1204-1004260003

ACTION MEMORANDUM

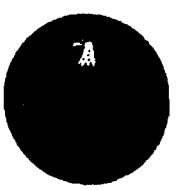
ENGINEERING EVALUATION/COST ANALYSIS

T BUILDING REMOVAL ACTION

MIAMISBURG CLOSURE PROJECT
MIAMISBURG, OHIO

JUNE 2003

FINAL



Department of Energy

CH2MHILL

The Mound Core Team
P.O. Box 66
Miamisburg, Ohio 45343-0066

June 2003

Mr. Daniel Bird, AICP
Planning Manager
Miamisburg Mound Community Improvement Corporation
720 Mound Road
COS Bldg. 4221
Miamisburg, Ohio 45342-6714

Dear Mr. Bird:

The Core Team, consisting of the U.S. Department of Energy Miamisburg Closure Project (DOE-MCP), U.S. Environmental Protection Agency (USEPA), and the Ohio Environmental Protection Agency (OEPA), appreciates your comments on the T Building Action Memorandum and Building Data Package. Attached is our response.

Should the responses to comments require additional detail, please contact Paul Lucas at (937) 847-8350, x314 and we will gladly arrange a meeting or telephone conference.

Sincerely,

DOE/MCP: Paul Lucas — 6/18/03
Paul Lucas, Remedial Project Manager — date

USEPA: David P Seely — 6/24/03
David P. Seely, Remedial Project Manager — date

OEPA: Brian K. Nickel — 6/18/03
Brian K. Nickel, Project Manager — date

Response to Public Comments

from MMCIC
on Building T Data Package and T Building Removal Action
February 2003

Comment 1. From our review of the Building T Data Package and T Building Action Memorandum, MMCIC is in agreement with the decision to remediate the building prior to transfer to MMCIC. The schedule of September 2005 for completion of the remediation is acceptable under the MMCIC site reuse schedule.

Response 1.
Thanks for your interest and support.

Comment 2. The Building T Data Package outlines twenty-seven PRS's associated with T Building. These consist mostly of sumps located inside the Building. Will these twenty-seven PRS's be binned, sampled and remediated if necessary as part of the Building T remediation, or will each PRS associated with Building T be addressed in separate PRS Data Packages? The report also states that an additional forty-seven PRS's are located in proximity to T Building; however, the associated table lists only sixteen PRS's. Why is there a discrepancy between the number stated and those lists (page 9 of 12 and 10 of 12 in the Building Data Package)? While some of the PRS's found in the vicinity have been determined to be No Further Action, quite a few remain as Remedial Action. Will any of these PRS's be remediated as part of the T Building Cleanup, or will they be addressed under separate and specific PRS Data Packages?

Response 2.
Table 3 of the T Building Data Package and Table 1 of the T Building Action Memo list the twenty-seven PRSs associated with T Building. These PRSs will be addressed as part of the T Building remediation. The T Building On-Scene Coordinator Report will document the completion of these PRSs (attainment of NFA status). The text in Section 4.2.3 of the Building Data Package indicates that there are 43 PRSs in proximity to T Building. These 43 PRSs include the 27 associated with (within) T Building and the 16 in proximity to T Building. Of the sixteen PRSs in proximity to T Building, seven are NFA and nine are removal actions (RA). Seven of the RA PRSs will be addressed as part of the Underground Lines removal action. Two of the RA PRSs (144 & 146) are in R Building and are part of the R/SW Removal Action.

Comment 3. Due to the size of the T Building and the extent of Potential contamination, and because MMCIC will be receiving the building through the transfer process, MMCIC would like to complete a more thorough review of all sampling activities and results throughout the course of the cleanup. Preliminary sampling activities have occurred to date in order to determine the extent and type of contamination. This data would have been needed to more clearly define the cleanup parameters. MMCIC would like to request a copy of any sampling data to date, along with a map of sample locations. As the remediation progresses, additional sampling data, with associated sampling locations, would be appreciated. The verification sampling will also be of significant interest to MMCIC. By reviewing the sampling data throughout the course of the project, MMCIC will be able to establish a confidence and familiarity before the project is complete.

Response 3.
We welcome opportunities to work with MMCIC. Due to the volumes of historical and current routine and in-process sampling results that are available, this may not be an efficient use of resources or time. The project integration meetings on Thursday with DOE/MCP and CH2M Hill appear to be the appropriate venue to pursue this request for information.

Comment 4. With an effort toward efficiency, MMCIC would like to request an integration of activities between the remediation project and the scheduling of site improvements. This will require good coordination between the site contractor and MMCIC.

Response 4.
We welcome opportunities to improve efficiency. The project integration meetings on Thursday with DOE/MCP and CH2M Hill appear to be the appropriate venue to pursue this opportunity.

Errata

1. There is a typographic error on Page 3 of 12 of the Building Data Package. The last sentence of section 2.1 should include the word "at" after the comma instead of the word "a".

Additional Changes to BDP

1. Changed from Public Review Draft to Final

2. Replaced named contractor with "site contractor"
   Page 1 section 1.2; page 9 section 4.2.3; page 12 section 4.2.4.5

3. Inserted words "cobalt and polonium" under section 2.4.

4. Changed roof depth from 3 feet to 15 feet, page 3 section 2.0

5. Deleted duplicate of first 12 pages.

Additional Changes to AM

1. Changed Table 3 headings to match table headings in Mound 2000 Workplan.

2. Inserted words "Table 6" and "Table 7".

3. Inserted room 3 and 204 for storage page B-1. Room 3 was inadvertently left off from the original planned storage area. Several factors have influenced the need for

increased flexibility in the storage of CERCLA hazardous/mixed waste within T Building. First, a significant amount of lead waste was discovered within the building. During the development of the action memorandum, it was estimated that 2,000 pounds of lead would need to be stored. To date, over 36,000 pounds of lead have been discovered in wall sheeting and shapes. This material has been consolidated into steel boxes at approximately 5000 lbs. Per box. Consolidation of these boxes to the identified areas has been complicated by the safe operational load limits (4500 lbs.) of the elevators. Movement can only be accomplished by hoisting the boxes through a hatch to the other floor.

