 shows that no air monitoring location is present along the western side of the Thorium/Plant 9 Complex. The implementation plan should be revised to explain why no air monitors will be located along the western side of the Thorium/Plant 9 Complex.

DOE Response

Agree. The location of monitors around the Thorium/Plant 9 Complex was based on wind rose data and modeling of potential atmospheric releases. The most potentially impacted vectors were identified for the placement of monitors and the least affected vector was selected for the upwind monitor location. None of the vectors in the western sector of the Thorium/Plant 9 Complex show historical significance, therefore no monitors were included in these locations. Please refer to the revisions shown on Page 24 (lines 2-8), which is included in Section 3 of this document.

U.S. EPA Specific Comment #20 (originally numbered as Comment #19)

The text [Section 2.4; p. 20, lines 2-6] states that if radiological levels from 4 consecutive weeks of air monitoring are at least twice as high as baseline levels, D&D activities will be reviewed to determine the effectiveness of engineering controls during remediation. The text should be revised to explain the rationale behind this criterion. In addition, if radiological levels are detected at least twice as high as baseline levels for 4 consecutive weeks, the text should be revised to clarify the timeframe associated with evaluating the effectiveness of engineering controls.

DOE Response

Agree. The referenced text has been clarified to state that if radiological levels from 4 consecutive weeks of air monitoring are more than twice the maximum baseline values, then FEMP Project Management will be notified of initial trending of values above baseline. Four consecutive weeks of positive trending accounts for any anomalies that may be occurring over time. Given the low concentrations observed during the last three D&D projects, any data point greater than twice the maximum baseline values is conservative enough to allow for an engineering evaluation prior to meeting or exceeding the project self-imposed limit of 0.1 mrem/year.

"Twice the maximum baseline" was chosen as an arbitrary criteria to trigger internal review and has little or no connection to any regulatory issues. Since the project strives to limit emissions

U.S. EPA Comments on the Draft Thorium/Plant 9 Complex Implementation Plan and DOE Comment Responses (Continued)

below any detectable levels at the site boundaries, the internal trigger is to permit early warning of engineering controls opportunities.

Additionally, clarification was made to require "immediate or as soon as practicable" evaluation of the effectiveness of engineering controls following exceedance of the criteria (i.e., twice the maximum baseline for four consecutive weeks).

Please refer to the revisions shown on Pages 26 (lines 22-29) and 27 (lines 1-3), which are included in Section 3 of this document.

U.S. EPA Specific Comment #21 (originally numbered as Comment #20)
The text [Appendix A; p. A-1, lines 19 and 20] refers to "Those sampled for total Uranium and U-235." The text is incomplete and should be revised.

DOE Response
Agree. The sentence preceding the one referenced has been revised to include the key information from the one that was incomplete, and the incomplete sentence has been deleted. Please refer to the redline/strikeout text provided on Page A-1 (lines 18-20), which is included in Section 3 of this document.

U.S. EPA Specific Comment #22 (originally numbered as Comment #21)
[Re: Appendix D; Figure D-2] Figure D-2 identifies the buildings and structures to be demolished with a cross-hatched pattern. Building 9E, a gas cylinder storage shed located south of Building 9D, is not identified as a structure that will be demolished. The figure should be revised to include a cross-hatched pattern for Building 9E.

DOE Response
Agree. Figure D-2 was revised to address the comment. Component 9E (the small rectangle located at the west end of a larger rectangular area) has been shaded. The larger rectangular area is a concrete slab situated at- and below-grade. Since Figure D-2 is identical to Figure 1-1, please refer to the revisions made to Figure 1-1, which is included in Section 3 of this document.

Ohio EPA Comments on the Draft Thorium/Plant 9 Complex Implementation Plan and DOE Comment Responses

OHIO EPA GENERAL COMMENTS

Ohio EPA Comment #1

A Radiological Requirements Plan which outlines the requirements that must be met by the remediation subcontractors is referenced throughout the document. ODH requests a copy of this plan for our reference.

DOE Response:

Agree. A copy of the Radiological Requirements Plan, which is contained in Part 8, Section C of the current internal draft of the Thorium/Plant 9 Complex Request For Proposal (RFP), has been attached to this comment response document for information only. Since the RFP is still undergoing internal review, the RRP has been identified as "Preliminary — For Information Only."

OHIO EPA SPECIFIC COMMENTS

Ohio EPA Comment #2

The sentence [Section 2.3.2: p. 11, line 13] states that water added for dust suppression will be dispositioned in the storm sewer. What assurance will DOE give that this water will not be contaminated?

DOE Response:

The referenced statement in the draft implementation plan was incorrect and was deleted. In fact, water that is used for dust suppression amounts to a minimal volume spread over a large surface area and is only sufficient enough to wet surfaces and not generate collectable runoff quantities. Furthermore, water used for dust suppression is applied to surfaces that either have been decontaminated to meet the criteria for opening a building to the environment pursuant to Specification 01517 or have already been exposed to atmospheric precipitation. The text revision is shown in strikeout form on Page 13 (lines 19-20), which is included in Section 3 of this document.

Ohio EPA Comment #3

[Re: Section 2.4: p. 18, line 22] The background air monitors are to be operated around the clock and analyzed weekly. The plan does not specify that duration of the baseline sampling. That is, it does not specify how many week long time intervals will be measured. The meaning of the adjective "supplemental" is unclear. Will the baseline monitors not be co-located with the compliance monitors?

DOE Response:

Background or baseline monitoring activities typically commence four to six weeks prior to interior debris removal or equipment removal tasks. Monitoring continues throughout the life of the project until subcontractor field activities have been completed (Completion of Field Activities or CFA). This amount of baseline monitoring has been shown in past D&D projects to be sufficient to establish average uranium concentrations per location so that a proper comparison can be made during the life of the project. This duration has been clarified in the revisions shown on Page 24 (lines 25-30), which is included in Section 3 of this document.

Ohio EPA Comments on the Draft Thorium/Plant 9 Complex Implementation Plan and DOE Comment Responses (Continued)

The term, "supplemental" refers to environmental radiological air monitoring devices that will be used to assess specific process control needs. These monitoring devices are separate and distinct from the monitors noted in the IEMP that will be used for NESHAPs compliance purposes. For the Thorium/Plant 9 Complex D&D effort, the specific process control need is to monitor adequacy of engineering controls during project dismantlement activities. An overview of the supplemental radiological air monitoring program, including how it is to be applied on the project-specific level, is described in the March 1997 revisions to the OU3 Integrated RD/RA Work Plan.

Project-specific supplemental monitoring is not used to demonstrate compliance with NESHAPs Subpart H. Placement of monitors in the locations shown in Figure 2-1 was based on wind rose data and modeling of potential atmospheric releases, resulting in locations most likely to provide useful feedback information to the project. The most potentially impacted vectors were identified for the placement of monitors and the least affected vector was selected for the upwind monitor location.

Ohio EPA Comment #4

This sentence [Section 2.4: p. 18, line 5] is confusing, it is unclear what "potential emission sources were treated as being in [their] gaseous states" means.

DOE Response:

"Gaseous states" is a descriptive term that is used to refer to emissions that are readily dispersible. This intended meaning (i.e., readily dispersible form) has replaced the term "gaseous states" on Page 23 (line 24), which is provided in Section 3 of this document. The methodology assumes that pollution control equipment do not exist, such as high efficiency particulate air (HEPA) filters on containment ventilation systems, but the operations are otherwise normal. By treating potential emissions in this manner, the model accounts for uncaptured emissions.

Please note that the word "their" was purposely not used in the referenced phrase on Page 18 (line 5) of the draft implementation plan, which may otherwise confuse the reader into believing that the potential particulate emissions modeled actually exist in a gaseous state.

Ohio EPA Comment #5

[Re: Section 2.4: p. 18, line 3] It is not clear what source terms from Appendix B, Attachment B.1 were input into the computer modeling. A more detailed description of the inputs to the model and how the modeling was specific to this complex would be helpful. If this information is available as an earlier submittal, please provide a reference.

DOE Response:

Agree. The specific reference to Appendix B, Attachment B.I of the OU3 RI/FS Report was not accurate. Although OU3 RI/FS source term data similar to that contained in the OU3 RI/FS Report was made available during the design and could have been used for modeling, radiological swipe (smear) sample results were used instead as a more realistic measure of removable alpha, beta, and gamma contamination that could be released during dismantlement. The removable contamination data obtained through smear sampling represents a model input that depicts worst case emissions since it represents removable contamination present prior to the decontamination activities that will precede dismantlement. This and other detail have been added to the discussion on air emissions modeling as requested. Please refer to the redline text on Page 23

(lines 2-20), which is included in Section 3 of this document.

Ohio EPA Comment #6

[Re: Section 2.4: p. 17, line 25] The site-wide air monitoring program is currently being negotiated as part of NESHAPs compliance monitoring. Please discuss how changes in the site-wide monitoring plan (such as the re-location of fence-line monitors) would affect the monitoring for this project.

DOE Response:

The potential movement of site-wide ambient monitors will not impact the Thorium/Plant 9 Complex project supplemental radiological air monitoring program. At this time, the site-wide ambient monitors are not projected to play an active role in project-specific monitoring. The site-wide air monitoring program would only be affected by this project if any emissions from the Thorium/Plant 9 Complex project are measured as part of the overall FEMP emissions.

The supplemental radiological air monitoring program for OU3 D&D projects, which is described in the March 1997 revisions to the OU3 Integrated RD/RA Work Plan (see revisions to Section 3.6.2.1 of the work plan in the Comment Response Package submitted to U.S. EPA/Ohio EPA on March 7, 1997), is not a program to demonstrate compliance with NESHAPs Subpart H but rather is being performed to assess the adequacy of engineering controls implemented for dismantlement activities.

Ohio EPA Comment #7

[Re: Section 2.4: p. 18, line 28] Please suggest a mechanism and schedule to report these data to the Ohio EPA. Weekly faxes of unvalidated monitoring results followed by written reports with the validated data are acceptable to Ohio EPA.

DOE Response:

Environmental monitoring air data will be transmitted electronically as data are received and reviewed. Results are typically received within seven days of submittal to the analytical laboratory. Periodic reports will be submitted to Ohio EPA on a quarterly basis, consistent with other data reporting.

Ohio EPA Comment #8

[Re: Section 2.4, p. 18, line 15] The discussion of activities and doses presented here seems to be limited to uranium to the exclusion of thorium. Do the historical trends for thorium also show a limited dose? This section does not explicitly state that thorium will be monitored.

DOE Response:

None of the projects listed as the historical basis for project air emission monitoring (i.e., Plant 7, Building 4A, Plant 1 Complex - Phase I) involved thorium. There are guidelines for monitoring thorium but information on actual effects can only be gained from experience.

Historical data has been reviewed for the Thorium/Plant 9 Complex and thorium has not been identified as a constituent of concern at this time; however, upon turnover of Buildings 64 and 65, following completion of the Thorium Overpacking Project (TOP) and the Thorium/Mixed

Ohio EPA Comments on the Draft Thorium/Plant 9 Complex Implementation Plan and DOE Comment Responses (Continued)

Waste Stabilization Project, radiological assessments will be done on component surfaces to determine if thorium is a concern. It is appropriate to evaluate potential thorium emissions after turnover of the buildings since current conditions are not likely to reflect conditions following completion of the two waste management projects. Should thorium represent a potential environmental air emissions concern, the project-specific air monitoring program will be modified to provide the appropriate level of process control.

In response to U.S. EPA Specific Comment #17, the referenced text was revised to identify total uranium as the primary radionuclide of concern and that total suspended particulates will be collected and evaluated over the life of the project. Data from each building will be continually evaluated to ensure that no additional parameters are necessary from an environmental standpoint. Please refer to the revisions shown on Pages 24 (lines 22-32) and 26 (lines 1-8), which are included in Section 3 of this document.

Ohio EPA Comment #9

[Re: Section 2.4, p. 19, Figure 2-1] Please provide a scaled drawing out to the fence line.

DOE Response:

Agree. Figure 2-1 has been revised to scale showing all pertinent air sampling locations. The revised figure is provided on Page 25, which is included in Section 3 of this document.

Ohio EPA Comment #10

Was this sentence [Section 2.4: p. 20, line 3] intended to mean "more than twice as high"? Regardless of the preferred phrasing, a brief elaboration of how to determine the factor of two increase over background is desirable.

DOE Response:

Ohio EPA's interpretation of the phrase is correct. The referenced sentence has been clarified further to read, "more than twice the maximum".

It is agreed that a brief explanation of how to determine the factor of two increase[s] over background. Please refer to the DOE response to U.S. EPA Specific Comment #20, which provides the elaboration that was added to the implementation plan.

Ohio EPA Comment #11

[Re: Appendix B: p. B-1, line 5] This scrap metal disposition analysis was limited to structural steel. Was an evaluation performed for copper, stainless steel or other metals in addition to structural steel?

DOE Response:

The evaluation was only for structural steel, which was chosen as a test case. The Methodology is currently being revised and will soon be made available for stakeholder review at a public meeting. After the Methodology revisions are finalized for structural steel, a process which will include stakeholder input, it may be adapted to other material categories. Please see response to Ohio EPA Comment #13 regarding plans for finalizing the Methodology.

Please note that since the Methodology is being revised, the text previously contained in Appendix B of the implementation plan has been removed. Upon stakeholder acceptance of the revised Methodology, the Thorium/Plant 9 Complex case will be evaluated again and the results separately submitted to the regulatory agencies as an amendment to the implementation plan. Although the outdated draft Methodology evaluation was removed from Appendix B, it should not impede the approval process for the implementation plan. The introduction to Appendix B has been revised, as shown as redlined text in Section 3 of this document, to reference the current status of the Methodology and the path forward for finalizing it.

Ohio EPA Comment #12

[Re: Appendix B: Table B-1] For performance measures H.) Public Health Impacts and I.) Worker Safety Impacts the term "Facilities" is used instead of "Fatalities".

A more substantive comment about these two performance measures is their ineffectiveness in distinguishing between the alternatives. Given that these measures were determined quite early in the presentations to the Stakeholders to be poor distinguishers between the alternatives, it isn't helpful to carry them through the analysis. They are more confounding issues that take attention away from more sensitive performance measures that do distinguish between alternatives. We acknowledge the difficulty of reconciling the subjective value we all place on safety and health (a very high number) with the utility of these two performance measures to distinguish between the alternatives (a much lower number). An easy, obvious way out is to choose to weigh these two measures very low but this conflicts with most people's values. Perhaps a narrative discussion in the text that explains why these two measures will not be used in the future could be incorporated into the next presentation to the Stakeholders.

DOE Response:

Agree. "Fatalities" is correct. In addition, DOE acknowledges the points that Ohio EPA makes with this comment and will consider them in the current revisions to the Methodology and for future presentation to the stakeholders. In the current revisions to the Methodology, Public Health and Worker Safety are no longer being considered as performance measures but rather are being considered "threshold criteria," and that no alternative will be included in the evaluation if the public health and/or worker safety aspects of the alternative are unacceptable. The revised Methodology will provide the sufficient details regarding performance measures and threshold criteria.

Ohio EPA Comment #13

[Re: Appendix B: Table B-2} The weighing scheme presented in Table B-2 appears to be reflect the inputs received from the stakeholders for the Plant 4 Complex. Will these weights remain standardized or will additional stakeholder input be sought? What are the criteria to be used to decide whether to update the weights of the performance measures?

A similar comment is also appropriate for the subjective criteria. What factors will be considered in evaluating whether the stakeholders should be asked to reevaluate performance measures D through G?

DOE Response:

Ohio EPA is correct in that the weighing scheme presented in B-2 reflects stakeholder input from

the Building 4A evaluation. In the revision of the Methodology, DOE will establish standard weighting factors for each performance measure and solicit stakeholder input at a public meeting in the near future. DOE will also inform stakeholders at the meeting about criteria for updating performance measures in the future and how stakeholders will be informed about Methodology evaluations on future projects.