4. Inserted floor plan for second floor (T204) to show the additional CERCLA hazardous/mixed waste storage area.

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ACRONYMS

AM	Action Memorandum
ARARs	Applicable or Relevant and Appropriate Requirements
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Contaminant of Concern
CSAP	Confirmation Sampling and Analysis Plan
D&D	decontamination and decommissioning
DOE	Department of Energy
DOT	Department of Transportation
EE/CA	Engineering Evaluation/Cost Analysis
ER	Environmental Restoration
FA	Further Assessment
FFA	Federal Facilities Agreement
HASP/JSHA	Health and Safety Plan/Job Specific Hazard Analysis
HEPA	High Efficiency Particulate Air
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MCP	Miamisburg Closure Project
MMCIC	Miamisburg Mound Community Improvement Corporation
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
NFA	No Further Assessment
OAC	Ohio Administrative Code
OEPA	Ohio Environmental Protection Agency
OSC	On-Scene Coordinator
OSHA	Occupational Safety and Health Administration
PRS	Potential Release Site
RA	Removal Action
ROD	Record of Decision
RCRA	Resource Conservation and Recovery Act
RSE	Removal Site Evaluation
SARA	Superfund Amendments and Reauthorization Act
TERF	Tritium Emissions Recovery Facility
TRU	Transuranic

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ACRONYMS

USEPA	United States Environmental Protection Agency
VSAP	Verification Sampling and Analysis Plan

1.0 PURPOSE

The U.S. Department of Energy (DOE) and the U.S. Environmental Protection Agency (USEPA) have agreed on an approach for decommissioning surplus DOE facilities consistent with the ***Policy on Decommissioning of Department of Energy Facilities under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)*** dated May 22, 1995.

U.S. DOE is the designated lead agency under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and removal actions at the Miamisburg Closure Project (MCP) are implemented as non-Superfund, federal-lead actions. DOE provides the On-Scene Coordinator (OSC). Non-Superfund, federal-lead removal actions are not subject to United States Environmental Protection Agency (USEPA) limitations on the OSC ($50,000 authority) and are not subject to National Oil and Hazardous Substances Pollution Contingency Plan (NCP) limitations on removal actions (i.e., $2,000,000 in cost and 12 months in duration).

This Action Memorandum (AM) Engineering Evaluation/Cost Analysis (EE/CA) has been generated to document the general site conditions that would justify application of a Removal Action (RA) consistent with CERCLA, to propose the RA described herein, and to allow public input.

2.0 SITE CONDITIONS AND BACKGROUND

2.1 Site Description

This section describes the physical site location, site characteristics, release of contaminants into the environment, and the site's National Priorities List (NPL) status.

2.1.1 Physical Location

The MCP Site is located on the southern border of the city of Miamisburg in Montgomery County, Ohio, approximately 10 miles south-southwest of Dayton and 45 miles north of Cincinnati.

The location of T (Technical) Building is shown in Figure 1. A photograph of the T Building East Tunnel Entrance is shown in Figure 2. The building is located on the south side of the Main Hill area of the plant and was constructed directly into the hillside. Buildings E and M (both demolished) once bordered T Building. Currently T Building is bordered by R Building to the north, Building 48 to the west, and COS Building to the south. COS Building was constructed against the exterior wall of the T East Tunnel. This RA is proposed for the removal of contamination related to T Building such that the building can be transferred to the Miamisburg Mound Community Improvement Corporation (MMCIC). This RA includes addressing the Potential Release Sites (PRSs) identified in Table 1.

2.1.2 Site Characteristics

Construction of T Building, a heavily reinforced, underground structure, began in February 1947. Construction was completed in December 1948. The building has two floors that are compartmentalized into three general areas by two 30-inch thick firewalls. The reinforced concrete exterior structure has a 15-foot thick roof, 16.5-foot thick walls on an 8-foot slab further supported by a 2-foot thick slab (Reference 6).

The roof was designed to resist damage from a 2,000 pound semi-armor piercing jet-assisted aerial bomb. The floor structure was built to withstand an explosion of a bomb at some point below the floor should it reach that point by a curved path through the soil surrounding the building. The entrances and air intake shafts, as designed and constructed, had sufficient angle turns and blast pockets to absorb the force of a concussion from a bombing through the doors in the entrance. The air filters within the building would likely not be damaged from such an explosion. The tunnel doors are "steel blast doors". "Steel blast doors" were also installed at the tower entrances. All blast doors were designed to withstand a blast pressure wave of five pounds per square inch.

Associated building structures include two exhaust airshafts each with two hundred-foot tall brick and mortar exhaust stacks. The building has three towers, along the north wall, one at each end and one at the center. The end towers contain stairways, passenger elevators, air shafts for intake ventilation air and pedestrian entrances at grade level. The middle tower was used for providing intake ventilation air. There are two head houses near the ends of the building that contain airshafts that are part of the exhaust air ventilation system. A vehicular tunnel extends the length of the south side of the building.

Access to the building is through elevator towers at the east and west ends of the building or by a service tunnel. There are two entries into the tunnel from the outside. A utility tunnel extends from HH Building to T Building. The central steam system is utilized for heat. A chilled water station and an electrical substation, within the structure, service the building.

T Building was host to a multitude of research, development and production programs with various radioisotopes. The two major radionuclide programs were the polonium and tritium programs. T Building was designed as a facility to purify polonium-210 for use in initiators in early nuclear weapons. From 1949 to 1973 polonium-210 programs included a processing and separation program, a fuels research and development program, neutron source program, and a variety of other research, development, and production programs with polonium. Extraction of bismuth was part of the processing and separation program. Gamma and beta emitting radioisotopes such as Cobalt-60 and Strontium-90 were impurities in the bismuth extraction process.

Decontamination work was done from 1971 to 1973 on the polonium processing area. Areas were decontaminated to < 2000 cpm (Reference 5). The facility was later used for beryllium projects. Other operations included a nickel carbonyl vapor deposition plating process and neutron activation analysis. T Building was renovated and most recently used for tritium recovery and purification operations, calorimetry production, heat source calibration, x-ray and gamma scanning, and liquid scintillation counting. Trace quantities

of americium are associated with the count lab. Certain areas of the building have been and are still used for the storage of Transuranic (TRU) materials. The T Building footprint is 173,000 square feet. Usable floor area, including the tunnel, is 150,000 square feet

As part of the ongoing decontamination and decommissioning (D&D) process at the MCP Site, limited volumes of CERCLA hazardous/mixed waste will be stored in T Building in accordance with ARARs presented in Appendix B. Waste Management will package and ship the CERCLA hazardous/mixed waste from T Building to an appropriate disposal site.

Associated PRSs

Twenty-seven Potential Release Sites (PRSs) are associated with T Building as listed in Table 1 and include a solidification unit, a waste compactor, and twenty-five sumps/tanks. All of these PRSs will be sufficiently decontaminated or removed to a No Further Assessment (NFA) status prior to building transfer.

Table 1 - PRSs Associated with T Building

PRS	Description
213	Solidification unit
214	Solid radioactive waste compactor
215	Cooling water sump (Tank 124) Room T-1
216	Sanitary waste sump (Tank 125) Corridor 2
217	Sanitary waste sump (Tank 126) Corridor 2
218	Sanitary waste sump (Tank 127) Corridor 2
219	Cooling water sump (Tank 128) Stair 3
220	Steam condensate sump (Tank 129) T-78
221	Sanitary waste sump (Tank 130)
222	Sanitary waste sump (Tank 131)
223	Cooling system condensate sump (Tank 132)
224	Sanitary waste sump (Tank 133)
225	Beta waste water sump (Tank 227) T-23
226	Floor drain sump (Tank 228) T-3
227	Alpha waste water sump (Tank 229)
228	Alpha waste water sump (Tank 230)
229	Alpha waste water sump (Tank 231)
230	Alpha waste water sump (Tank 232)

PRS	Description
231	Alpha waste water sump (Tank 233)
232	Alpha waste water sump (Tank 234)
233	Alpha waste water sump (Tank 235)
339	Waste water sump (Tank 250)
340	Waste water sump (Tank 251)
341	Condensate sump (Tank 269) T-90
342	Hot side fire water tank (Tank 271) T-1
343	Fire water sump (Tank 272)
344	Fire water sump (Tank 273)

2.1.3 Release or Threatened Release into the Environment

The potential release of radionuclides and/or hazardous chemicals prompted this RA.

2.1.4 National Priorities List Status

The USEPA placed the Mound Plant (currently MCP) on the National Priorities List (NPL) by publication in the Federal Register on November 21, 1989.

2.2 Other Actions to Date

The Mound Plant initiated a CERCLA program in 1989, now guided by the agreement among the DOE, Ohio Environmental Protection Agency (OEPA), and USEPA. A Federal Facilities Agreement (FFA) under CERCLA Section 120 was executed between DOE and USEPA Region V on October 12, 1990, Reference 2. It was revised on July 15, 1993 (EPA Administrative Docket No. OH 890-008984, Reference 3) to include OEPA as a signatory. The general purposes of the FFA are to:

- ensure that the environmental impacts associated with past and present activities at the site are thoroughly investigated and appropriate remedial actions taken as necessary to protect the public health, welfare, and the environment;

- establish a procedural framework and schedule for developing, implementing, maintaining, and monitoring appropriate response actions at the site in accordance with CERCLA, Superfund Amendments and Reauthorization Act (SARA), the NCP, Superfund guidance and policy, and Resource Conservation and Recovery Act (RCRA) guidance and policy; and

- facilitate cooperation, exchange of information, and participation of the parties in such actions.

2.2.1 Previous Removal Actions

No previous CERCLA Removal Actions were conducted in T Building. Removal of contamination and administrative closure of the PRSs listed in Table 1 is included in this removal action.

2.2.2 Current Actions

T Building is a multi-story poured concrete building constructed in 1947-48. The building contains laboratories for radioactive and non-radioactive work, offices, and service rooms. Radioactive elements associated with T Building operations include uranium, polonium, cobalt, plutonium, americium, radium, radon, bismuth, cesium, strontium, and tritium.

The Tritium Emissions Recovery Facility (TERF) processes tritiated gases to recover waste tritium for appropriate disposal. TERF will continue to operate until approximately August

2003. Current actions pertinent to T Building include pre-characterization, work planning for D&D activities, safe shutdown, and confirmation/verification of sufficient contamination removal. Work planning consists of preliminary work that is required to execute building disposition activities in accordance with Environmental Safety & Health requirements, DOE orders, and best management practices. Safe shutdown includes building surveillance (weekly and monthly contamination surveys) and the accumulation, decontamination, characterization, and disposition of equipment and waste. CERCLA hazardous/mixed waste in T Building is characterized, managed, stored, treated and disposed of in accordance with the ARARs identified in Appendix B.

Safe Shutdown

Two safe shutdown activities are planned for T Building. The first activity is the safe shutdown of radiologically contaminated areas, including disposition of equipment and waste. Included in the safe shutdown process are rooms where polonium work was conducted and discontinued, and laboratories and areas that include HEPA filters, sumps, and crawlspaces above and below the floors.

The second safe shutdown activity involves the safe shutdown of non-contaminated areas such as offices, restrooms, and storage areas within the building. There are some laboratories included where non-radioactive development work was performed, as well as laboratories that have been previously decommissioned.

2.3 State and Local Authorities' Roles

2.3.1 State and Local Action to Date

In 1990, as a result of the Mound Plant placement onto the NPL, DOE and USEPA entered into an FFA that specified the manner in which the Mound Plant CERCLA-based Environmental Restoration (ER) was to be implemented. In 1993, the FFA was amended to include the OEPA as a signatory. DOE remains the lead agency.

2.3.2 Potential for Continued State and Local Response

Eventual release of the MCP Site for industrial/commercial use is planned. Periodic environmental monitoring of the area may be required.

3.0 THREAT TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT

3.1 Threats to Public Health or Welfare

The potential release of radionuclides and/or hazardous chemicals may create a potential threat to the public health or welfare.

3.2 Threats to the Environment

The potential release of radionuclides and/or hazardous chemicals may create a potential threat to the environment.

3.3 Removal Site Evaluation

The Removal Site Evaluation (RSE) requirements, as outlined under USEPA's NCP regulations in the Code of Federal Regulations (CFR) 40 CFR 300.415, are presented throughout this AM/EE/CA. The source and nature of the potential release are listed in Table 1. These PRSs have not been binned (Response Action, Further Assessment, or No Further Assessment) because they are associated with the building. All of these PRSs will be decontaminated or removed to allow a finding of NFA prior to building transfer. The AM herein and the OSC Report will be the avenue to close out these PRSs.

The NCP identifies eight factors that must be considered in determining the appropriateness of a Removal Action [40 CFR 300.415(b)(2)]. These criteria are evaluated in Table 2.

4.0 ENDANGERMENT DETERMINATION

As the location is currently configured and access controlled, actual or threatened releases of pollutants and contaminants from this building do not pose an endangerment to public health or welfare or to the environment. However, to eliminate the possibility of endangerment, as the site transfers from DOE ownership and control, DOE has determined that removal of the contaminants is appropriate.

5.0 PROPOSED ACTION AND ESTIMATED COSTS

5.1 Proposed Action

The proposed action is the D&D of T Building prior to transfer. Since the proposed action is within the site boundaries, it is not expected to have a disproportionate impact on low income or minority populations.

5.1.1 Proposed Action Description

The proposed action is expected to result in multiple fieldwork efforts. Components of the proposed action include the following:

- Project Planning

Planning and execution of the proposed action are divided into four phases. The first phase is safe shutdown, characterization, and reduction in contamination or removal of significantly contaminated rooms and facilities (including tritium-processing areas on both first and second floors) if release criteria cannot be met.