Ohio EPA Comment #14

[Re: Appendix B] The analytical phase of the Methodology was started, but the results were not calculated and no ranking of the alternatives was completed. It is Ohio EPAs expectation that when the methodology is finalized, it is actually used as a tool to assist the decision-makers. In future Implementation plans (and the final version of this Plan if possible) we expect enough detailed information about the costs, subjective rankings, and the weighing criteria to be able to evaluate whether the Methodology was applied as part of a good-faith effort to consider alternatives to disposal in the OSDF.

DOE Response:

Agree. DOE fully intends to use the Methodology as a tool to assist decision-makers. When the Thorium/Plant 9 Complex Methodology evaluation is complete, a summary of the results of the evaluation will be submitted to the regulatory agencies for review and be included in the implementation plan as an amendment. The summary of evaluation results will include sufficiently detailed information to address Ohio EPA's concerns.

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SECTION 2

Other Significant DOE Enhancements to the Draft Thorium/Plant 9 Complex Implementation Plan

The references identified in the table below identify significant DOE enhancements made to the draft implementation plan resulting from the need to provide greater clarification on certain topics as well as provide significant updated information. The table provided below also identifies the basis for each enhancement. The referenced pages are included in Section 3 of this document.

Significant DOE Enhancements

	Significant DOE Enhancements to Draft (Page/Line Nos.)	Basis for Enhancement
1.	p. 9/(lines 12-13, 15-21, 25, 29-30) and p. 10/(lines 1-6)	The sequence for remediation of components within the Thorium/Plant 9 Complex was revised based on current projections for availability of buildings.
2.	pp. 14-16/Tables 2-1, 2-2, and 2-3	Volume and weight estimates were revised for inaccessible metals in Building 9A, and for Miscellaneous Materials in Buildings 9A, 9D, 78, and Miscellaneous Components. These revised estimates resulted from recently performed field evaluations to refine initial engineering estimates. The refined estimates resulted in a fewer number of roll-off boxes for miscellaneous materials. Table 2-1 was also revised to account for special management of potentially thorium-contaminated materials from Buildings 64 and 65.
3.	p. 11/lines 16-18 p. 13/lines 25-26 p. 14/Footnote #8 p. 36/line 2 p. 41/lines 10, 14-15	Two clarifications have been made to discussions regarding the removal of specific quantities of concrete containing Technetium-99 (Tc-99) from Process Areas 2 and 4 in Building 9A. First, the provision for "scabbling" has been revised to be non-specific to any particular method, such as scabbling. In its place, the term "removal" has been used. Second, references to "one inch of concrete" have been revised to "*at least* one inch of concrete". This latter clarification was necessary to avoid the implication that *only* one inch will be removed.
4.	p. 55/lines 20-27 and p. 56/lines 1-3.	Process trailers that currently reside in the project area will be relocated for reuse elsewhere onsite and therefore are not within the scope of the D&D project. The content from Section 3.15 of the draft version was deleted and Section 3.16 was renumbered accordingly.
5.	p. 58/Figure 4-1	1.) "Certification of Construction Completion" was retitled to "Completion of Field Activities" to be consistent with the same change made to the OU3 Integrated RD/RA Work Plan (re: DOE Enhancement No. 14 in the March 7, 1997 Comment Response Package submittal); 2.) The period for preparation of the project completion report was corrected to the standard 60-day duration rather than the 90-day period shown in the previous draft. The project completion report submittal date was advanced accordingly.

Significant DOE Enhancements (Cont'd)

Significant DOE Enhancements to Draft (Page/Line Nos.)	Basis for Enhancement
6. Appendix B	Consistent with the responses made to Ohio EPA Comment Nos. 11 - 14, the contents of Appendix B have been removed due to current Methodology revisions. Appendix B has been revised for the time being to reference the current status of the Methodology and the path forward for finalizing it. The revision also includes a statement identifying DOE's commitment to amending this appendix following a new Methodology evaluation, which will be performed following stakeholder input to the revised Methodology. As stated in response to Ohio EPA Comment #11, the temporary removal of the evaluation summary should not impede the approval process for the implementation plan.
7. Appendix C	Since the entire set of engineering performance specifications, including Specification 01519, has been revised (updated) and were submitted to U.S. EPA and Ohio EPA with the March 1997 Comment Response Package for the OU3 Integrated RD/RA Work Plan, there is no need to include any additional specifications in Appendix C. The current table of contents for the specifications that apply to the Thorium/Plant 9 Complex project is provided in Appendix C along with a revised introductory paragraph.

SECTION 3

Redline/Strikeout Pages Resulting from U.S. EPA/Ohio EPA Comments and DOE Enhancements to the Draft Thorium/Plant 9 Complex Implementation Plan

The pages contained in this section are shown in redline/strikeout form to show how text from the draft version of the implementation plan was affected by U.S. EPA/Ohio EPA comments and DOE responses presented in Section 1, and by DOE enhancements identified in Section 2. Upon approval of the revisions contained in Section 3, the redline/strikeout markings will be removed to finalize the document.

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The sequence, schedule, and component-specific remediation requirements for at- and below-grade dismantlement are contingent on RD/RA scheduling for soil remediation within the former Production Area and will be addressed in the appropriate RD/RA submittals for the Soil Characterization and Excavation Project (SCEP).

In accordance with the draft OU3 Integrated RD/RA Work Plan, the Thorium/Plant 9 Complex remediation activities have been planned utilizing a performance-based methodology using performance-based specifications as described in Section 3.1.3 and 4.1 of that work plan, and are also included in Appendix B of that work plan. Appendix C of this implementation plan provides a list of those performance specifications which also apply to this project. Also provided in Appendix C of this implementation plan is one additional specification, Specification 01519, which has been written since the submittal of the draft OU3 Integrated RD/RA Work Plan. Since that specification was not included in the draft OU3 Integrated RD/RA Work Plan, it is included in its entirety in Appendix C.

The use of performance specifications for project implementation requires that the remediation subcontractor develop work plans, subject to DOE approval, which will specify proposed remediation methods necessary to accomplish certain tasks and meet project objectives. The sequence for performance of remedial activities may differ from the sequence in which they are presented in this implementation plan since the remediation subcontractor's work plan may propose an alternate sequence.

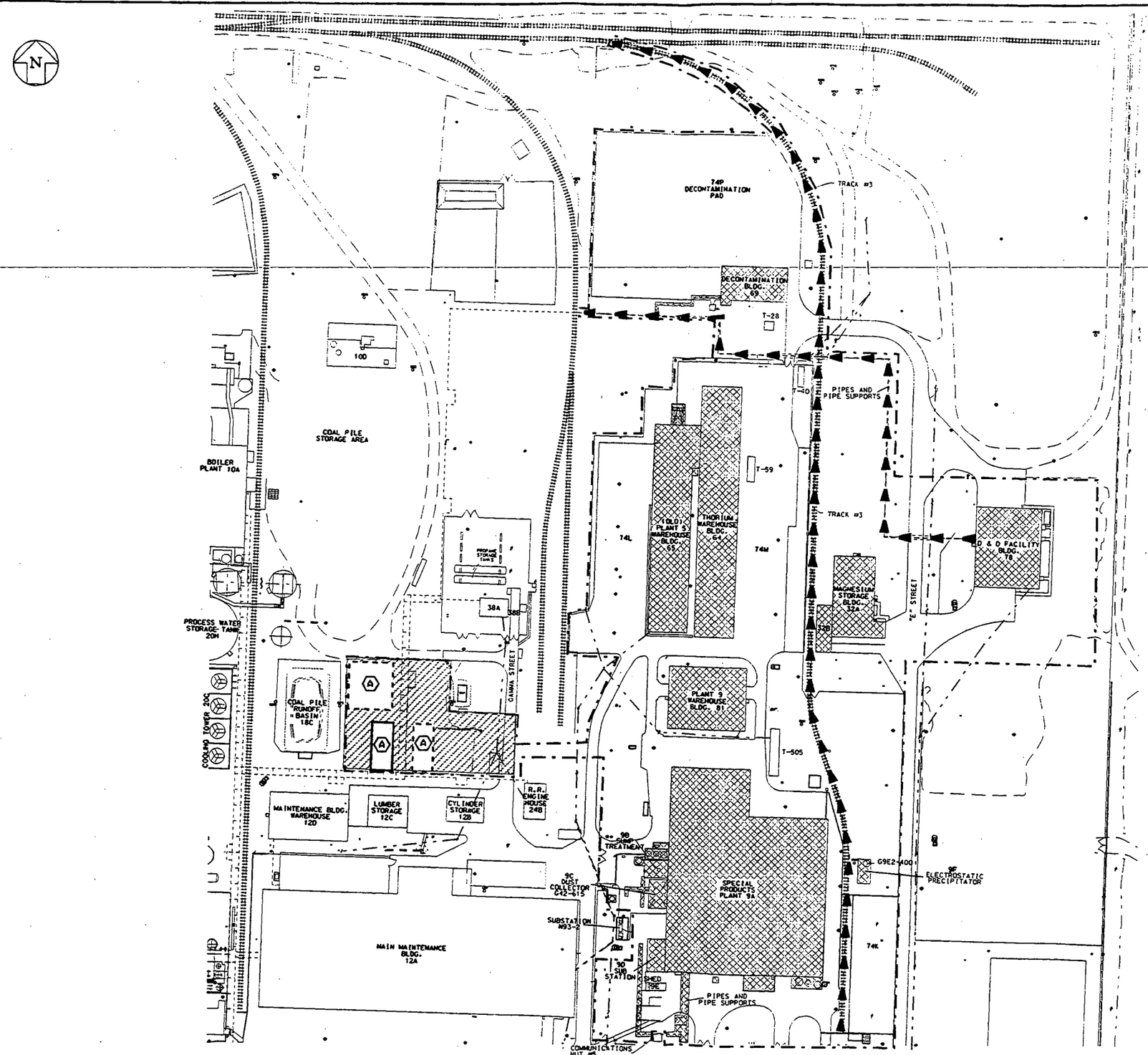
Substantive changes in the scope or intent of this plan will require U.S. EPA and Ohio EPA notification/approval prior to implementation of the activities. The scope includes performance of six major activities involving the 17 components listed. Intent relates to the fulfillment of requirements and conditions specified in the OU3 Final Action ROD. A substantive change to the scope would include a change that results in either performing additional major activities, not performing any of the six that are listed, or the addition or deletion of components for a project. Substantive changes of intent would include deviations from remediation strategies which affect regulatory-based obligations such as the commitments defined in the OU3 Final Action ROD. An example of this case would be the deviation to Applicable or Relative and Appropriate Requirements (ARARs).

Notification to the Agencies will be made for nonsubstantive but otherwise significant deviations to specific methods or techniques proposed in this plan. Nonsubstantive, but otherwise significant deviations refer to specific methods or techniques described in the implementation plan which require notification to the regulatory agencies. Examples of such deviations would include the reduction of the number of air monitors for a project or revisions to the specifications (e.g., a modification of the allowable residual contamination levels for opening a building to the environment). These would be reported to the Agencies prior to implementation, and would be included in the project completion report. ~~These will also be reported in the project completion report prepared following certification of construction completion for this decontamination and dismantlement project.~~

1.3 Plan Organization

This implementation plan is comprised of five sections and five appendices. Section 1 contains the remedial action project statement, scope of work, an overview of this implementation plan, and a brief description of the Thorium/Plant 9 Complex. Section 2 describes the overall approach to implementing the Thorium/Plant 9 Complex remediation project, as applied from the draft OU3 Integrated RD/RA Work Plan. That approach includes a sequence for remediation of components, a plan for materials management, environmental monitoring activities, and an overview of the six-task approach for implementing above-grade remediation. Section 3 presents specific notable aspects of the six remedial tasks for each component. Section 4 presents the schedule for remediation and project reporting. Section 5 describes notable aspects of the project management approach.

Appendix A contains a summary table that estimates the types and quantities of environmental and occupational sampling for this project, based on the assumptions in the Sampling and Analysis Plan (SAP) for the OU3 integrated remedial action, contained in Appendix B of the draft OU3 Integrated RD/RA Work Plan, and on the remediation requirements presented in this plan. Appendix B provides a summary of the disposition evaluation methodology for accessible metals. Appendix C provides the list of the most recent performance specifications that were developed for the remediation subcontractor procurement package for this project. Appendix D provides copies of drawings made available during design which show floor plans and elevations of buildings. Appendix E contains selected photographs of notable features of,



LEGEND

- FACILITIES TO BE DEMOLISHED
- CHANGE OUT/CAFETERIA AREA
- MISC TO BE REMOVED
- (A) PROPOSED SUPPORT FACILITY
- SUBCONTRACTOR CONSTRUCTION ZONE BOUNDARY

LIST OF BUILDINGS/COMPONENTS TO BE REMOVED

9A	SPECIAL PRODUCTS PLANT
9B	SUMP TREATMENT
9C	DUST COLLECTOR
9D	SUB STATION
9E	SHED
9F	ELECTROSTATIC PRECIPITATOR
32A	MAGNESUIM STORAGE
32B	COVERED LOADING DOCK
65	PLANT 5 WAREHOUSE
64	THORIUM WAREHOUSE
69	DECOTAMINATION BLDG.
78	D & D FACILITY
81	PLANT 9 WAREHOUSE

TANKS F1-1, F1-2, F1-3, T-2429, PPT, WATER ACID, ACID, F-9N1-700, G9E2-400,
MISCELLANOUS: PIPES, PIPE SUPPORTS AND RAILROAD TRACKS

1. EXISTING CONDITIONS SHOWN ON THIS DRAWING WERE PREPARED FROM FEMP SITE PROVIDED DATA FROM THE DOCUMENTS LISTED BELOW.

   EXISTING SITE DATA SOURCE (IN PLANT FILES)
   FEMP CADD GRID/UTILITY DRAWINGS
   FEMP CONTRACTOR PROJECT DESIGN DOCUMENTS

2. INFORMATION ON THE LOCATIONS OF EXISTING FEATURES SHOWN ON THIS PLAN WERE TAKEN FROM FERNALD SITE DRAWINGS. NO FIELD VERIFICATION BY SURVEY HAS BEEN PERFORMED.

3. SUBCONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS INCLUDING ELEVATIONS BEFORE STARTING CONSTRUCTION AND/OR FABRICATION. ANY DEVIATIONS NOTED SHALL BE BROUGHT TO FLOUR DANIEL, FERNALD CONSTRUCTION MANAGER'S ATTENTION IN WRITING IMMEDIATELY AND RESOLVED BEFORE CONTINUING WITH CONSTRUCTION.

4. EXISTING HARD SURFACE PAVEMENTS (ASPHALT, CONCRETE, ETC.) TO REMAIN UNDISTURBED UNLESS APPROVED BY FLOUR DANIEL, FERNALD CONSTRUCTION MANAGER.

5. SUBCONTRACTOR SHALL PROTECT ALL UNDERGROUND UTILITIES AND MONITORING WELLS. SEE DRAWING 22C-5500-P-00668, 22C-5500-P-00669, 22C-5500-P-00670, 22C-5500-P-00660, 22C-5500-P-00661, 22C-5500-P-00662 FOR UTILITIES.

6. LAYDOWN AREAS SHALL BE DETERMINED BY SUBCONTRACTOR WITH APPROVAL BY FLOUR DANIEL, FERNALD CONSTRUCTION MANAGER.

7. AT THE COMPLETION OF THE PROJECT, SUBCONTRACTOR SHALL REMOVE AND STORE THE TEMPORARY CONSTRUCTION FENCE AND GATES IN THE LOCATION DESIGNATED BY FLOUR DANIEL, FERNALD CONSTRUCTION MANAGER.

8. FOR DIMENSIONS AND DETAILS OF BUILDING FACILITIES REFERENCE THE EXISTING FILE DRAWINGS.

9. CONTRACTOR SHALL VERIFY THAT THE UTILITIES TO PIPE RACK HAVE BEEN PROPERLY DISCONNECTED AND END CAPPED. UTILITY DISCONNECT AND CAPPING WORK BY FLOUR DANIEL, FERNALD.