Table 2 – Evaluation of Removal Action Appropriateness Criteria

Criteria	Evaluation
"...potential exposure to nearby human populations, animals, or the food chain..."	There is potential exposure to human populations from radionuclides and chemicals when present institutional controls are relaxed and building is transferred to MMCIC.
"Actual or potential contamination of drinking water supplies..."	There is a small potential for contamination of onsite drinking water supplies from the radionuclides. The contaminants could migrate to the groundwater that is the source for the plant drinking water.
"Hazardous substances or pollutants or contaminants in drums, barrels, tanks, or other bulk storage containers, that may pose a threat of release;"	Limited quantities of CERCLA hazardous/mixed wastes will be stored until shipped to an appropriate receiver site. There is a potential for release of hazardous substances in drums, boxes, or other storage containers.
"High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface, that may migrate;"	Only soil associated with required structure (i.e. sumps, drains) removal or decontamination will be addressed. This action does not address soil surrounding or underneath the building.
"Weather conditions that may cause hazardous substances to migrate or be released;"	This site is exposed to weather conditions. Rain might cause the associated hazardous substances to migrate through soil migration or surface runoff.
"Threat of fire or explosion;"	Not applicable.
"The availability of other appropriate federal or state response mechanisms to respond to the release;" and	There are no other state or federal mechanisms required to respond. The FFA established a combined state and federal mechanism to respond under CERCLA. DOE is the designated lead agency at the MCP under CERCLA.
"Other situations or factors that may pose threats to public health or welfare or the environment."	Not applicable.

The **second** phase is safe shutdown and removal activities of minimally contaminated rooms and facilities, includes building service areas and rooms on the first floor with little or no contamination. The **third** phase is safe shutdown and removal activities of the Radioactive Material Management Areas and Radiological Material Areas (predominately on the second floor) and includes rooms where contamination is minimal. The **last** phase includes general building support, final decontamination, hazard mitigation, and characterization and confirmation/ verification activities.

The environmental envelope is defined as the building, the ability to maintain a negative pressure to the outside, and the environmental monitoring of discharged air to the outside environment. Due to the complexity of the work, multiple work plans will be generated. Because the environmental envelope is still intact during this RA, work plan documents will be reviewed by DOE and made available to the USEPA and OEPA upon request. DOE reviews project specific safety documentation such as the Health and Safety Plan/Job Specific Hazard Analysis (HASP/JSHA).

- Public Participation

A notice of the availability of this Action Memorandum for a 30-day public comment period will be published in a local newspaper.

- General Approach

The general approach to the cleanup of radiological contamination in areas involves:

1. Decontaminate or remove walls and floors until contamination meets surface criteria in Table 3 and there is no evidence of migration into the concrete (e.g., presence of sumps, drains, or spills).

2. If migration appears possible, some coring may be necessary to determine the extent of migration. If required, all drains, drain lines, and sumps will be removed along with affected soil as necessary within the building footprint. Walls may need to be scabbled to remove contamination to meet the Table 3 limits.

- Decontamination

Decontamination is the removal of residual radioactive and hazardous materials by mechanical, chemical, and/or other techniques to achieve a stated objective or end condition. Activities being conducted prior to release of the building to MMCIC include removing excess equipment, removing tritium contaminated equipment (including bubblers, effluent recovery system, tritium transfer lines, gloveboxes, and fumehood), removing ductwork, removing contaminated piping, decontaminate/ remove walls and possibly overhead utilities, decontaminate rooms and any associated building structures. All contaminated sumps, trenches, and pipes will be removed or decontaminated to levels listed in Table 3 and dispositioned as appropriate.

Decontamination of T Building addresses the PRSs listed in Table 1. The T Building structure itself, along with important components such as stacks, sumps, drains, and trenches, and crawlspaces will be characterized. T Building personnel will characterize, manage, store, treat, and dispose of CERCLA hazardous/mixed waste in accordance with the ARARs identified in Appendix B. CERCLA Hazardous/Mixed waste accumulation areas are proposed in Rooms 2, 2A, and 2B, located along the north wall of the first floor.

- Remove Associated Foundations and Soil

Removal of foundations and soil is not expected and not addressed in this action memo. However, soil areas in proximity to the building drains and sumps may be characterized and remediated as needed. Environmental Restoration (ER) will manage removal of soil surrounding the building, if required.

- Verification/Confirmation

This step includes sampling and analysis of areas identified in the Verification or Confirmation Sampling and Analysis Plan (VSAP or CSAP) to determine the residual contaminant concentrations, if any, and verifying that the residual contamination concentration is within acceptable limits. This document will further define the confirmation/verification sampling and analysis process and will include contaminants of concern (COCs) and cleanup objectives. Sampling for verification of contaminant removal will follow a Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)-like approach. Both OEPA and EPA will approve this document. Table 3 provides the radiological contamination cleanup objectives for T Building as defined in the Work Plan for Environmental Restoration (Reference 4).

Table 3 - Contamination Clean-Up Objectives
(dpm/100cm^2)[1]

Radionuclides[2]	Average[3,4]	Maximum[5,6]	Removable[6]
Th-natural; Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	200	3,000	1,000
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129	20	300	100
U-Natural, U235, U238 and associated decay products, alpha emitters	1,000	15,000	5,000
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous[7] fission) except SR-90 and others listed above. Includes mixed fission products containing Sr-90.	1,000	15,000	5,000
Tritium organic compounds, surfaces contaminated by HT, HTO, tritiated particulates, and organically bound tritium.	10,000		N/A

Footnotes continued on next page

1. As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by counts per minute measured by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.
2. Where surface contamination by both alpha- and beta-gamma-emitting radionuclides exist, the limits established for alpha- and beta-gamma-emitting radionuclides should apply independently.
3. Measurements of average contamination should not be averaged over an area of more than 1 m^2. For objects of less surface area, the area should be derived for each such object.
4. Dose Rate: The average and maximum dose rates associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/h and 1.0 mrad/h respectively at 1 cm.
5. The maximum contamination level applies to an area of not more than 100 cm^2.
6. The amount of removable material per 100 cm^2 of surface area should be determined by wiping the area of that size with dry filter or soft absorbent paper, applying moderate pressure, and measuring the amount of radioactive material on the wiping with the appropriate instrument of known efficiency. When removable contamination on objects of surface area less than 100 cm^2 is determined, the activity per unit area should be based on the actual area and the entire surface should be wiped. It is not necessary to use wiping techniques to measure removable contamination levels if direct scan surveys indicate that the total residual surface contamination levels are within the limits for removable contamination.
7. This category of radionuclides includes mixed fission products, including the Sr-90 which is present in them. It does not apply to Sr-90 which has been separated from the other fission products or mixtures where the Sr-90 has been enriched.

- Facility Release

Contaminated equipment, materials, and waste containers will be removed from the building. Building surfaces and associated structures will meet release criteria prior to release to MMCIC.

- Documentation of Completion

Completion of the removal action will be documented by the OSC Report(s).

5.1.1.1 Rationale, Technical Feasibility, and Effectiveness

The RA chosen is necessary for the removal of known contamination and to ensure that migration of the contamination does not occur.

Verification/confirmation sampling will be employed to confirm the effectiveness of the RA. Sampling results will be documented in the OSC Report(s).

5.1.1.2 Monitoring

Health and safety monitoring will be performed throughout the RA according to standard MCP and Radiological Control procedures.