10. RADIOLOGICAL CONTROL FENCES WILL BE INSTALLED BY FLOUR DANIEL, FERNALD.

11. TRAILERS T-40,59, AND 28 TO BE REMOVED PRIOR TO THE START OF THE PROJECT

PRELIMINARY
INFORMATION ONLY
CADD SERVICES

000029

NO.	REVISIONS	DATE	DWN. BY	APPD.
1	UPDATED CHANGE OUT AREA, NOTES, TRAILERS	4-24-91	JsW	GEP
0	CFC	3-27-91	JsW	GEP

NOTE: FLUOR DANIEL FERNALD CADD DRAWING, DO NOT REVISE MANUALLY.

CONFIGURATION MANAGEMENT DRAWING

APPROVALS

CIVIL & STR.		SAFETY ENG.	
ELECTRICAL		MAINTENANCE	
ENGINEER	P. COURTNEY 3-27-91	FIRE PROTECT	
INSTRUMENT		WASTE MANAGE	
MECHANICAL		SECURITY	
		CPU	
CHECKED	GEP	CONSTRUCTION	
APPROVED	E. PAUL 3-27-91		

COGNIZANT ENGINEER DATE

Fernald Environmental Management Project
FLUOR DANIEL FERNALD
U.S. DEPARTMENT OF ENERGY

PLANT 9 AREA
THORIUM PLANT 9 AREA COMPLEX
CIVIL DEMOLITION PLAN
NO SCALE

RCS 2176
DATE Mar. 21, 1991
DRAWN JsW
09X-5500-X-03973 1

FORMAT REVISED 11/5/86 PDF5.DGN

FIGURE 1-1 Thorium/Plant 9 Complex Project Area

2.0 GENERAL PROJECT REMEDIATION APPROACH

The overall approach to the decontamination and dismantlement of Thorium/Plant 9 Complex incorporates the applicable programmatic elements and tasks that were described in Section 3 of the draft OU3 Integrated RD/RA Work Plan. This section describes the notable aspects of the overall approach evaluated during remedial design and addressed in the subcontract documents.

2.1 Sequencing of Remediation

The main factors which affect the sequence for the remediation of components in the Thorium/Plant 9 Complex are scheduling constraints associated with ongoing projects, and facility use considerations. Decontamination and dismantlement of Buildings 64 and 65 will not begin until completion of the Thorium Overpacking Project (TOP) which is currently scheduled to be completed in September 1997 ~~April, 1998~~, and the Thorium/Mixed Waste Stabilization Project in September 1998. The potential mixed waste presently stored in the Plant 9 Warehouse (81) will be sampled and analyzed. If the wastes are determined to be mixed, treatment will be required prior to disposition under the Thorium/Mixed Waste Stabilization Project. Buildings 64 and 65 are currently ~~One of the primary locations that would be considered for the treatment project is Buildings 64 and 65. Since it is currently anticipated that these buildings will be available for remediation, the buildings are~~ included in the remediation subcontractor bid package as an option due to the potential downtime between dismantlement of other components in the complex and the availability of Buildings 64 and 65. However, in the event the buildings cannot be removed from service in time to warrant exercising the option, an amendment to this implementation plan will be submitted for Agency approval.

It is anticipated that the remediation sequence begins with Building 9A, Building 69, Building 32A and 32B, and Building 81 ~~78~~ being available for decontamination and dismantlement first. Decontamination and dismantlement of the Plant 9 ancillary structures (Buildings 9B through 9F) will start after commencement of Building 9A remediation. Building 81 is an also active hazardous waste management unit (HWMU), and will be decontaminated in accordance with the RCRA/CERCLA Integrated Process discussed in the OU3 Integrated RD/RA Work Plan. It is anticipated that Building 78 will be released for remediation approximately two to three

~~months after Notice to Proceed. Decontamination and dismantlement of~~ Release of Buildings 64 and 65 is anticipated for December 1998, which is the expected completion time frame for the Thorium/Mixed Waste Stabilization Project. ~~will commence following the completion of TOP, or, at the completion of the treatment of waste removed from Building 81 if required (explained above). The Plant 9 Warehouse (81) is planned to be the last component in the complex that will undergo remediation.~~

2.2 Characterization of the Thorium/Plant 9 Complex

The processes and operations that were performed in the Thorium/Plant 9 Complex components during production included uranium reduction, casting, and related production-support operations in the Special Products Plant (9A), material storage (including hazardous/mixed waste, thorium, and magnesium), and equipment/material decontamination systems. Section 3 of this plan further describes relevant process/production-related information to provide a context for component remediation. The former process operations within the complex utilized both radiological and chemical constituents and generated a wide variety of waste materials.

The radiological survey data compiled during the OU3 Remedial Investigation/Feasibility Study (RI/FS), and provided in the OU3 RI/FS Report (DOE 1996b) provided alpha removable, beta-gamma removable, and total beta-gamma radiological information. This data has been utilized in support of the following Thorium/Plant 9 Complex decontamination and dismantlement planning and design efforts including, but not limited to:

- developing the safety assessment documentation to support the proposed activities;
- enhancing the project-specific health and safety plan and determining potential concerns for worker protection based on the suggested decontamination and dismantlement techniques;
- enhancing the remediation subcontractor's understanding of expected contamination levels;
- determining personnel monitoring requirements;
- determining the number and location of project-specific radiological ambient air monitors;

- identifying potential gross radiological contamination that may require decontamination prior to the remediation subcontractor activities; and,
- determining disposition options for various primary and secondary material streams generated by the project activities.

OU3 RI/FS data that were used to evaluate material, during the remedial design process, for treatment and disposition, radiological environmental air monitoring needs, and potential wastewater treatment requirements are presented in Appendix B (Attachment B.III) of the OU3 RI/FS Report and, due to the volume of data, are not repeated in this section.

The most significant results from the remedial design data evaluation are those which are relevant to identifying and managing certain materials for treatment and off-site disposition, consistent with the decisions made in the OU3 Record of Decision for Final Action (DOE 1996c). The results of the evaluation reveal the following:

- the top inch of concrete from both the Enriched Uranium Casting Process Area and the Uranium Machining Process Area in Plant 9 (9A) (see Figure D-3, Appendix D), totalling an estimated 1,699 cubic feet, contains elevated levels of technetium-99 —requiring that at least the top inch of conrete be removed and disposition off-site ~~and requires scabbling and off-site disposition~~;
- potential mixed waste acid brick, totalling an estimated 1,437 cubic feet are located in the Zirnlo Decladding process area, Heat Treating process area, and the Briquetting process area in Plant 9 (9A) and will be dispositioned for off-site;
- approximately 959 cubic feet of potential mixed waste acid brick in Building 69 that has been administratively designated for off-site disposition; and
- approximately 15 cubic feet of mixed waste lead flashing exist in Plant 9 (9A), the Thorium Warehouse (64), and the Plant 5 Warehouse (65) and will be treated and dispositioned either off-site, or recycled.

The result of the material data evaluation, summarized above, is the proper identification of specific materials that have special handling requirements in the project specifications and subcontract scope of work.

2.3 Materials Management

The project specific application of material management strategies presented in Section 3.3 of the draft OU3 Integrated RD/RA Work Plan are outlined in this section.

Specification 01120 of the performance specifications (Waste Handling Criteria) and the Waste Management Plan included in the bid document, and discussed in Section 4.1.3 of the draft OU3 Integrated RD/RA Work Plan, specifies the remediation subcontractor requirements for managing material resulting from all project tasks. Based on the requirements specified in Specification 01120, a mobilization work plan that details waste handling methods and procedures will be prepared by the remediation subcontractor. Waste minimization will be accomplished, in part, by unpacking equipment and material prior to entering the radiologically controlled area whenever possible, limiting the number of tools and equipment that could become contaminated, and limiting the quantities of hazardous material brought into the construction zone.

2.3.1 Primary Materials Management

Primary materials include dismantlement debris and other bulk waste materials from the Thorium/Plant 9 Complex components. As a result of the revision of performance specifications done in the past to address material handling requirements stipulated by amendments to Removal Action 17 in August 1996 and OU3 Final Action ROD, this implementation plan reflects material management applications that are consistent with the requirements for treatment and disposition of materials discussed in the draft OU3 Integrated RD/RA Work Plan.

As discussed in Section 2.2, the results of material evaluation performed during design revealed that certain primary materials must be managed for off-site treatment and/or disposal. Section 2.3.4 discusses how these materials will be segregated, containerized, and dispositioned. An additional evaluation of materials using the disposition evaluation methodology for accessible metals was also performed, and a summary of the results is presented in Appendix B.

2.3.2 Secondary Waste Management

Management of secondary wastes includes handling, sampling, storage, and disposition of secondary waste materials generated during remediation. Secondary waste includes vacuumed dust, filters, filter cake, personal protective equipment (PPE), spent consumables, and washwaters. If hydro-cleaning of component surfaces is used, washwaters generated will be controlled by the remediation subcontractor by minimizing its generation, providing proper containment, etc. (Specification 01517). If washwaters are generated, floor cracks and edges around equipment foundations will be sealed to contain effluent to the building interior. The building's collection sump may be used for collection of washwaters. Once collected, washwaters will be pumped through a 20 micron prefilter and a 5 micron filter to remove entrained particulate prior to effluent discharge into containers. Washwater may be sampled for constituents of concern if the Waste Water Treatment System (WWTS) Manager requires analytical data for treatment purposes prior to discharge into the FEMP WWTS. Waste water sampling is described in the SAP which is contained in Appendix D of the draft OU3 Integrated RD/RA Work Plan. Samples of washwaters will be collected for only those batches that have been determined (through a review of available process information and existing data) to have potentially elevated levels of contaminants of concern, such as volatile organic compounds, heavy metals, uranium and RCRA-listed constituents. Depending on contaminant concentration levels, pre-treatment may be required. ~~Water added for dust suppression will be controlled and dispositioned to the storm sewer.~~

2.3.3 Estimates of Material Volumes

Materials to be generated during this project have been categorized according to the same classification system that was developed for and described in the OU3 RI/FS Report, and draft OU3 RD/RA Integrated Work Plan, and are estimated in Tables 2-1, 2-2, and 2-3. Estimated material volumes are also presented for lead flashing and ~~the scabbled~~ concrete to be removed for off-site disposal (from Process Areas 2 and 4 in Building 9A). These latter two types of materials fall within the defined material categories (painted light gauge metals and concrete, respectively), but will be handled separately from the other materials within their respective categories. Where applicable, materials were assigned to a specific container according to current material management strategies, which were described in the draft OU3 Integrated

Table 2-1 Bulked Material Volume Estimates (ft^3)

Component Designation	Accessible Metals	Inaccessible Metals	Process-Related Metals	Painted Light-Gauge Metals	Lead Flashing	Concrete	Concrete Containing Tc-99[8]	Acid Brick	Non-Regulated ACM	Regulated ACM[1]	Misc. Materials[2]	Component/ Complex Totals
9A	25,244	63,525	23,717	876	6	303	1,699	1,866	4,319	3,473	8,686	133,714
9B	559	2,759	302	8	0	105	0	0	183	125	685	4,726
9C	102	93	0	7	0	0	0	0	0	39	38	279
9D	293	223	0	0	0	0	0	0	265	12	455	1,248
9E	14	0	0	0	0	0	0	0	7	4	19	44
9F	68	148	9	7	0	0	0	0	15	35	57	339
32A	1,658	663	0	5	0	6,530	0	0	0	93	2,724	11,673
32B	290	37	0	0	0	0	0	0	0	4	426	757
64	3,297	3,720	0	212	6	1,560	0	0	40	0	2,758	11,587
65	4,497	1,315	0	144	4	0	0	0	0	0	1,505	7,465
69	2,599	821	57	33	0	7,313	0	1,245	0	235	2,249	14,552
78	3,985	14,023	1,431	97	0	10,608	0	0	0	0	3,224	33,280
81	1,347	761	0	80	0	0	0	0	0	0	143	2,331
Miscellaneous[9]	4,159	0	0	0	0	0	0	0	0	0	2,433	6,592
Complex Total	48,112	86,080	25,516	1,469	16	26,419	1,699	3,111	4,741	4,020	25,402	226,585
Container/ Quantity[3]	None/ ROB/10[10]	None/ ROB/7[10]	TL[5]/27	None/ ROB/1[10]	B-12[5]/1	None/ ROB/2[10]	B-12[5]/60	SWMB[6]/39	ROB[5]/7	ISO[5]/5	ROB[5]/31	
Interim Storage Config.[4]	Stockpile/ ROB[10]	Stockpile/ ROB[10]	TL	Stockpile/ ROB[10]	B-12	Stockpile/ ROB[10]	B-12	SWMB	ROB	ISO	ROB	
Disposition	to be determined	On-Property	Offsite: NTS	On-Property	PCDF[7]	On-Property	Offsite: NTS	Offsite: PCDF	On-Property	On-Property	On-Property	

(1) Excludes gutter cleanout which will be placed in drums (volume estimated at less than one drum).
(2) Excludes compactibles which will be placed in a dumpster as refuse for compaction. Miscellaneous materials can be containerized with Non-Regulated ACM.
(3) **TL**: Top-Loading (also referred to a Large Metal Box) holds 970 cubic feet and/or 18.0 tons of material; **ISO**: End-Loading Container/Sea-Land boxes) holds up to 971 cubic feet and/or 42,000 lbs. of material; **ROB**: Roll-Off Box holds 810 cubic feet and/or 16.95 tons of material; **B-12**: B-12 Box holds up to 44 cubic feet and/or 9,000 lbs. of material; and **SWMB**: Small White Metal Box holds approximately 80 cubic feet and/or 9,000 lbs. of material.
(4) Currently, the preferred location for interim storage of containerized and stockpiled materials is the Plant 1 Storage Pad; structural steel is planned to be stockpiled on the Plant 9 slab. Containerized accessible metals, inaccessible metals, painted light-gauge metals, and concrete from Bldgs. 64/65 are planned to be placed on the 64/65 slabs.
(5) Container is volume restricted.
(6) Container is weight restricted.
(7) PCDF: Permitted Commercial Disposal Facility.
(8) Volumes of ~~scabbled~~ concrete containing Tc-99 removed from Process Areas 2 and 4 in Building 9A are at- and below-grade quantities.
(9) Miscellaneous includes railroad tracks and pipe bridges, ~~and non-process trailers~~.
(10) Accessible metals, inaccessible metals, painted light gauge metals, and concrete from Bldgs. 64 and 65 to be placed in ROBs unless no thorium contamination concerns.

Table 2-2 Unbulked Material Volume Estimates (ft^3)

Component Designation	Accessible Metals	Inaccessible Metals	Process-Related Metals	Painted Light-Gauge Metals	Lead Flashing	Concrete	Concrete Containing Tc-99	Acid Brick	Non-Regulated ACM	Regulated ACM	Misc. Materials	Component/ Complex Totals
9A	1,512	25,410	6,816	441	3	233	1,699	1,437	3,599	1,011	6,682	48,843
9B	33	852	92	4	0	81	0	0	161	46	524	1,793
9C	6	46	0	3	0	0	0	0	0	14	32	101
9D	18	112	0	0	0	0	0	0	221	10	300	711
9E	1	0	0	0	0	0	0	0	6	3	16	26
9F	4	65	3	3	0	0	0	0	12	15	48	150
32A	99	311	0	2	0	5,023	0	0	0	40	1,791	7,266
32B	17	19	0	0	0	0	0	0	0	3	293	332
64	197	1,423	0	106	3	1,200	0	0	25	0	1,489	4,443
65	269	640	0	72	2	0	0	0	0	0	789	1,772
69	156	401	28	17	0	5,625	0	959	0	116	1,513	8,815
78	239	4,333	418	49	0	8,160	0	0	0	0	2,480	15,680
81	81	376	0	40	0	0	0	0	0	0	120	617
Miscellaneous[1]	479	0	0	0	0	0	0	0	0	0	1,872	2,351
Complex Total	3,111	33,988	7,357	737	8	20,322	1,699	2,396	4,024	1,258	17,899	92,899

(1) Miscellaneous includes railroad tracks and pipe bridges~~, and non-process trailers~~.

Table 2-3 Material Weight Estimates (tons)

Component Designation	Accessible Metals	Inaccessible Metals	Process-Related Metals	Painted Light-Gauge Metals	Lead Flashing	Concrete	Concrete Containing Tc-99	Acid Brick	Non-Regulated ACM	Regulated ACM	Misc. Materials	Component/ Complex Totals
9A	370	604	116	103	1	6	154	116	201	2	40	1,713
9B	8	20	2	0	0	6	0	0	9	0	2	48
9C	2	4	0	1	0	0	0	0	0	0	0	6
9D	4	6	0	0	0	0	0	0	12	0	1	23
9E	0	0	0	0	0	0	0	0	0	0	0	1
9F	1	3	0	1	0	0	0	0	1	0	0	6
32A	24	14	0	1	0	138	0	0	0	0	22	202
32B	4	0	0	0	0	0	0	0	0	0	4	8
64	48	49	0	20	1	33	0	0	1	0	23	174
65	66	23	0	13	1	0	0	0	0	0	13	115
69	38	17	1	0	0	216	0	67	0	0	16	357
78	58	63	6	6	0	281	0	0	0	0	25	438
81	20	15	0	8	0	0	0	0	0	0	0	43
Miscellaneous[1]	117	0	0	0	0	0	0	0	0	0	6	123
Complex Total	760	818	125	153	3	680	154	183	224	2	152	3,254

(1) Miscellaneous components include railroad tracks and pipe bridges~~, and non-process trailers~~.

RD/RA Work Plan, and will be documented in the material segregation and containerization criteria (MSCC) form that will be contained in the bid document. The volume estimates associated with each material segregation category are listed according to general material type, volume (bulked and unbulked), and weight, and the type and number of containers needed. Estimates for spent PPE and consumables are included as either regulated ACM or miscellaneous materials, depending on the activity undertaken when these materials were generated.

The volumes and weights in Tables 2-1, 2-2, and 2-3 were developed by reviewing engineering drawings and performing field inspections to identify and quantify materials. Container types and storage configuration are based on the category of material, characteristics of the material, disposition decisions made under the OU3 Final Action ROD, and anticipated alternative disposition based on the results of the disposition evaluation methodology for accessible metals discussed in Appendix B.

Container types and quantities are also estimated in Table 2-1. Container types correspond to those specified in the MSCC prepared during remedial design. Container quantities are estimated based on the weight or volume restriction placed on each type of container to be used. The two primary assumptions that should be noted regarding the material volume and weight estimates are that all materials are assumed to be radiologically contaminated, and any mixed/hazardous wastes and PCB-contaminated wastes are to be containerized separately.

2.3.4 Material Handling, Staging, Interim Storage, and Disposition

Material Handling/Staging

Pursuant to Specification 01120 materials generated from the decontamination and dismantlement of Thorium/Plant 9 Complex will be reduced in size, segregated, and containerized (if necessary) in accordance with the requirements placed in the MSCC and other subcontract waste management provisions. Containers will then be weighed, inspected, sealed, and tagged for on-site movement. The MSCC will be used by the remediation subcontractor as the basis for all containerizing activities. Although the MSCC provides a high level of detail for the remediation subcontractor, Table 2-1 provides the essential segregation and containerization criteria for this implementation plan. Material size requirements are

identical to those provided in the example MSCC contained in Appendix A of the draft OU3 Integrated RD/RA Work Plan.

Pursuant to Specification 01120, the remediation subcontractor will establish a container queuing area having a controlled boundary within the construction site. The queuing area will be used as a temporary storage area for empty and full debris/waste containers. ~~Empty containers and container preparation materials will be delivered to this area for use by the remediation subcontractor.~~

Compressed gases, explosives, free-liquids, fine particulates, hazardous wastes, corrosive materials and etiological agents will be containerized separately from debris. Sampling of waste containers designated for off-site shipments will be performed by FEMP waste management personnel in accordance with the OU3 RD/RA SAP (contained in Appendix D of the draft OU3 Integrated RD/RA Work Plan) and WAC of the receiving facilities.

~~In addition, all generated~~ Hazardous wastes will be taken once a day to either a designated satellite accumulation area (SAA) or an approved RCRA storage area for proper handling, treatment, and disposal as needed. Approved RCRA storage areas are identified in the FEMP Part B Permit Application. The subcontractor is required, pursuant to Specification Section 01120, to submit for DOE approval a work plan that identifies a proposed location of the SAA ~~, removed hazardous waste will be taken once a day either to a satellite accumulation area, or a 90-day RCRA storage area~~. The SAA ~~These areas~~, which will be controlled by FEMP personnel and managed in accordance with applicable RCRA requirements, will be established in locations which will ensure minimal disruption of construction activities.

Containers used for ACM will require additional preparation, including the use of polyethylene sheeting as secondary containment.

Full containers destined for off-site disposition will be delivered to an on-property packaging/staging area for sampling (if necessary), container inspection, and sealing. Materials destined for on-property temporary storage will be delivered directly to the designated interim storage area.

Pursuant to Specification 01120, waste materials that require movement outside to be

containerized will be required to meet the decontamination requirements. If that requirement cannot be attained, the material may be encapsulated or wrapped in fiber reinforced sheeting and sealed prior to movement to prevent migration of contaminants during movement.

The Radiological Requirements Plan (RRP) outlines the requirements that must be met by the remediation subcontractor regarding radiological limits. The RRP is discussed in the draft OU3 Integrated RD/RA Work Plan, Section 3.2.5.

Interim Storage/Disposition

The strategy for interim storage of OU3 materials is described globally in the draft OU3 Integrated RD/RA Work Plan. It is anticipated that all materials generated from the decontamination and dismantlement of the Thorium/Plant 9 Complex that are eligible for disposition in the On-Site Disposal Facility (OSDF), with the exception of structural steel, will be placed in interim storage at the Plant 1 Pad. The current strategy for the management of structural steel identifies interim storage in bulk form on the Plant 9 concrete slab; however, placement on other storage pads or slabs with adequate engineering controls may be performed as needed. Another exception to this strategy is for accessible metals, inaccessible metals, painted light-gauge metals, and concrete from Buildings 64 and 65, which are currently assumed to be potentially contaminated with thorium. Those materials will be containerized in covered roll-off boxes and it is currently anticipated that they will be placed on the Building 64/65 pads. The duration of interim storage for these materials will depend on the OSDF material placement schedule. Materials generated that do not meet the OSDF waste acceptance criteria are expected to be dispositioned off-site within six months of generation.

Although the Plant 1 Pad will likely serve as the primary storage location for most containerized debris, other existing storage pads, and/or foundations of dismantled buildings may be used if necessary. These interim storage locations will be maintained until such time as the materials achieve final disposition. Interim storage on the Plant 1 Pad, or other designated pad, includes both stockpiling and container storage.

Materials not identified for immediate off-site disposition will be placed in the queuing area by the remediation subcontractor to allow FEMP waste management personnel to inspect them

prior to their relocation to the designated interim storage facility. ~~The strategy for interim storage of OU3 materials is described globally in the draft OU3 Integrated RD/RA Work Plan. The preferred interim storage location for Thorium/Plant 9 Complex materials includes the Plant 1 Storage Pad, other existing storage pads, and/or foundations of dismantled buildings. These interim storage locations will be maintained until such time as the material receives a final dispositioned. Interim storage on the Plant 1 pad, or other designated pad, includes both stockpiling and container storage.~~

Material tracking and reporting will be accomplished through use of the Site-Wide Information and Tracking System (SWIFTS). Section 3.3.2.2 (Segregation, Containerization, Tracking) of the OU3 Integrated RD/RA Work Plan describes material tracking and reporting using SWIFTS. Project-specific material tracking and reporting for the Thorium/Plant 9 Complex project does not differ from the strategies laid out in the OU3 Integrated RD/RA Work Plan.

Treatment and Disposition

The project-specific disposition strategy for materials generated during this project is consistent with the strategies presented in the draft OU3 Integrated RD/RA Work Plan Treatment and disposition decisions for project materials were made in accordance with the requirements stated in the OU3 Final Action ROD.

Table 2-1 identifies the disposition determination for project materials. Treatment will be required prior to the disposal of potential mixed waste acid brick and lead sheeting. Both materials are projected to be shipped to the Envirocare of Utah facility in Clive, Utah for treatment and burial. Accessible Metals (Category A) from the complex are currently being evaluated for potential recycling options. This evaluation will be performed using the ~~is being performed using the~~ "Decision Methodology for Fernald Scrap Metal Disposition Alternatives", which is being developed by DOE-FN to specifically address evaluation of disposition alternatives. This evaluation is briefly described in Appendix B.

2.4 Environmental Monitoring

Project-specific environmental monitoring for the Thorium/Plant 9 Complex project includes wastewater monitoring and radiological air monitoring; groundwater monitoring is not

applicable to this project but may be employed if necessary as described in Section 3.6.2.3 of the OU3 Integrated RD/RA Work Plan.

Project-specific stormwater management is governed by the FEMP Stormwater Pollution Prevention Plan (DOE 1996) and any monitoring associated with that program is managed by the Aquifer Restoration Project. To ensure that the applicable performance requirements of that plan are followed during the Thorium/Plant 9 Complex project, Specification Section 01515 (Part 1.5.A.1.c of Rev. 0) requires that the subcontractor provide for FEMP approval the plans to be employed to control stormwater runoff, migration of washwater, and erosion control.

Project-specific reporting for wastewater and radiological air monitoring will be provided in the project completion report, which will include a summary of the results generated during the project. For wastewater, the report will include a summary of the results from sampling and analysis of decontamination washwater prior to its discharge into the FEMP wastewater treatment system (WWTS). For project-specific air monitoring, the report will be identify each of the air monitoring stations; the minimum, maximum, and average radiological activity readings at each of those locations; and the highest maximum value at site-wide ambient monitoring stations during the project period in relation to DOE Order 5400.5 limits.

Surface Water (Wastewater) Monitoring

The OU3 Integrated RD/RA Work Plan describes the strategies to be used for project monitoring of wastewater. Listed below are the specific references in the work plan:

- **Section 3.2.5 Surface Decontamination:** Wastewater collection and management strategies are discussed.
- **Section 3.3.3 Management of Secondary Waste:** The overall strategy for managing wastewater, as one of the primary aspects of secondary waste, through the site wastewater treatment system is discussed.
- **Section 3.5.2 Management of Contaminated Water:** References site procedure to be used for the evaluation and management of contaminated wastewater.
- **SAP/Section 2 General Sampling and Data Collection Approach:** The subsections in this section focuses on wastewater sampling, among other aspects of sampling.

- **SAP/Section 3 Specific Sampling Programs:** Sampling for disposition of wastes, including wastewater, is discussed. Determination of hazardous, radiological, and other waste characteristics is discussed.

The Thorium/Plant 9 Complex project is not expected to deviate from the strategies laid out in the referenced documents and therefore no further detail is provided in this implementation plan.

~~The draft OU3 RD/RA Integrated Work Plan addresses the surface water and groundwater monitoring (Sections 3.6.2.2 and 3.6.2.3, respectively) that will be performed in support of the Thorium/Plant 9 Complex remediation project. Environmental air quality monitoring during the Thorium/Plant 9 Complex decontamination and dismantlement project will consist of two programs: the current site-wide monitoring program as discussed in Section 3.6.2.1 of the draft OU3 RD/RA Integrated Work Plan and the supplemental radiological air monitoring program specifically designed for this decontamination and dismantlement project. The only aspect of environmental monitoring that requires elaboration beyond the discussion in the draft OU3 Integrated RD/RA Work Plan is the supplemental radiological air monitoring program developed for this project.~~

Radiological Air Monitoring

Environmental radiological air monitoring during the Thorium/Plant 9 Complex decontamination and dismantlement project will consist of two programs: the Fernald Site Environmental Monitoring Program described in the site-wide Integrated Environmental Monitoring Plan (IEMP) (Draft Final, March 1997), as discussed in Sections 3.5.1 and 3.6.2.1 of the draft OU3 RD/RA Integrated Work Plan, and the supplemental radiological air monitoring program specifically designed for this decontamination and dismantlement project to ensure adequate process control. An overview of the supplemental radiological program is provided in Section 3.6.2.1 of the OU3 Integrated RD/RA Work Plan while this implementation plan discusses the details of applying that program to this project.

Occupational monitoring of airborne radionuclides in the work areas will also be performed to ensure worker protection and will also serve as a real-time indicator of airborne radiological activity during decontamination and dismantlement; Section 8.1 of the OU3 Integrated Remedial Action Health and Safety Plan (Appendix E of the OU3 Integrated RD/RA Work Plan)

describes occupational air monitoring program.

Computer modeling of potential emissions from the Thorium/Plant 9 Complex area was performed in January 1995 using the CAP88PC method to measure potential dose impacts from the project. CAP88PC is the personal computer version of the U.S. EPA model CAP88 that is the approved method for predicting emissions of radionuclides under the National Emissions Standards for Hazardous Air Pollutants (NESHAPs) regulations. It should be emphasized that the CAP88 model is being used as a tool for assessing potential emissions from a project for the purpose of identifying potential mitigative controls and possibly the use of supplemental monitoring measures; it is not being used as a means to demonstrate compliance with NESHAPs Subpart H. The method to be used for demonstrating NESHAPs Subpart H compliance is presented in the IEMP as a collective sitewide strategy.

The CAP88PC modeling methodology is prescribed by the U.S. EPA reference manual: U.S. EPA User's Guide for CAP88, Version 1.0, 402-B-92-001. Computer modeling of potential emissions from the Thorium/Plant 9 Complex used radiological smear data to provide a more realistic measure than fixed contamination (identified through intrusive sampling results from the OU3 RI/FS database) of removable alpha, beta, and gamma contamination that could be released during dismantlement. The removable contamination data obtained through smear sampling represents a model input that depicts worst case emissions since it represents removable contamination present prior to the decontamination activities that will precede dismantlement.

~~contaminant source terms identified in Appendix B, Attachment B.I of the OU3 RI/FS Report.~~ The modeling methodology assumed no controls on emissions release, such as high efficiency particulate air (HEPA) filters on containment ventilation systems, and potential emissions sources were treated as being in readily dispersible forms ~~gaseous states~~. The results of the computer modeling indicate what the maximally exposed individual at the closest off-site receptor location would receive. The results of the computer modeling indicated that the maximally exposed individual would theoretically be located 956 meters north-northeast of the project area and would potentially receive a maximum Effective Dose Equivalent of 9.1×10^{-7} mrem/year from the D&D activities. ~~As discussed in Section 3.6.2 of the draft OU3 Integrated RD/RA Work Plan the FEMP boundary threshold is 1.0×10^{-1} mrem/year.~~ Five optimal project

emissions receptor locations were identified for supplemental air monitoring and are shown in Figure 2-1. The monitoring locations for the Thorium/Plant 9 Complex project were based on wind rose data and modeling of potential atmospheric releases. The most potentially impacted vectors were identified for the placement of monitors and the least affected vector was selected for the upwind monitor location. None of the vectors in the western sector of the Thorium/Plant 9 Complex showed significant impact, therefore no monitors were included in these locations. Considerations such as accessibility, availability of electrical power, and siting requirements were also evaluated in locating the monitors. Further justification for selecting only five monitors comes from analysis of data from Plant 7 (summarized in the "Plant 7 Dismantling - Removal Action No. 19, Final Report", May 1995), Plant 4 (summarized in the "Project Completion Report, Building 4A Complex", draft January 1997), and Plant 1 Complex - Phase I (to be summarized in the Project Completion Report for that project, although it has been reviewed internally as it has been collected during the implementation of the project) decontamination and dismantlement projects, which have shown that dismantlement activities resulted in negligible airborne radiological contaminant emissions. Results for airborne uranium contamination during those projects have been approximately 5 percent of the DOE maximum off-site guidelines of 0.1 pCi/m^3. The relationship between pCi/year and mrem/year may be understood by the conversion factor used to equate the two terms at the FEMP: if inhaled continuously (24 hours/day, 365 days/year), 0.1 pCi/m^3 of uranium in air will result in a dose of 100 mrem/year. It should be noted that various assumptions have been incorporated into this conversion factor.