5.1.1.3 Uncertainties

The major uncertainties are the concentration levels of the contaminants and the extent of contamination (lateral and depth). The minor uncertainties include location of utilities that may exist within structures or possible excavation areas.

5.1.1.4 Institutional Controls

DOE will remain in control of the location addressed by this RA until transfer of ownership of the parcel(s) it is in. If necessary, enforceable deed restrictions will be in place at the time of transfer in order to ensure future protection of human health and the environment.

5.1.1.5 Post-Removal Site Control

Initially, post-removal site control will be provided by DOE/ MCP. The property is to be transferred to MMCIC. The institutional and site controls needed at the time of the property transfer in order to ensure future protection of human health and the environment will be included in the Record of Decision (ROD).

5.1.1.6 Cross-Media Relationships and Potential Adverse Impacts

The potential cross-media impact associated with the RA is the potential for unintended release of contaminated materials into the atmosphere or surface/groundwater. Careful monitoring and control will be implemented during the RA.

No potential adverse impacts of the RA have been identified.

5.1.2 Contribution to Future Remedial Actions

To facilitate Further Assessments and Removal Actions in or near the site of this RA, the exact dimensions of any excavation areas and the levels of contamination identified and removed will be documented. The OSC Report(s) will document the RA with photographs, drawings, and other information collected during the fieldwork.

The information obtained as a result of this RA will be used in determining the availability of the site for final disposition and will be subject to review in the subsequent residual risk evaluation.

5.1.3 Description of Alternative Technologies

Alternative technologies frequently evaluated for CERCLA remediation include institutional controls, containment, collection, treatment, and disposal. Based on the prevailing conditions, the following alternatives (in addition to the proposed alternative of dismantlement) were developed.

1. No Action
2. Institutional Controls

The performance capabilities of each alternative with respect to the specific criteria are discussed below:

5.1.3.1 No Action

The "No Action" option was eliminated from further consideration. The Core Team determined that a RA is warranted for T Building.

5.1.3.2 Institutional Controls

Existing Plant institutional controls effectively minimize the potential for contact of the subject contamination with the general public. However, after ownership is transferred, these same institutional controls will be difficult to monitor and enforce. Thus, institutional controls were eliminated from further consideration. A RA is warranted.

5.1.4 EE/CA

This document serves as the Action Memorandum and EE/CA.

5.1.5 Applicable or Relevant and Appropriate Requirements (ARARs)

MCP ARARs for the ER Program have been identified (Reference 1). CERCLA regulations require that RAs comply with ARARs.

Mound personnel will comply with the ARARs identified in Appendix B.

5.1.6 Other Standards and Requirements

Other standards or requirements related to the actual implementation of the RA may be identified subsequently during the design phase and will be incorporated into the Work Plan(s) for this RA. MCP personnel will comply with the following requirements, as is applicable:

Transportation

- 49 CFR 172, 173: Department of Transportation (DOT) hazardous material transportation and employee training requirements.

Worker Safety Standards

- 29 CFR Part 1926: Occupational Safety and Health Act (OSHA) - Safety and Health Standards
- 29 CFR Part 1904: OSHA - Record keeping, Reporting, and Related Regulations
- To Be Considered
- EPA/230/02-89/042: Methods for Evaluating the Attainment of Cleanup Standards.
- DOE Order 5400.5: Radiation Protection of the Public and the Environment

5.1.7 Project Schedule

The schedule established for planning and implementing the RA is illustrated in Table 4. The actual number, duration, and timing of these campaigns may differ from Table 4.

Table 4 – Schedule Summary

Activity	Start Date	Completion Date
Safe shutdown and removal of significantly contaminated rooms and facilities.	Oct 1, 2001	May 2004
Safe shutdown and removal of minimally contaminated rooms and facilities	Oct 1, 2001	Sept. 2003
Safe shutdown and removal of Radioactive Material Management Areas and Radioactive Material Areas.	Oct 17, 2001	Mar, 2004
General building support, final decontamination, hazard mitigation, characterization and verification activities.	Oct 2, 2000	Sept. 2005

5.2 Estimated Costs

The cost estimate to perform the RA is shown in Table 5. Costs include the construction activities, all engineering, and construction management.

Table 5 – Removal Action Cost Estimate

Activity	Cost
Safe shutdown and removal of significantly contaminated rooms and facilities.	$16,369,338
Safe shutdown and removal of minimally contaminated rooms and facilities.	$1,179,288
Safe shutdown and removal of Radioactive Material Management Areas and Radioactive Material Areas.	$2,050,559
General building support, final decontamination, hazard mitigation, characterization and verification activities.	$17,492,310
TOTAL	$37,091,495

The cost consists of historical cost (December 1998 – May 2002) plus the estimate for the remaining work.

6.0 EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

There is the potential for the contaminants to migrate if action is delayed or not taken.

7.0 OUTSTANDING POLICY ISSUES

There are currently no outstanding policy issues affecting performance of this RA.

8.0 ENFORCEMENT

The Core Team consisting of DOE, USEPA, and OEPA has agreed on the need to perform the removal. The work described in this document does not create a waiver of any rights under the FFA, nor is it intended to create a waiver of any rights under the FFA. The DOE is the sole party responsible for implementing this cleanup. Therefore, DOE is undertaking the role of lead agency, per CERCLA and the NCP, for the performance of this RA. The funding for this RA will be through DOE budget authorization and no Superfund monies will be required.

9.0 RECOMMENDATION

This decision document represents the selected Removal Action for the decontamination and decommissioning of T Building, developed in accordance with CERCLA as amended by SARA, and not inconsistent with the NCP. This decision is based on the administrative record for the site.

Conditions at the site meet the NCP Section 300.415 (b)(2) criteria for a removal and we recommend initiation of the response action.

Approved:

DOE/MCP: _____ 2/27/03
Robert S. Rothman, Remedial Project Manager Date

USEPA: _____ 2/19/03
Timothy J. Fischer, Remedial Project Manager Date

OEPA: _____ 2/27/03
Brian K. Nickel, Project Manager Date

10.0 REFERENCES

Reference 1 List of Ohio Administrative Code and Ohio Revised Code ARARs, Letter from Nickel to Kleinrath, August 19, 1998.

Reference 2 Federal Facilities Agreement under CERCLA Section 120, USEPA, October 12, 1990.

Reference 3 Federal Facilities Agreement under CERCLA Section 120, USEPA, July 15, 1993.

Reference 4 Work Plan for Environmental Restoration of the DOE Mound Site, the Mound 2000 Approach, February 1999.

Reference 5 MLM-2239, A Report on the Decontamination and Decommissioning of the Technical (T) Building at Mound Laboratory, May 21, 1976.

Reference 6 White Paper, T Building Structural History and Process History Summary Background Document, November 2002.