Process knowledge and engineering evaluations have shown that total uranium is the primary radionuclide of concern for this project. Monitoring of potential airborne uranium will include collection of total suspended particulates using high-volume air samplers at the locations referenced above. Sampling will be performed 24 hours/day, 7 days/week, beginning four to six weeks prior to commencement of interior debris removal or equipment removal tasks to establish a background or baseline level and continue until Completion of Field Activities (milestone referenced in Section 4). The period of four to six weeks for background sampling has been determined based on previous and ongoing OU3 projects, to be sufficient for establishing a representative background. Samples for preliminary background monitoring and dismantlement monitoring will be collected once a week. Environmental radiological air monitoring procedures are provided in Appendix K of the Sitewide CERCLA Quality Assurance

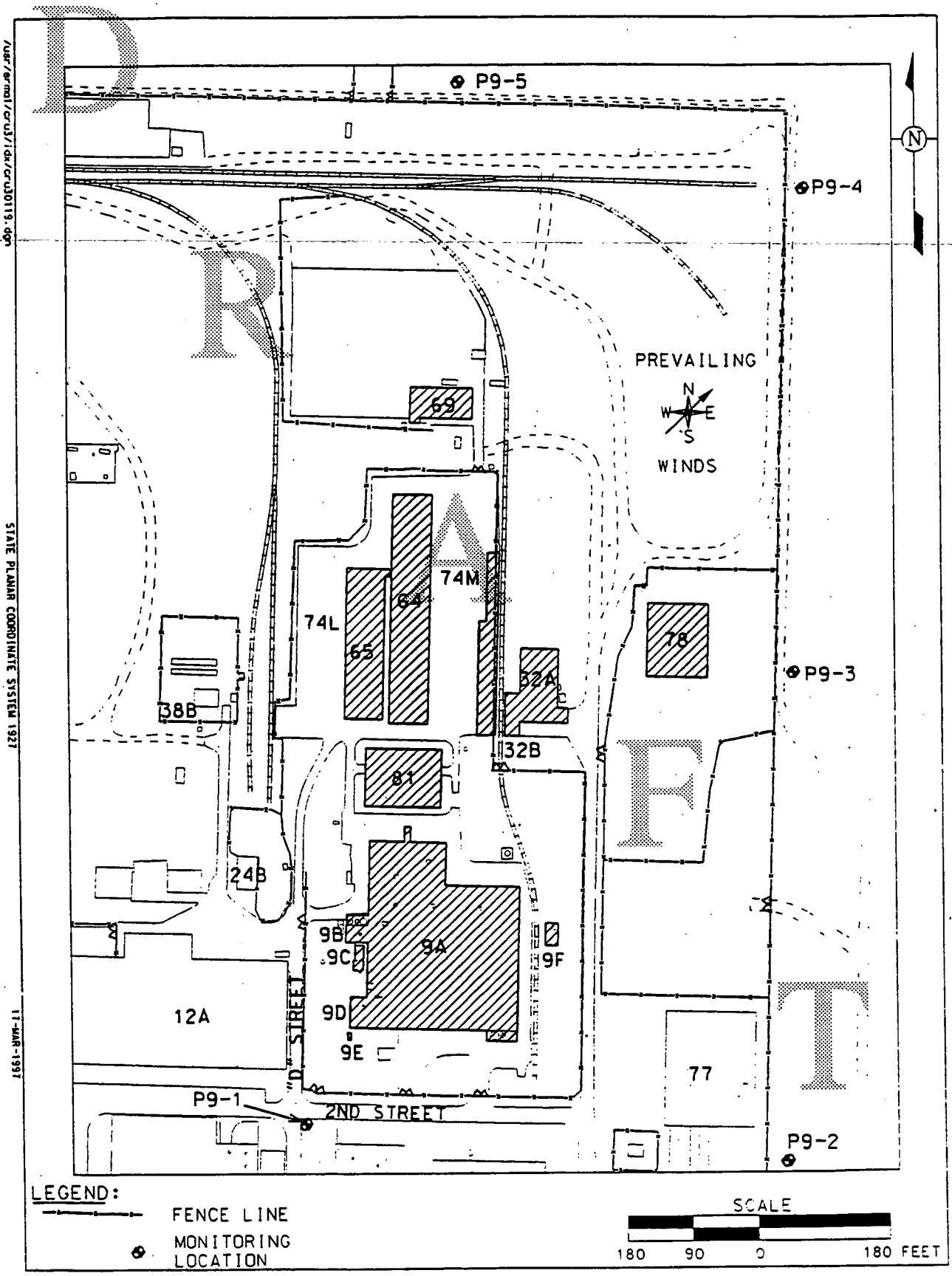


FIGURE 2-1 Proposed Air Monitoring Locations for Thorium/Plant 9 Complex

Project Plan (SCQ).

Data from each building will be continually evaluated to ensure that no additional parameters are necessary from an environmental standpoint. Upon turnover of Buildings 64 and 65 for decontamination and dismantlement, following completion of the Thorium Overpacking Project, radiological assessments will be done on component surfaces to determine if potential thorium emissions are also a concern. Should thorium represent a potential environmental air emissions concern, the project-specific air monitoring program will be modified to provide the appropriate level of process feedback.

~~To establish a background or baseline level with which to compare project results, supplemental air monitors will be set up and operated continuously (24 hours/day, 7 days/week) prior to the Thorium/Plant 9 Complex dismantlement activities. This representative period has been determined based on previous and ongoing OU3 projects, to be sufficient for establishing a representative background. Samples for preliminary background monitoring and dismantlement monitoring will be collected once a week.~~

For air monitoring to be useful in the evaluation of engineering controls, results from air monitoring will be reported to the construction manager as expeditiously as possible. In consideration of requisite decay periods for samples and time needed to perform analytical and reporting tasks, it is anticipated that the preliminary results of sampling would be delivered to the OU3 Project Manager in no less than seven calendar days from the date that the sample is taken. Preliminary results will provide the data, albeit not validated at that point, needed to evaluate project concentrations against the baseline concentration. If radiological levels from four consecutive weeks of air monitoring are more than twice the maximum ~~at least twice as high as~~ baseline levels, then FEMP Project Management will be notified of initial trending of values above baseline. The evaluation of the effectiveness of engineering controls following exceedance of the criteria (i.e., twice the maximum baseline for four consecutive weeks) will be performed immediately or as soon as practicable.

Four consecutive weeks of positive trending accounts for any anomalies that may be occurring over time. Given the low concentrations observed during previous OU3 projects, any data point greater than twice the maximum baseline values is conservative enough to allow for an

engineering evaluation prior to meeting or exceeding the project self-imposed action threshold of 0.1 mrem/year. ~~decontamination and dismantlement activities will be reviewed~~ The engineering evaluation will be used to determine the effectiveness of engineering controls during remediation and to identify any need for additional mitigative measures. Monitoring data will be validated in accordance with the SCQ requirements, compiled as it becomes available, and used to trend sample results and to further evaluate the effectiveness of engineering controls and any need for mitigative measures.

Additional mitigative measures that might be employed in the event of exceeding the criterion stated above would include an increase in engineering and administrative controls during a particular operation that has been identified as the cause, or probable cause, of the elevated radiological levels. Such controls could include an increase in negative pressure within the enclosed work area using additional HEPA filtration units or additional surface cleaning (wash) steps before removing material from the containment.

2.5 Remediation Activities

A general approach to the above-grade decontamination and dismantlement of the Thorium/Plant 9 Complex is described in the following subsections. Section 3 elaborates on this discussion by identifying component-specific interests concerning the six remedial tasks, as applicable. The six tasks are as follows:

- Preparatory Action: Inventory Removal;
- Preparatory Action: Safe Shutdown;
- Hazardous Waste Management Unit decontamination;
- Asbestos Removal;
- Surface Decontamination; and
- Above-Grade Dismantlement.

Although the six remedial tasks are generally described in the order in which they will be performed, the actual order for performing these activities may differ from the sequence presented in this plan as a result of evaluation and selection of alternate methods by the remediation subcontractor as approved by the OU3 Project Manager.

As required by Specification 01515 (Mobilization), the following activities will take place prior

to the implementation of remediation activities discussed in Section 3. OU3 Project Management, using the FEMP workforce, will establish a break room, clean room, and shower facilities. The remediation subcontractor will mobilize in preparation for the decontamination and dismantlement activities by establishing a material handling and containerization area, access and egress roadways to and from the job site, and the construction zone boundary. The proposed construction zone boundary is delineated in Figure 1-1. The remediation subcontractor will also deliver equipment, materials, and office and storage trailers to the site as necessary to perform remediation activities. All equipment will be inspected by OU3 Project Management and surveyed by radiological control technicians to ensure that no contamination or items prohibited by the FEMP are brought on-site. A sign-in station will be established at the entrance to the job site for posting of permits and health and safety plans. Additional radiological control boundaries will be established prior to starting remediation activities in order to locate contaminated material staging areas as well as access and egress points to and from contaminated areas.

Additionally, the remediation subcontractor is required to develop and submit work plans covering every aspect of the project. One such plan provides details relative to how the remediation subcontractor will protect adjacent facilities (Specification 01515). Other plans are required for controlling fugitive emissions (Specification 15067), storm water run-off protection (Specification 01515), and controlling erosion (Specification 01515). Throughout the remediation activities, the remediation subcontractor will be responsible for notifying OU3 Project Management of conditions in the field that require environmental response. All conditions that necessitate a response will be dealt with immediately.

2.5.1 Preparatory Action: Inventory Removal

Existing waste/product inventories from components will be removed by FEMP personnel prior to decontamination and dismantlement operations and transported to interim storage facilities or off-site disposal facilities under the decisions and procedures adopted from Removal Action No. 9. Section 3 provides volume estimates of containerized materials that were removed during Removal No. 9. Inventory removal was completed for all components except Components 64, 65, and 81 due to the ongoing Thorium Overpacking Project operation (64 and 65) and use as a RCRA storage facility (81). Each of these remaining facilities will

The remediation subcontractor will be required, pursuant to Specification 05126, to specify in a structural steel removal work plan the following methods:

- detailed sequence of dismantlement, including equipment;
- methods for contamination control, including fugitive emissions during size reduction;
- methods for cutting/size reduction, including equipment to be used;
- plans for protecting lay down and cutting areas from lead paint chips;
- methods and materials to be used for cutting lead painted steel; and
- calculations to verify structural integrity of partially dismantled structure, as applicable;
- calculations to verify structural integrity of roof to support personnel who may be required there;
- detailed work plan describing personnel tie-offs, pick boards, and walking on or near roof pearlings. All calculations shall be stamped by a Registered Professional Engineer.

Material size reduction requirements for the Thorium/Plant 9 Complex project are specified in the MSCC located in Part 6 of the bid document.

Specification 05126 provides direction to the remediation subcontractor in several other ways relative to the removal of structural steel. It reemphasizes the remediation subcontractor's responsibility for avoiding damage to adjacent structures, material, and equipment during dismantlement activities, and, it specifies that lead-based paint chips and debris, released during structural steel dismantlement, shall be collected and managed in accordance with Specification 01120.

Concrete Masonry Unit (CMU) Secondary Containment and Pedestal Removal

Specification 03315 requires the remediation subcontractor to develop a concrete removal work plan containing information quite similar to that of the structural steel removal work plan discussed above. The CMU secondary containments and pedestals will be radiologically surveyed prior to removal to determine the need for engineering controls, such as an enclosure

with ventilation or water sprays to minimize fugitive dust, during removal operations.

Except for the ~~surface~~ removal (at least the top one inch) of concrete in two process areas of Building 9A, the base slabs of the structures will remain in place during this remedial action. Specification 01515 addresses requirements relative to the preparation of the base slab during demobilization. Specifically, all openings in the slab will be filled with granular material and grout to provide a flat uniform surface thus minimizing the chance for water accumulation and migration, and potential safety hazards. All wire and cable will be cut away to grade level from the conduit embedded in the concrete. Conduit and other slab obstructions will be cut away to grade level, plugged, and covered with grout to grade level for positive drainage.

lock down the loose fibers. An additional air sampling test will then be performed to verify the lock down effectiveness.

A final asbestos removal effort will take place subsequent to the completion of the bulk removal and equipment removal operations. The equipment removal will allow for unobstructed movement around the building, simplifying the remaining asbestos removal activities. Approximately 2,996 lineal ft. of pipe insulation will be removed as part of the asbestos removal activity. Approximately 712 ft^2 of asbestos-containing floor tile and associated mastic will be removed.

Surface Decontamination

In accordance with ~~Pursuant to~~ Specification 01518 (Surface Removal of Concrete), at least the top one inch of concrete from Process Areas 2 and 4 in Building 9A will be removed using a method that is approved by DOE. The remediation subcontractor will be required to provide a system with all necessary equipment for concrete removal, dust control, containerization and transport of the produced waste. No wetting shall be allowed during the removal ~~scabbling~~ process. The system shall include a pre- and HEPA filtering system to maintain dust and contaminants below limits established in the Radiological Requirements Plan.

Although the remediation subcontractor is encouraged to investigate all technologies to determine a Best Available Technology, the concrete removal system known as Pentek Moose, Squirrel and Corner-Cutter scabblers is acceptable. Acceptable performance of concrete removal will be achieved when at least one inch of surface has been removed from the entire floor areas of Process Areas 2 and 4. Method of verification that one inch of surface concrete has been removed will be proposed by the remediation subcontractor and approved by DOE.

Above-Grade Dismantlement

Building 9A dismantlement will consist of removing the building contents and structure that were described above. Materials to be removed will include piping and conduit; HVAC ductwork and ductwork insulation; equipment (the types of equipment contained in Building 9A are identified in the background discussions at the beginning of this section); structural and miscellaneous steel; concrete masonry unit (CMU) block; roofing material; doors and windows; interior transite paneling; and, batting insulation and exterior transite.

3.2 Building 9B - Plant 9 Sump Treatment Facility

Background

Building 9B - Plant 9 Sump Treatment Facility is a single-level building measuring approximately 20 ft. x 30 ft. x 20 ft. Building 9B adjoins the west side of the Special Products Plant (Building 9A) and consists of a structural steel frame on a poured concrete base and floor with transite walls and roofing. The floor plan of Building 9B is shown in Figure D-7 of Appendix D. Figures E-13 and E-14 of Appendix E are copies of photographs showing the exterior elevation and the interior of Building 9B.

Building 9B treated wastewater from the Special Products Plant, originally with ammonium hydroxide (NH_4OH) and later with lime, to remove the bulk of the contaminants before wastewater transfer to the General Sump (Component 18B). Currently, the equipment remaining in Building 9B includes a decant tank, an acid tank, a mix tank, two plate and frame filters, and three filtrate tanks. A single process area has been identified for Building 9B.

Asbestos Removal

Individual asbestos work areas will be established within Building 9B. Most of the ACM is in good condition and has not caused any building areas to be designated as asbestos areas because of the concern for friable asbestos. Approximately 365 lineal ft. of pipe insulation will be removed as part of the asbestos removal activity. Additional information on asbestos removal requirements that apply to Building 9B can be obtained in Sections 2.5.4 and 3.1.

Above-Grade Dismantlement

Building 9B is constructed of transite panel walls and transite panel roofing on a poured reinforced concrete base. The supporting frame is constructed of structural steel. Materials generated during the dismantlement of Building 9B will include piping and conduit; equipment; structural and miscellaneous steel; roofing material; doors and windows; interior transite paneling; batting insulation; and, exterior transite.

there is no reason to believe that the concrete debris from the slab will exhibit a RCRA characteristic. The concrete debris that will be generated whenever the floor (pad) of this HWMU is dismantled will be eligible for disposal in the OSDF. The dismantling of the pad will be addressed in the SEP to be developed under the OU5 RD/RA process.

Above-Grade Dismantlement

Dismantlement of Building 81 will generate materials that will include piping and conduit; equipment; structural and miscellaneous steel; roofing material; and, doors and windows.

3.14 Component G-001 - Railroad Tracks

Background

Within the boundaries of the Thorium/Plant 9 Complex is approximately one half mile of railroad tracks. Historically, rail service was provided to Building 32A and the Plant 9 area. The boundaries of the railroad track removal includes the southern terminus of the tracks on the pad east of Plant 9 and the intersection of the tracks with the northern edge of the Decontamination Pad which surrounds Building 69.

Above-Grade Dismantlement

Dismantlement of this component will generate steel rails which will be managed under the Thorium/Plant 9 Complex Waste Management Plan. The wooden railroad ties will be left in place to be removed with other at- and below-grade materials by the Soil Characterization and Excavation Project.

~~3.15 Component G-006 - Process Trailers~~

~~Background~~

~~There are two process trailers in the Thorium/Plant 9 Complex. These trailers are used for office space and break areas.~~

~~Safe Shutdown~~

~~Safe shutdown of the process trailers will consist of de-energizing the electric service. No hold-up materials are present.~~

~~**Above-Grade Dismantlement**~~

~~The dismantlement of this component will generate structural and miscellaneous steel; wall insulation; and, miscellaneous materials.~~

3.15 ~~6~~ Component G-008 - Pipe Bridges

Background

The pipe bridges are steel structures which support the steam lines and other lines required for processing activities which took place in the Thorium/Plant 9 Complex buildings. One bridge crosses 2nd Street and enters Plant 9 on the South side. A second bridge follows an irregular course and enters Building 78 on the West side.

Safe Shutdown

Safe shutdown activities will consist of de-energizing all electrical services, disconnection and isolation of steam lines, and disconnecting water lines. No hold-up materials are present.

Asbestos Removal

Asbestos removal will consist of removing insulation from pipes and steam lines.

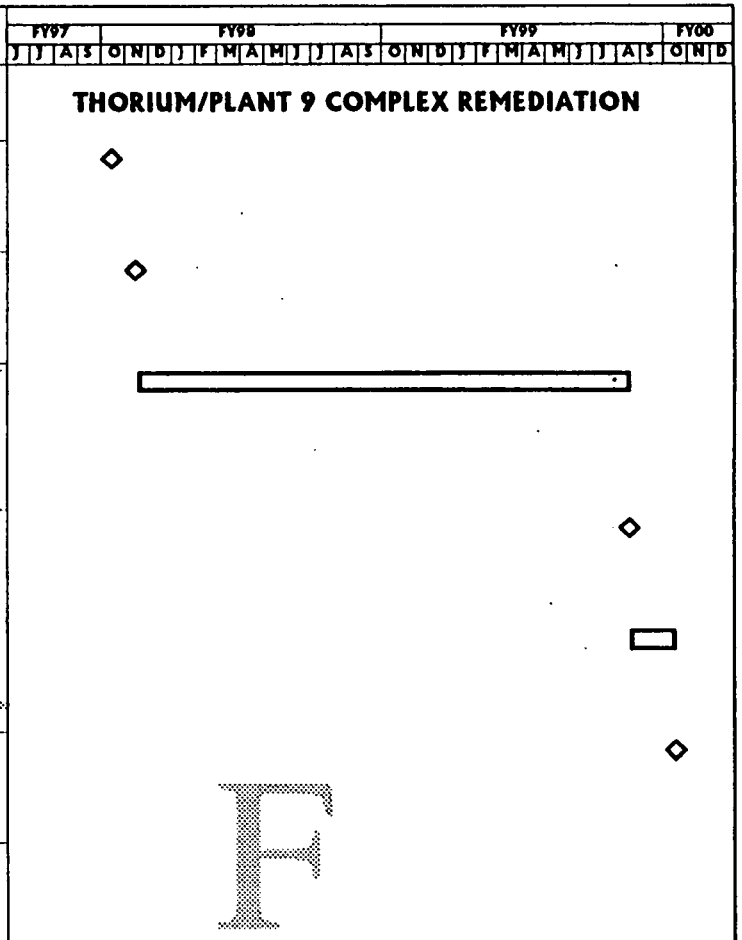
Above-Grade Dismantlement

Dismantlement of this component will generate structural steel, pipe and conduit. Concrete support footings will be left in place and removed with other at- and below-grade materials by the Soil Characterization and Excavation Project.

4.0 SCHEDULE

This section presents the planning and implementation schedules for the Thorium/Plant 9 Complex remedial action project. Figure 4-1 presents the schedule for implementation of field activities beginning with the remediation subcontractor's Notice To Proceed and ending with the submittal of the Project Completion Report. Since inventory removal and safe shutdown activities are preparatory actions and were already completed, they are not specifically represented in the schedule. Within Figure 4-1, the primary milestones of the project include initiation and duration of remediation field activities, project completion ("Completion of Field Activities ~~Certification of Construction Completion~~"), and the preparation and submittal of the Project Completion Report to U.S. EPA and Ohio EPA.

ACTIVITY DESCRIPTION	EARLY START	EARLY FINISH	ORIG DUR
AWARD THORIUM/PLANT 9 SUBCONTRACT	15OCT97		0
NOTICE TO PROCEED	15NOV97		0
FIELD REMEDIATION OF THORIUM/PLANT 9 COM (INCLUDES SUBCONTRACTOR WP's, MOBILIZATION AND DEMOBILIZATION)	18NOV97	17AUG99	638
COMPLETION OF FIELD ACTIVITIES		17AUG99	0
PREPARE PROJECT COMPLETION REPORT	18AUG99	16OCT99	60
SUBMIT PROJECT COMPL REPORT TO US/OEPA		16OCT99	0



DURATIONS BASED ON CALENDAR DAYS

Plot Date 13MAR97
Data Date 22NOV96
Project Start 1JUN96
Project Finish 16OCT99

(c) Primavera Systems, Inc.

Activity Bar/Early Dates
Critical Activity
Progress Bar
Milestone/Flag Activity

Sheet 1 of 1

CERCLA/RCRA UNIT 3
OU3 D&D SCHEDULE
THORIUM/PLANT 9 REMEDIATION

FLUOR DANIEL FERNALD

Date	Revision	Checked	Approved

FIGURE 4-1 Thorium/Plant 9 Complex Remediation Schedule

APPENDIX A

PROPOSED SAMPLING

The following methodologies were developed based on data needs identified in the Sampling and Analysis Plan, included as Appendix D to the OU3 Integrated RD/RA Work Plan. A project specific summary of the sample types are included in this implementation plan and are based on assumptions outlined below.

Characterization Screening

Screening has been conducted using X-Ray Fluorescence (XRF) screening of media for lead based paint. Screening has been conducted for fixed and removable radioactive contamination using Geiger-Mueller radiological contamination meters.

Asbestos

This category represents samples needed to verify whether a certain material is considered ACM and whether the ACM is regulated or non-regulated.

Secondary Waste (Decontamination Water)

General decontamination water will be sampled to determine potential treatment prior to discharge into the WWTS. It is estimated that 8 samples will be required to characterize wash water for isotopic radionuclides, heavy metals, volatile organic compounds, PCBs, oils and grease. Approximately 88 samples may be required to evaluate enrichment (i.e., levels of U-235 to total Uranium) of batched waste water from equipment decontamination prior to discharge. ~~Those sampled for total Uranium and U-235.~~

Nevada Test Site (NTS) Confirmatory

One per cent of each material/waste stream going to NTS is required to be sampled, and then three samples per container (for that one per cent sampled) in accordance with the NTS Waste Acceptance Criteria (WAC). Based on the materials projected for NTS disposal, it is estimated that 6 samples will be required. Sampling and analysis will have to meet the NVO-325 requirements discussed in the SAP contained in Appendix D of the draft OU3 Integrated RD/RA Work Plan.

Permitted Off-site Commercial Disposal Facility

Mixed waste, such as radiologically contaminated lead flashing and acid brick may be disposed of at an off-site mixed waste disposal facility. If this is necessary, confirmatory sampling will be required to verify whether or not the waste meets the WAC for the disposal facility. Sampling and analysis required for shipment certification will be as specified by the permitted facility's WAC.

Asbestos Air Monitoring

Asbestos air sampling will occur over the duration of the asbestos removal activity. Interior and exterior containment perimeter monitoring will be conducted during asbestos removal activities to detect any releases of friable asbestos to protect workers. Occupational breathing zone air monitor samples will also be utilized during asbestos removal within closed areas.

Radiological Air Monitoring

Supplemental and existing fence line environmental air monitoring stations established for project specific monitoring will be analyzed weekly by site personnel during decontamination and dismantlement activities.

Occupational air samplers will be worn by at least twenty-five per cent (25%) of the workers in each work group/crew (minimum of 1 worker) when entering a radiological area controlled for contamination or airborne radioactivity. More specific information on radiological worker protection can be found in the Radiation Requirements Plan of the subcontract.

APPENDIX B

DECISION METHODOLOGY FOR FERNALD SCRAP METAL DISPOSITION ALTERNATIVES

In accordance with the commitment to perform a disposition methodology evaluation on potentially recyclable/reusable materials from each project, pursuant to Section 3.3.6.1 of the OU3 Integrated RD/RA Work Plan under the subheading of Unrestricted Release Recycling/Reuse, an initial version of the Decision Methodology For Fernald Scrap Metal Disposition Alternatives (the "Methodology") was applied in December 1996 to Accessible Metals (OU3 Debris Category A) from Building 9A. A summary of some preliminary results were provided in the draft version of this implementation plan in January 1997. However, since the Methodology is currently being revised, the previous results are no longer valid.

It is anticipated that the revisions to the Methodology will be completed in the April/May 1997 time frame, whereupon it will be made available to stakeholders for review and comment at a public meeting to be announced. Following stakeholder input, the Methodology will be finalized and applied to Plant 9 Accessible Metals. A summary of the results of the evaluation will be prepared as an amendment to this appendix and submitted to the regulatory agencies for review.

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APPENDIX C

PERFORMANCE SPECIFICATIONS

The performance specifications listed on ~~the following page~~ Page C-3 are identical to the standard set of performance specifications submitted with the March 1997 revisions to the OU3 Integrated RD/RA Work Plan (provided as an attachment to the Comment Response Package submitted to the regulatory agencies on March 7, 1997). The standard specifications were revised in concert with Thorium/Plant 9 Complex project planning and a duplicate set was prepared for the Thorium/Plant 9 Complex project. The performance specifications for the Thorium/Plant 9 Complex contain a project-specific title (i.e., Thorium/Plant 9 Complex Decontamination and Dismantlement Engineering Performance Specifications), reference number, and reflect the appropriate revision number. ~~identifies the project-specific application of the specifications that were included in the draft OU3 Integrated RD/RA Work Plan. Only Specification 01519 is included with this appendix since the other project specifications do not differ from those that were presented in the draft OU3 Integrated RD/RA Work Plan.~~

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THORIUM/PLANT 9 COMPLEX DECONTAMINATION AND DISMANTLEMENT ENGINEERING PERFORMANCE SPECIFICATIONS

(Reference: EE-Specifications 1742-TS-0001)

D

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DIVISION 15 - MECHANICAL

15065	EQUIPMENT DISMANTLEMENT	1	03/06/97
15066	INTERIOR DISMANTLEMENT	1	03/06/97
15067	VENTILATION AND CONTAINMENT	0	02/14/97

DIVISION 16 (NOT USED)

ATTACHMENT

PRELIMINARY — FOR INFORMATION ONLY

THORIUM/PLANT 9 COMPLEX
DECONTAMINATION AND DISMANTLEMENT PROJECT

RADIOLOGICAL REQUIREMENTS PLAN
(DRAFT)

JANUARY 1997

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THORIUM/PLANT 9 COMPLEX D&D PROJECT
RADIOLOGICAL REQUIREMENTS PLAN

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C. RADIOLOGICAL REQUIREMENTS

C1.0 Purpose

This section provides the Subcontractor with many of the radiological requirements by which to plan the D&D of the Thorium/Plant 9 Complex. Additional radiological control requirements are incorporated throughout the body of this Subcontract. Specific information contained in this section includes: anticipated FDF Radiological Control interface with the Subcontractor; general radiological considerations; personnel entry and exit protocol through radiological areas; radiological limits; access and monitoring requirements, Radiological Work Permits (RWPs), and personal protective equipment (PPE).

C2.0 Project Radiological Requirements Plan

C2.1 Radiological Control Interface with the Subcontractor

C2.1.1 FDF-Provided Radiological Control Programs

FDF will provide radiological control support, including providing Radiological Control Technicians (RCTs), radiological monitoring, and record keeping. The Subcontractor shall comply with all radiological control requirements, directions, RWPs, Safe Work Plans, training requirements, sampling, testing, oversight, etc. As part of this FDF will provide the following:

- DOELAP accredited external dosimetry program (including record keeping and reporting);
- All radiological monitoring equipment;
- Internal Dosimetry program (including air sampling, bioassay, In Vivo analysis, and record keeping);
- Radiological Worker Training program consistent with the requirements of 10 CFR 835 and the DOE Radiological Control Manual; and
- Radiological Control support personnel trained to the requirements of 10 CFR 835 and the DOE Radiological Control Manual.

C2.1.2 Work Plans Submittals and Daily Activities List

FDF will review and comment upon all of the Subcontractor's safe work plan submittals that include task descriptions requiring radiological controls (entering a Contamination Area; dismantling equipment, etc.).

The Subcontractor is required to provide FDF with a written description of projected activities (including movement of material and specific personnel activities), crew sizes, crew members, and crew locations. This information shall be provided at least 24 hours prior to commencement of work and shall be brought directly to the RCT office for the project located in the Subcontractor's change trailers.

C2.1.3 Walk Downs/Meetings

Representatives of FDF will participate in periodic walkdowns/inspections of the facility, be present at pre-job meetings to address health and safety requirements of the safe work plans or work permits, will attend weekly meetings with the Subcontractor to raise issues of concern, provide updates on the status of the quality of radiological controls for the project

activities, participate in morning safety meetings with the Subcontractor's personnel, and discuss radiological safety requirements pertaining to work practices previously witnessed and anticipated based on upcoming work.

C2.1.4 Radiological Sources

Radiological sources may only be brought onsite with prior approval of FDF. Required information from the Subcontractor includes the type and activity of the source, its intended purpose, how long the source is expected to remain onsite, and what controls will be placed on the source to ensure its stability while onsite.

C2.1.5 Bioassay Cards

All personnel qualified under FDF Radiological Worker II Training are required to leave a bioassay (urine sample) after every 60 day period and at the end of work on the Subcontract. Bioassay cards will be provided to the prime Subcontractor for distribution to all affected employees. Employees who will be leaving the job prior to the next sampling date are required to leave a sample just before final departure.

The Subcontractor shall submit a list of his employees names and badge numbers requiring urinalysis sampling to FDF by 10:00 a.m. on the fifteenth (or closest working day) of each month for the preceding work period. The information submitted will allow FDF to generate bioassay cards for all personnel reported.

This form shall be completed for the Subcontractor and its lower-tier Subcontractors. Required information shall be reported for all workers qualified under FDF Radiological Worker II Training that have worked at the Project site during the reporting period.

All workers receiving a bioassay card will be required to report to the bioassay station in the S&H Building (Bldg. 53) by the date shown on the card. Failure to report to the bioassay station within the required time period may result in the employee being denied access to the controlled area until the requirement is fulfilled.

It is the Subcontractor's responsibility to confirm that it has received bioassay cards for all affected employees. Missing cards must be reported immediately to the FDF construction representative responsible for the subcontract.

C2.1.6 Radiological Incidents and Reporting for All Project Work

C2.1.6.1 Reporting and Classification

NOTE: In an emergency situation, the health and safety of an employee takes precedence over radiological controls.