APPENDIX A

FIGURES AND PHOTOGRAPHS

Figure 1 - Location of T Building

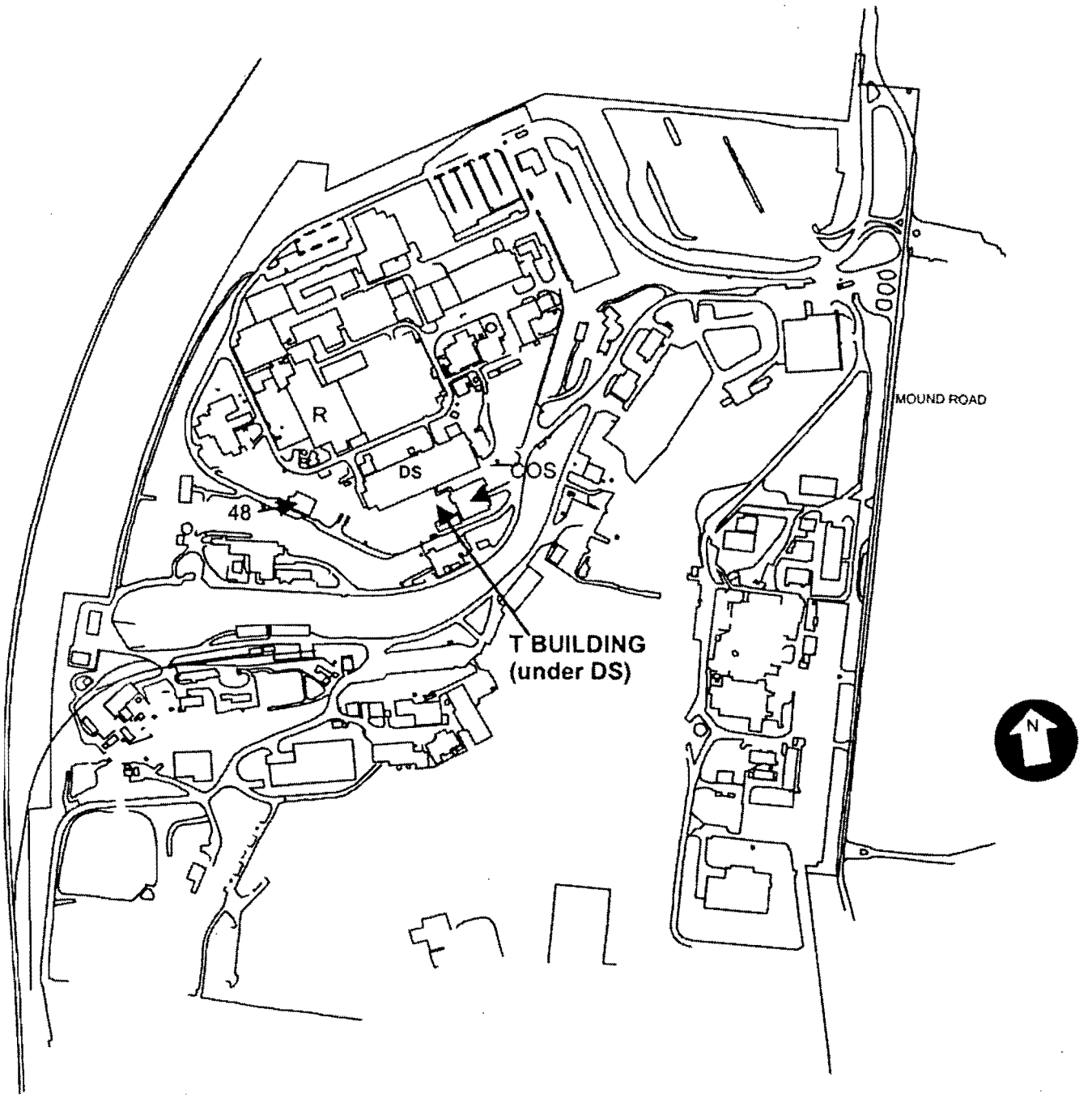


Figure 2 - Photograph of T Building East Tunnel Entrance