All radiological incidents or abnormal events shall be immediately reported to FDF. Examples include, but are not limited to, skin or clothing (non-PPE) contamination, situations where radioactive material uptake is suspected and situations where contamination is spread to a Controlled Area or clean area.

- The supervisor shall document the event or condition in writing. This documentation should include enough information to reconstruct the event, its associated

consequences, corrective and recovery actions, and the estimated dollar amounts of damage to property or cost of the corrective actions taken; and

- Events will be categorized by FDF in accordance with DOE Order 232.1. If an event critique is required, the Subcontractor is responsible for ensuring that all applicable employees attend the critique.

C2.1.6.2 Radiological Deficiency Reports

Radiological Deficiency Reports (RDRs) are written by FDF to document radiological deficiencies. Examples include, but are not limited to, poor performance of health physics practices, violations of procedures and safety policies, personnel contaminations, etc.

The Subcontractor is responsible for correcting deficiencies and providing a written response summarizing action(s) taken and/or planned to prevent recurrence.

C2.1.7 Stop Work Authority

All FDF and Subcontractor personnel have the responsibility and authority to stop radiological work when radiological controls are inadequate.

In any situation in which stop work authority is used, the following requirements apply:

- Exercise stop work authority in a justifiable and responsible manner;
- Once work is stopped, do NOT resume until proper radiological controls have been established; and
- Resumption of work requires approval of the responsible line manager and the FDF Radiological Control Manager.

C2.2 General Radiological Considerations

C2.2.1 Radiological Isotopes of Concern

The most limiting isotope (for radiological contamination control purposes) is determined and applied as the isotope of concern. This is determined by FDF based on a combination of sampling data, calculation and process knowledge.

See Part 6 for descriptions of the facilities covered by this Subcontract and their respective isotopes-of-concern. Surface contamination and airborne radioactivity limits will vary based on the isotopes of concern. Frisking techniques and whole body monitoring techniques will necessarily vary in these areas as well.

Movement from an area controlled to thorium 232 limits to an area controlled to uranium 238 limits requires monitoring and, if necessary, decontamination.

C2.2.2 ALARA Considerations and Exposure Limits

ALARA is an approach to radiological control to manage and control exposures (individual and collective) to the work force and to the general public at levels As Low As Reasonably

Achievable, taking into account social, technical, economic, practical and public policy considerations. ALARA is not a dose limit but a process that has the objective of attaining doses as far below the applicable controlling limits as is reasonably achievable.

The Subcontractor shall perform necessary actions to maintain occupational exposures below site administrative limits (internal and external exposures) and shall practice ALARA at all times.

The Subcontractor shall take measures to maintain radiation exposures in controlled areas As Low As Reasonably Achievable through facility and equipment design and administrative control. The primary method used shall be physical design features (e.g., confinement, ventilation, remote handling, and shielding). Administrative controls and procedural requirements shall be employed only as supplemental methods to control radiation exposure.

For specific activities where use of physical design features are demonstrated to be impractical, administrative controls and procedural requirements shall be used to maintain exposures ALARA.

ALARA practices shall be documented in the Subcontractor's safe work plans.

C2.3 Personnel Entry and Exit Protocol Through Radiologically Controlled Areas

C2.3.1 Access to the Controlled Area

The workers must obtain their thermoluminescent dosimeter (TLD) PRIOR to reaching the Controlled Area. TLDs must be worn while the worker is in the Controlled Area and must be stored on the storage rack assigned to them when not in this area. TLDs shall be worn on the outside of the worker's clothing (non-PPE), facing forward, between their waist and shoulders.

Badging-in at the Access Control Point:

- At the control point (accessway from the uncontrolled area to the controlled area), workers will bar code into the computer verifying their training and bioassay requirements are current. If the access control computer system is inoperable, training will be verified by visual inspection of the worker's qualification card; and

- If a worker's training or bioassay is insufficient or out of date, access to the controlled area will be denied.

C2.3.2 Access to Change Trailer

Personnel and material monitoring is required prior to entry into the project breakroom or locker room if coming from a Radiologically Controlled Area.

C2.3.3 Access to the Contamination Area

The following are standard requirements for access to the Contamination Area:

- Workers will sign the appropriate RWP for entry into the work area, collect prescribed respiratory protection, enter their badge number and respirator serial number into the

project control point computer logging system, show evidence of being respirator fit to the control point RCT, go to the dressing area, and don the prescribed protective clothing;

- If a worker's training or bioassay is insufficient or out of date, their access to the Contamination Area will be denied;

- When wearing protective clothing such that no skin is exposed (e.g., full anti-contamination clothing and a respirator), the worker's TLD must be worn underneath the protective clothing. When protective clothing requirements are such that skin is exposed (e.g., no respirator), the TLD must be worn on the outside of the anti-contamination clothing;

- Prior to entering the work area, workers must contact an RCT for assignment to a personal air sampler and testing of the airflow of powered air purifying respirators (if worn). The following conditions apply to wearers of personal air samplers:

  1. In areas where uranium is the isotope of concern, a minimum of 25% of workers in each work group/crew (minimum of one worker) shall wear a belt mounted personal air sampler. All other workers in the work crew must be signed-in on the paperwork under which their crew-partner received their personal air sampler. Workers in the work crew shall work in the general proximity of the other workers such that the assigned personal air sampler is representative of the air being breathed by all parties in the work crew;

  2. When changing work areas, the worker must sign-in on the appropriate RWP and verify their level of PPE is in compliance with the RWP. If the worker must change protective clothing prior to moving to a new job area, the worker must exit the Contamination Area and go through the appropriate steps for re-entry, wearing the correct protective clothing. The worker will be reassigned to a different personal air sampler; and

  3. In areas where thorium is the isotope of concern, 100% of the workers will be required to wear personal air samplers.

- Where thorium is the radionuclide of concern, the Subcontractor shall anticipate that anti-C clothing and personal protective equipment requirements will include powered air-purifying respirators, and double anti-Cs (with the outer layer being consumable and the inner layer being launderable or consumable unless otherwise prescribed by the applicable radiological work permit); and

- Personnel entry into the Contamination Area must be through the established control point.

C2.3.4 Exiting the Contamination Area

Workers must always leave the work area and doff anti-contamination clothing at the appropriate control point whenever their protective clothing is compromised or when, non-water resistant anti-Cs get wet or workers sweat through their protective clothing. FDF will periodically monitor contamination levels on outside of PPE. If contamination, as detected by

an RCT, on the outside of a worker's work gloves is found to be greater than 1,000 counts per minute, the worker must change their work gloves. If this level of contamination is found on the outside of a single-layer of anti-contamination clothing, workers must return to the control point to change their protective clothing.
The Subcontractor should estimate that a minimum of four workers per day will be sent through this routine. If 10% of the Subcontractor work force is greater than four workers, estimate that 10% of the workers will be sent through this routine daily.

The Subcontractor should recognize and allow for additional time for monitoring when exiting thorium contamination areas due to the lower contamination limits. Workers in thorium Contamination Areas or High Contamination Areas and Asbestos Areas that are in Contamination Areas will always be in a double layer of anti-C clothing. Prior to leaving any of these areas, workers will doff their outer set of anti-C's at the work area boundary and proceed directly to the appropriate change out facility. Doffing of the inner layer of anti-C's and personnel monitoring will be performed at the change facility.
Personal items may be surveyed out by the workers themselves (except from areas controlled to thorium limits), using friskers provided at the control point.

Tools, lapel samplers, and equipment (and, in the case of thorium Contamination Areas: personal items) may only be surveyed out of a Contamination Area by an RCT. Workers requiring items of this nature to be removed from the Contamination Area must give the RCT notice of such a need at least one full work shift in advance.

Whole body personnel monitoring is required prior to exit from contamination areas.

Workers will sign out on the RWP upon exiting.

C2.3.5 Exiting Controlled Areas

After exiting the Contamination Area, to gain access to the clean area of the site (i.e., to exit the Controlled Area), workers must monitor through a personnel contamination monitor (PCM). All material exiting the Controlled Area must be surveyed.

After successfully monitoring through the PCM, the workers shall then place their TLD in the appropriate slot of the TLD storage rack (slots are labeled with badge numbers).

C2.4 Radiological Limits and Respiratory Requirements

C2.4.1 Personnel Monitoring Limits

When personnel are surveyed upon leaving a Contamination or Controlled Area (including monitoring into the locker room or break area from the Controlled Area), the following limits shall be applied:

- for leaving a thorium-232 Contamination Area: 1,000 dpm/100cm^2 alpha; and
- for leaving a uranium Contamination Area or a Controlled Area: 5,000 dpm/100cm^2 beta/gamma.

If a personnel monitoring instrument alarms then the worker must notify FDF. FDF will investigate to determine if there is long-lived contamination (e.g., thorium or uranium) on the

worker's clothes or skin. If this is confirmed, FDF will begin the documentation of the incident and decontamination of the worker.

C2.4.2 Airborne Radioactivity Limits

Airborne Radioactivity Areas will be posted around locations that exceed (or have the potential to exceed) a weekly average of 10% of the Derived Air Concentration (DAC) limits for the applicable isotopes. Engineering and/or administrative controls shall be implemented for these areas to control the impact on personnel and other project areas. The DAC levels that apply to this project include the following:

- DAC for Th-232: 5.0E-13 uCi/ml;
- DAC for Uranium: 2.0E-11 uCi/ml;
- DAC for Rn-222 (radon): 0.333 WL (working levels) - one working level equals any combination of short lived radon daughters, in one liter of air without regard to the degree of equilibrium, that will result in the ultimate emission of 1.3E+05 MeV of alpha energy); and
- DAC for Rn-220 (thoron): 1.0 WL.

Within the work area, airborne radioactivity shall be controlled to less than 10% of the specific DAC for the isotope-of-concern taking into account the protection factor (PF) of the respirator worn by workers in the area, plus ALARA. The (PF's) that apply to this project include the following:

- PF = 1000 for powered air-purifying respirator;
- PF = 50 for full-face air-purifying respirator; and
- PF = 1 for no respirator or half-mask respirators.

NOTE: If the Subcontractor desires the use of other types of respirators on the job beyond those listed, the Subcontractor shall contact FDF to determine the respiratory protection factor of that respirator.

If general area airborne radioactivity exceeds 10% of the appropriate DAC (given the appropriate respiratory protection factor), then immediate radiological controls must be implemented at the source of generation to reduce airborne concentration. Upon written notification by FDF, the Subcontractor has one week to provide FDF with a written explanation of causes and corrective actions to prevent the recurrence of the situation.

In all cases, the Subcontractor shall control airborne emissions at the project boundaries such that 2% of the DAC for the appropriate radiological isotope-of-concern is not exceeded (based on a weekly average).

C2.4.3 Contamination Limits

Equipment Release Cleaning Requirements

Requirements, including contamination limits for release of Subcontractor provided tools, equipment or material from containment or the building enclosure and the Contamination Area or for unrestricted release from the Controlled Area, are provided in Specification Section 01519.

Facility Release Cleaning Requirements

Prior to removing the exterior siding of a structure and prior to structural dismantlement where the exterior siding is not removed, all non-porous surfaces (such as steel decking or columns) within the structure shall be below 5,000 dpm/100cm^2 beta-gamma removable radiological contamination and all above-grade porous surfaces (such as concrete decking or wood) shall be below 1,000 dpm/100 cm^2 beta-gamma removable, 5,000 dpm/100cm^2 average beta-gamma fixed plus removable, and 15,000 dpm/100cm^2 maximum beta-gamma fixed radiological contamination. The average beta-gamma fixed plus removable radiological contamination limit is the average of the radiological contamination levels that exist within an individual 20 ft. x 20 ft. area (generally defined by plant column locations) and the maximum beta-gamma fixed radiological contamination limit is the highest permissible contamination levels within the 20 ft. x 20 ft. area.

These limits shall be achieved by following the requirements of Specification Section 01517. A combination of decontamination and application of fixative may be used.

The fixed plus removable limit for porous surfaces is not applicable where the Subcontractor's safe work plans implement requirements ensuring contamination and airborne radioactivity are adequately contained during facility takedown. An acceptable option is encapsulation of the slab and wrapping the slab with geotextile fabric that is wetted down with amended water prior to felling activities.

C2.4.4 Radiation Limits, Dose Limits, and Dosimetry Investigations

Radiation Areas will be established for any area accessible to individuals in which radiation level could result in an individual receiving a deep dose equivalent in excess of 5.0 mrem in one hour at 30 cm from the source or from any surface that the radiation penetrates.

High radiation areas will be established for any area accessible to individuals in which radiation level could result in an individual receiving a deep dose equivalent in excess of 100 mrem in one hour at 30 cm from the source or from any surface that the radiation penetrates.

FDF Radiological Dosimetry performs investigations of unplanned external exposure results when the following levels are exceeded:

- 100 mrem to the whole body; and
- 1,000 mrem to the skin or extremities.

NOTE: If any of these levels are exceeded, the Subcontractor shall be required to participate in an investigation into the cause of the exposure.

FDF Dosimetry performs internal dosimetry investigations with possible follow-up bioassay sampling when one of three conditions listed below occur:

1. Air sampling indicates that a worker(s) may have been exposed to levels above the action level for a particular radionuclide.

NOTE: Action levels are determined by internal dosimetry on a nuclide specific basis. Action levels are typically based on a worker's potential to receive two mrem Committed Effective Dose Equivalent (CEDE) in a one week

period.

2. An incident or routine bioassay sample (urine and/or fecal) result is above the decision level for a particular radionuclide.

3. A routine or incident In Vivo measurement (i.e., lung) is above the decision level for a particular radionuclide.

When an internal dosimetry investigation is required, actions taken by internal dosimetry are as follows:

- A preliminary internal dose estimate is performed based on air sampling and/or bioassay results;

- An interview is performed with the worker and/or their supervisor to determine radiological working conditions and potential time of intake;

- If preliminary dose estimates are greater than or equal to 100 mrem CEDE, a radiological work restriction is issued and a field investigation is initiated;

NOTE: A radiological work restriction may be issued by Dosimetry with approval of the Radiological Control Manager when preliminary dose estimates are less than 100 mrem to limit any further exposure that may prevent obtaining valid follow-up bioassay sampling and interfere with the dose evaluation.

- Obtain follow-up bioassay sampling (In Vitro and/or In Vivo) to confirm initial results; and

NOTE: The type and extent of follow-up bioassay sampling required is determined by internal dosimetry given the type of exposure, the radionuclide, the length of time since the exposure, and the preliminary dose estimate. For incident investigations, involving potential exposure to uranium, a minimum of two samples is required.

- Finalize internal dose estimates and notify worker or supervisor after follow-up sampling is completed.

Workers shall be restricted from working in radiologically controlled areas if total (external plus internal) exposures, in any one calendar year, exceed 1,000 mrem Total Effective Dose Equivalent (TEDE). The following conditions also apply:

- The worker restriction shall last until the end of the calendar year in which the exposure was received; and

- An investigation shall be initiated by FDF when a worker reaches 80% of this limit. The investigation will determine whether the worker requires limitations on work in a radiological area to ensure that the annual limit (1,000 mrem TEDE) is not exceeded.

C2.5 Minimum Radiological Requirements for Personnel Access and Work Within a Controlled Area or other Radiological Area

Subcontractor personnel requiring access to the Controlled Areas or other radiological areas are to be trained radiological workers meeting requirements of 10 CFR 835 and DOE Radiological Control Manual (approved FDF training programs are available). Workers are to participate in FDF DOELAP accredited personnel dosimetry and bioassay program, and respiratory protection and medical requirements associated with the programs.

Project Personnel Radiological Monitoring and Surveillance Requirements

All project personnel who perform work in a Controlled Area must participate in the following personnel monitoring and surveillance programs:

- TLD: The Subcontractor must provide FDF with the number of personnel in need of TLDs at least five working days prior to the need for TLDs; and
- Baseline, annual, incident and termination urinalysis

All project personnel who perform work in a Radiological Area must participate in the following FDF personnel monitoring and surveillance programs:

- TLD;
- Baseline, every 60 days, incident and termination urinalysis; and
- Baseline, annual, incident and termination In-Vivo examination.

Specific bioassay requirements for work in thorium areas include baseline (as applicable) and incident fecal sampling. Baseline fecal samples are required for any worker who has a history of exposure to thorium.

C2.6 Radiological Work Permits (RWPs)

Prior to commencing with any field activities, the Subcontractor shall obtain the appropriate work permits to begin the work. Every activity performed by the Subcontractor must be covered by a work permit.

Work permits are initiated by FDF based upon discussion with the Subcontractor regarding upcoming work. FDF fills out a FEMP work permit with the appropriate information such as job location and detailed job description. The description must be specific enough to allow the job to be evaluated by health and safety personnel so that they can assign proper controls for the job. From this work permit, all necessary safety permits may be generated.

RWPs will be generated by FDF. Work may not begin until the appropriate RWP is in place. The RWP informs workers of area radiological conditions, work controls, and entry/exit requirements. RWPs are required for activities at FEMP that include, but are not limited to:

- Entry into any radiological area as defined in 10 CFR 835;
- Breaching of any process line, tank, vessel, or enclosure containing radioactive material

that may become loose or airborne during the work;

- Any work within the controlled area on contaminated or potentially contaminated equipment where safety precautions are not adequately discussed in technical work documents approved by FDF Radiological Control;

- Decontamination of highly contaminated equipment;

- Digging or disturbing soil in a Soil Contamination Area; and

- Breaking the barrier of a Fixed Contamination Area.

All workers must be briefed by an RCT on the contents of each RWP under which that worker will perform work and the conditions of the work area. Workers must sign the acknowledgment sheet one time (per revision to the RWP) to indicate an understanding of the requirements of that RWP.

Workers will sign the daily sign in sheet on the RWP applicable to the work they are going to perform prior to entering the work areas, and will sign out upon exiting these areas. With reference to the daily sign-in sheet, a worker may only be signed-in on one RWP at a time.

C2.7 Personal Protective Equipment (PPE) and Anti-Contamination Clothing (anti-C) Requirements

PPE and anti-C requirements anticipated for general work activities are outlined in the PSHSRM. Final requirements for a particular task will be specified in work permits or Safe Work Plans based on the existing radiological conditions and scope of work.

A typical single set of full anti-Cs consists of coveralls, gloves, booties, rubber overshoes, a hood or skullcap, and taped interfaces. Any work which requires close proximity to overhead structures or has the potential to create falling debris will require a hood in place of a skullcap. A typical double set of anti-Cs includes an additional set of coveralls and booties.

The Subcontractor shall maintain a set of hard hats designated for use in Contamination Areas only. Additional requirements for hard hat usage include the following:

- When an anti-C hood is required, hard hats will be worn over the hood;

- Storage of hard hats in posted Contamination Areas is allowed for hard hats worn over anti-C hoods. The hard hats shall be periodically monitored by an RCT; and

- If a hard hat storage area has not been established within the Contamination Area, hard hats shall be doffed (at the control point step-off pad) by individuals exiting these areas. The individual shall turn the hard hat over to an RCT for survey and release.

Specifications for FDF-approved consumable anti-contamination clothing are included in Part 7.

All cloth and consumable anti-Cs are removed after one use (i.e., whenever a worker exits a Contamination Area). Consumable anti-C's are disposed; launderable anti-C's are segregated for return to the laundry.

C2.7. Anti-Contamination Clothing

The five types of anti-C garments that could be specified for likely work conditions at the FEMP are listed below:

1. Lightweight, disposable: barrier to particulates (radiological and other), asbestos, and lead. This is a breathable type garment which aids in the evaporation of perspiration. Lightweight disposables shall not be worn as an outer layer for protection from liquids or chemical hazards, or when wet conditions can be expected.

   Lightweight disposables shall never be worn as a single layer of anti-Cs. In cases where these anti-Cs are needed, such as asbestos or thorium work, a double layer of anti-Cs is required.

2. Waterproof, disposable: used as a barrier for casual or indiscriminate contact with water or liquids (i.e., mist from spray, wet surfaces, dew, etc.). The waterproof coverall has design specifications for breathability which allows minimization of heat stress concerns when waterproof protection is required. This waterproof coverall shall not be used when repeated or prolonged contact with water is expected.

   During summer heat season, typically May through September, waterproof anti-Cs may be required as the outermost layer of protection when the nature of the work and area conditions exhibit the potential for perspiration and subsequent degradation of particulate barrier types. If a chemical hazard is present, then the outer layer will be specified by FDF Industrial Hygiene.

3. Chemical protective, disposable or reusable: used as barrier to liquids, particulates, and specified chemicals. This type of anti-C shall be used for:

   - extremely wet conditions when repeated or prolonged contact with liquids can be expected; disposable "rain suits" and Saranex aprons are other types of waterproof disposables that will be required for specific situations requiring proximity protection;
   - protection from specified chemicals or radiological/chemical hazards such as uranyl nitrate, thorium nitrate, or other corrosive or acidic materials; and
   - contact with contaminated grease, oil or other similar types of surface contamination.

   When double anti-Cs are required and water-proof (or Saranex type) anti-Cs are necessary for a particular job, any type of anti-C garment can be worn as the inner layer of protection.

   NOTE: Radio belts or other objects worn on the outside of Saranex coated Tyvek chemical protective coveralls can degrade or "strip" the Saranex coating from the Tyvek base reducing the protective properties of the garment. Care shall be taken to avoid these situations by placing radio belts (or other) as to avoid direct friction with the Saranex coating. If the object can be worn on the inside of the garment, this would be preferred. If it cannot, a method to consider is the placement of a barrier (duct tape or other appropriate material) between the object and the outer surface of the Saranex garment.

NOTE: Rubber shoe covers worn directly over Saranex booties has had the same effect. RWPs and Safe Work Plans must account for this whenever Saranex coveralls are required and contact with liquids in the foot area is possible.

4. Fire retardant, launderable or disposable: used as protection when performing "hot work". The launderable types are normally constructed of Nomex (or other materials approved by FDF Fire Protection Engineering). Any individual performing welding or burning activities ("hot work") in Contamination, High Contamination, or Airborne Radioactivity Areas is required to wear flame retardant disposables or the orange flame retardant launderable coveralls. This color designation has been approved for flame retardant anti-C garments only. Green is the color designation for welder coveralls when anti-contamination clothing is not required. Select disposables for "hot work" will be approved on a case-by-case basis by FDF. Inner waterproof or chemical protective may be required on a case-by-case basis when other workplace hazards are present.

   When double sets of anti-C clothing are required, welder coveralls will serve as the outer layer of protection.

   When launderable fire retardant anti-Cs are worn in areas that are controlled for isotopes other than uranium (i.e., thorium, radium, or other), an RCT will survey the garments for release from those areas prior to sending to laundry. Decontamination using tape press may be necessary where feasible.

5. Other launderable types: used as a barrier to particulate forms of radiological contamination. Constructed with cotton, cotton/polyester blends, or nylon fabrics. Depending on the garment type, it may be a durable rubberized material. Cotton, cotton/polyester-blend, or nylon fabric types shall not be used as an outer or single layer of protection from liquids or chemical hazards, or when wet conditions can be expected. Cotton, cotton/polyester-blend, or nylon fabric types shall not be worn as a single layer of protection for heavy work activities which require repeated, prolonged, or continuous contact with contaminated surfaces.

   With the exception of rubber shoe covers and launderable welder coveralls, launderable anti-Cs shall not be worn as outer layer of protection in Contamination, High Contamination, or Airborne Radioactivity Areas that are controlled for isotopes other than uranium (i.e., thorium, radium, or other).

C2.7.2 Gloves

The specified glove types for radiological work are nitrile or neoprene. Outer cotton or leather work gloves are required for hands on work where physical hand protection from sharp or rough work surfaces or abrasion resistance is needed. Cotton liners may be worn with these glove types for comfort purposes, but are not considered as a layer of radiological protection. Other types of gloves may be specified by Industrial Hygiene for physical hand protection and for protection from specified chemicals. All gloves used in Contamination Areas must be disposed of in appropriate waste containers and shall not be permitted to leave areas posted for contamination.

C2.7.3 Rubber Overshoes

FDF provided launderable rubber shoe covers will be required over anti-C booties. In uranium areas, used shoecovers will be segregated for return to laundry. For thorium areas, RCTs will survey the used shoecovers for release from the Contamination Area prior to sending to laundry.

For muddy Contamination Area work or work in Contamination Areas where liquids have accumulated, the Subcontractor must provide knee high overboots, waders, or PVC rubberized booties extending above the ankles in lieu of the rubber shoecovers. Storage of these items in the Contamination Area at the control point for subsequent reuse is encouraged. For reuse, the protective clothing must be worn on the outside of typical anti-Cs and the Subcontractor shall maintain the inside surfaces of these items below the removable contamination area limits.

C2.7.4 Respirator Requirements

In general, full face air purifying respirators (FFAPR) will be required for airborne generating activities in conjunction with engineering controls to maintain exposures to ALARA. FFAPRs may be used up to a concentration of five DAC for the specific nuclide of concern. Powered Air Purifying Respirators (PAPRs) may be used to a concentration of 100 DAC. Above 100 DAC, work will be stopped until adequate controls are implemented to reduce the airborne concentration.

PAPRs, as a minimum, are required for all airborne generating activities in thorium areas.

For the purposes of radiological control, all respirators are required to have HEPA-filter cartridges.

C2.7.5 Donning and Doffing of Protective Clothing

The following requirements apply to donning and doffing of protective clothing:

- Each individual required to wear anti-C garments shall don and doff these garments as taught in Radiological Worker Training;
- Cleaned PPE and laundered protective clothing shall be inspected by the worker prior to use. Clothing shall be free of tears, holes, separated seams, missing buttons or zipper damage, or repaired in a manner that provides the original level of protection;
- Anti-C clothing shall not be worn in Controlled Areas unless worker is donning anti-Cs for entry through a control point into Contamination or Airborne Radioactivity Areas; and
- While in a Contamination Area, workers will not expose any area of their bodies or clothing, protected by anti-C clothing, except for the act of doffing anti-Cs at the control point with the intention of leaving the Contamination Area, or where authorized in a heat stress control room.

C2.7.6 Special Considerations

The following special considerations apply to use protective clothing:

- A face shield and waterproof hood is required when a reasonable potential exists for liquids to splash in the facial and head area. If a full-face respirator is being worn, the face shield is not required;

- To minimize heat stress potential, anti-Cs may be placed directly over modesty clothing or undergarments;

- Areas located below unprotected or open overhead work must be posted with barrier rope or tape and appropriate restrictions must be placed on personnel access. A hard hat and the same level of anti-C protection (as workers above) is required;

- Cold weather gear (coats, jackets, etc.) must be worn under anti-C clothing, unless the gear is an approved anti-C garment;

- Personal head gear (i.e., scarfs, kerchiefs, baseball caps, etc.) must be maintained so that no part of the head gear comes in contact with the exterior surfaces of anti-C clothing. When a hood or skullcap is required, the affected piece of personal head gear must be completely covered; and

- Long hair which extends below the collar of anti-C clothing shall be maintained or covered by anti-C protection.

C2.8 Break Rooms, Cool Down Rooms, and Heat Stress Control Rooms

C2.8.1 Break rooms

The following requirements apply to the establishment and use of break rooms:

- The establishment of break rooms in radiologically controlled areas must be approved by FDF;

- In approved break rooms, workers may drink any supplied beverages (in general: soda, water, coffee, and drink mixes). No eating, smoking or chewing is allowed in the break rooms. If a smoking area is provided at the jobsite, it will be immediately adjacent to an approved break room, but will be out of doors. The only access to the smoking area will be through the break room. A smoking area near the break room associated with this project is NOT guaranteed under the terms of this contract; and

- No anti-C clothing is allowed in break rooms with the exception of bagged and laundered anti-Cs that are being returned to the trailers after laundering, which must be moved immediately to the changing areas/locker rooms for storage. The respirator cabinet may be in the break room for accessibility.

C2.8.2 Cool Down Rooms

Cool down rooms may be established by the Subcontractor in Contamination Areas to allow workers to briefly rest in an air-conditioned or cooler environment. In cool down rooms,

workers may not remove respirators, receive physiological monitoring, or obtain a drink of water. Worker entry to a cool down room does NOT require any radiological monitoring prior to entry. Cool down rooms must be maintained at removable contamination levels less than 10,000 dpm/100cm^2. Workers may not spend more than 15 minutes in a cool down room in any one hour. If a worker needs to break for more than 15 minutes, that worker must exit the radiological area.

C2.8.3 Heat Stress Control Rooms

- The Subcontractor may establish a heat stress control room in the Contamination Area with FDF approval. These areas are distinguishable from cool down rooms in that workers may remove respirators, receive physiological monitoring (pulse rate and temperature), and drink water. Physiological monitoring can be performed to determine longer on-the-job stay-times for workers based on personal temperature and pulse rather than the ambient-temperature-and-humidity method;

- Worker entry into a heat stress control room requires a survey of outer anti-Cs by an RCT prior to entry of the room. Detectable contamination (above background) on the anti-Cs will prohibit the worker from entering that room. Workers in double anti-Cs may doff their outer set in order to enter the room. Workers in single anti-Cs with detectable contamination on their anti-Cs are forbidden entry into the heat stress control room;

- Heat stress control rooms must be physically isolated (impermeable barrier) from the rest of the plant in which it resides. If the heat stress control room is immediately adjacent to an Airborne Radioactivity Area, the room must contain a double-chamber airlock. The chamber adjacent to the Airborne Radioactivity Area shall be under positive pressure (Specification Section 15067, "Ventilation and Containment"). Entry into the room shall only be through the airlock, but an emergency exit must exist. The room must be maintained at removable contamination levels less than 1,000 dpm/100 cm^2. When removable contamination in excess of this limit is discovered, the room will be shutdown until it has been decontaminated;

- Workers must exit the radiological area for rest periods greater than 15 minutes;

- FDF shall perform air sampling in heat stress control rooms. Airborne radioactivity greater than 2% of the uranium 238 DAC will restrict the removal of respirators until it can be verified that the Subcontractor has lowered the airborne radioactivity to less than 2% of the relevant DAC; and

- Heat stress control rooms may not be established in thorium areas and are forbidden for use by asbestos workers.

C2.9 Remote Control Point

All control points (i.e., access/egress points at radiological area boundaries) that are within the work area, beyond the control point trailers, shall be enclosed (building, shed, containment, etc.) to cover those materials and equipment that are necessary for monitoring of personnel, personal items, or equipment, collection of any PPE that may be doffed at this point, etc. These types of control points and step-off pads are required at boundaries of varying radiological conditions (e.g., High Contamination Area vs. Contamination Area or thorium

Contamination Area vs. uranium Contamination Area).

C2.10 Power Requirements

Radiological air samplers (provided and operated by FDF) will require power to be supplied by the Subcontractor (estimate 20 locations with a gooseneck air sampler each requiring 120 volts/4 amps and a hi-volume air sampler at every location of work on this project, also requiring 120 volts/4 amps each). The Subcontractor should expect to need extension cords to support this activity. Power to operate the air samplers will be drawn from the temporary power supply designed by the Subcontractor for use on this project.

Power must be supplied by the Subcontractor to operate the overhead door used by the Subcontractor for the equipment access and vestibules. All overhead doors must be closed when not in use and, unless permission is given by FDF, may not be opened unless enclosed (on the inside of the respective buildings) by a vestibule.

C2.11 Debris Containerization

Waste containers shall be staged in the Contamination Area when loading material from within the Contamination Area. Waste containers must be closed when not in use and always at the end of any shift. Workers working above open waste containers will be in respirators (generally Full Face Air Purifying respirators). Personnel working outdoors without respiratory protection, but in the Contamination Area, must maintain a 25 foot distance from waste being transferred to the waste containers.

The openings of internally contaminated equipment shall be sealed prior to movement.

Thorium-contaminated, interior material/debris must be containerized within containment.

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