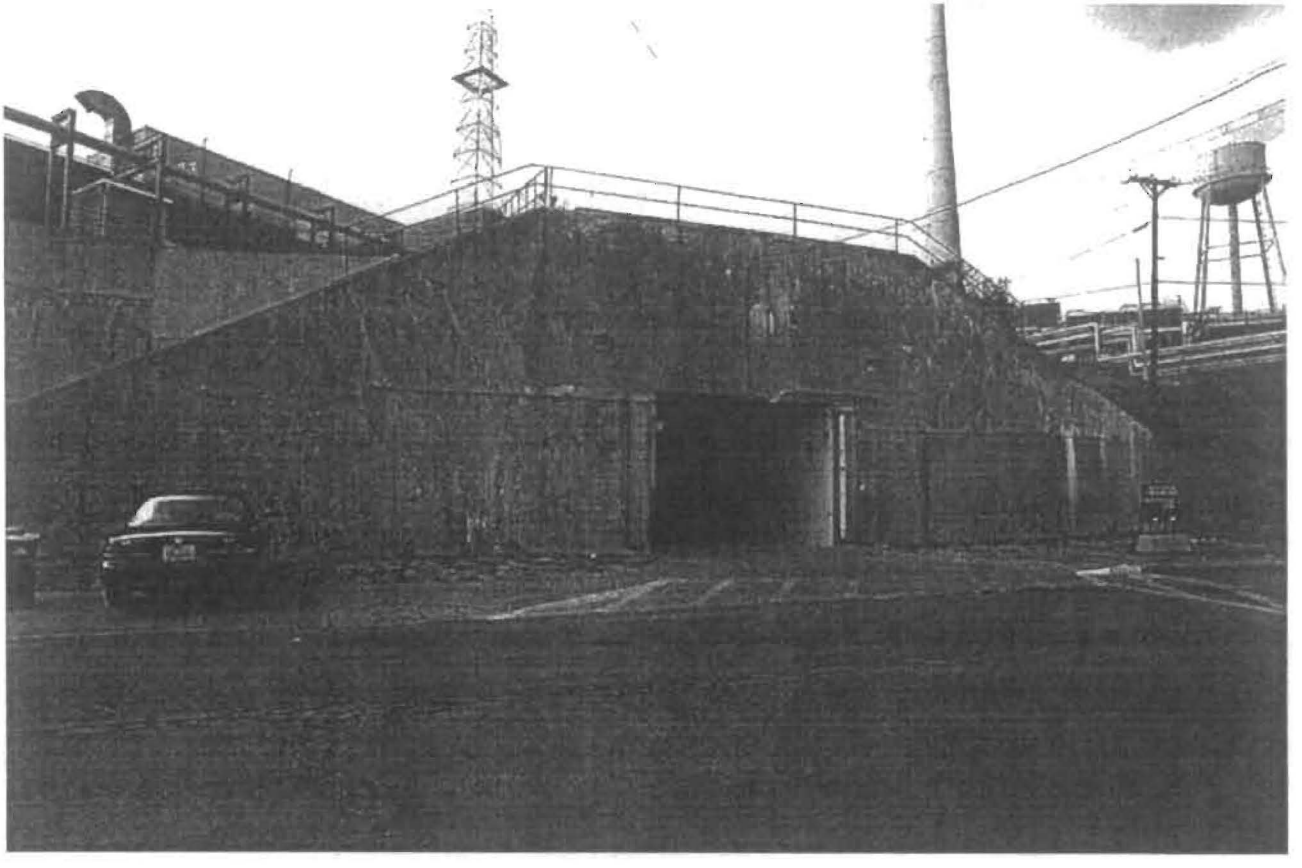
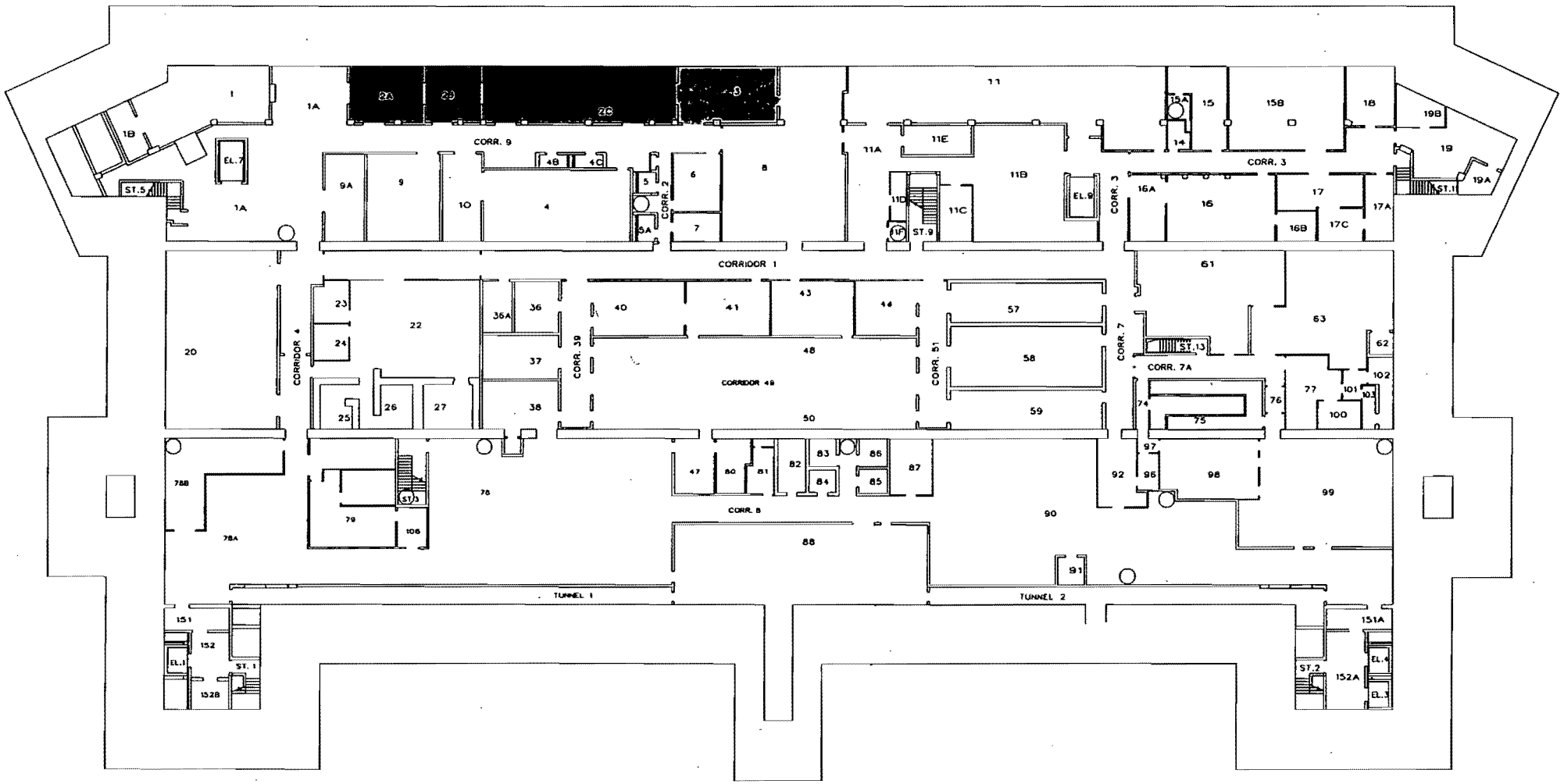


Figure 3 - Location of CERCLA Hazardous/Mixed Waste Accumulation Areas



T BLDG
FIRST FLOOR
CLASS: OUO

LEGEND:

LOCATION OF HAZARDOUS / MIXED WASTE ACCUMULATION AREAS

Figure 3

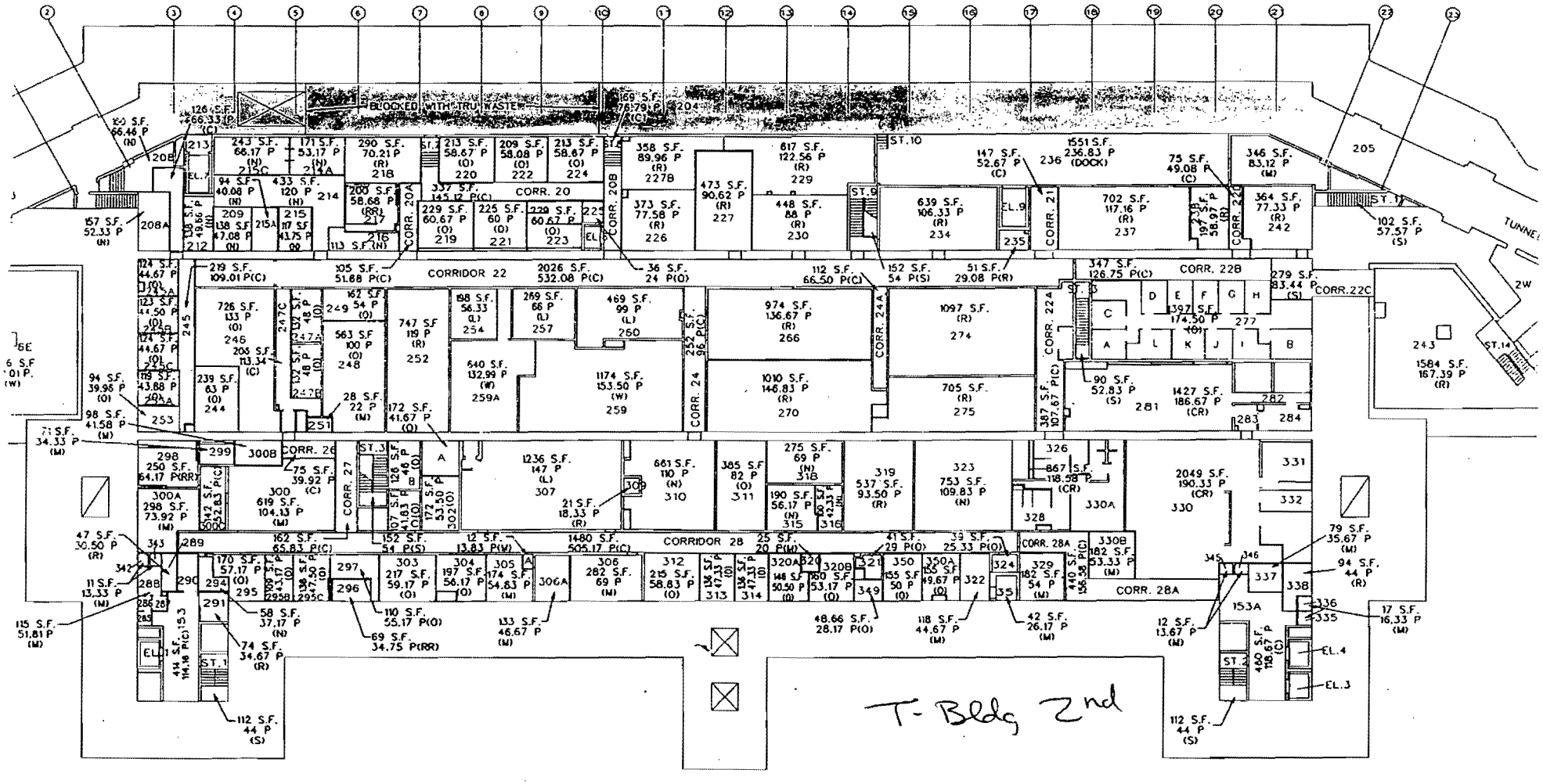

BLOCKED WITH TRU WASTE
CORRIDOR 22
CORR. 20
CORR. 24
CORR. 24A
CORR. 22B
CORR. 22C
CORR. 26
CORR. 27
CORRIDOR 28
CORR. 28A
T-Bldg 2nd

Figure 4 - Location of CERCLA Hazardous/Mixed Waste Accumulation Area

APPENDIX B

ARAR TABLES

T Building ARARs evaluation

CERCLA is the regulatory authority that governs the cleanup of the Mound facility. The CERCLA umbrella uses other environmental regulations to ensure that the cleanup of Mound is accomplished in a manner that is protective of human health and the environment. The regulations that are applied to the management of hazardous/mixed waste generated at a CERCLA remediation site are RCRA. The following ARAR (Applicable, or Relevant, and Appropriate Requirements) table includes the regulatory analysis of how RCRA will be applied to the management of hazardous waste during the maintenance and decommissioning of T Building.

Decommissioning of a nuclear facility takes time and planning to accomplish, and during that time the facility must be maintained in a safe condition. CERCLA hazardous/mixed wastes that may be generated during the T building maintenance period are anticipated to be lead acid batteries from back-up electrical systems, and waste oil from vacuum pumps. CERCLA hazardous/mixed waste that could be generated from decommissioning include oil in pumps and reservoirs, mercury, lead bricks and lead shielding, circuit boards, and miscellaneous small volume lab chemicals. CERCLA hazardous/mixed waste that could be generated from current operations in the tritium emissions recovery facility includes waste oil from vacuum pumps.

CERCLA hazardous/mixed waste with the, exception of tritiated oil, generated from maintenance, current processes and decommissioning activities will be managed in accordance with the ARAR table until sufficient amounts are accumulated for transfer to an on-site hazardous waste facility or transfer to an offsite regulated treatment/disposal facility. Tritiated oils will be treated on site in accordance with treatment ARARs prior to shipment to an offsite disposal facility. Monthly inspections will be conducted and documented to ensure containers are safely stored. Visual inspections will be conducted and documented to ensure containers are in good condition each time waste is added or removed from the area.

Small quantities of CERCLA hazardous/mixed waste are currently staged in various locations throughout buildings R, SW, T, and 58 and will be relocated to central areas (rooms T-2a, 2b, 2c, 3 and 204) prior to disposal offsite. Waste will be characterized using Material Safety Data Sheets, process knowledge, or analytical data to ensure it is in the proper container, and that appropriate segregation occurs where required for safe storage. Potential for exposure to workers or the public is extremely low, since waste staging areas are unoccupied and secured from unauthorized entry.

T building was selected as a storage area for CERCLA hazardous/mixed waste due to the fact it is one of the buildings that is not to be demolished and it is already contaminated with radioactive materials and will need decontamination

prior to transitioning to MMCIC. Building 72 was not selected as a storage area for CERCLA hazardous/mixed waste because it has not previously contained radioactive material and is scheduled to be demolished. Rooms T2a, 2b, and 2c were selected because they have sufficient capacity to store 5500 gallons of waste which would contain the maximum expected to be generated as identified in the ARAR table. Secondary containment containers will be used when storing liquid waste. These containers will be designed to contain leaks, spills, and any accumulated precipitation. Secondary containment containers will be selected based on their containment capacity and the volume of capacity that is needed to contain ten per cent of the volume of containers or the volume of the largest container holding liquids.

Each activity identified in the schedule summary is associated with the RCRA related elements in Appendix B. Consolidated storage of CERCLA hazardous/mixed waste will commence upon approval of this Action Memorandum, continue through each phase of the project, and cease upon final building decontamination. Contaminants of concern and clean-up objectives will be identified in the Verification Sampling and Analysis Plan. Current schedules have all work associated with T building decommissioning completed by September 2005.

Appendix B – Table 6 - ARAR Application Table T Building CERCLA Hazardous/Mixed Waste

Solids Including: ▪ Lead bricks and shapes (approx. 40,000lbs.) ▪ Lead pipe joints (approx. 300) ▪ Lead-acid batteries (approx. 3-4 dozen) ▪ Mercury-contaminated equipment (approx. 55 gal.) ▪ Additional solid waste materials not previously identified		**Liquids** Including: ▪ Vacuum pump oil, vane pump oil, and other oils to be solidified (approx. 3,500 liters) ▪ Elemental mercury (approx. 10 liters) ▪ Miscellaneous lab chemicals ▪ Additional liquid waste materials not previously identified	
Proposed actions involving waste	**Specific actions**	**ARARs**	**Implementation of ARARs**
1. Following generation, CERCLA hazardous/mixed wastes will be stored in drums, on pallets, or in other appropriate containers pending characterization and disposition.	1. Storage of hazardous/mixed waste solids will comply with the following RCRA requirements:	1. CERCLA Hazardous/Mixed waste storage ARARs:	1. Monthly Inspections will be documented in a log maintained by waste management personnel or building manager
	a. Condition of containers	a. 40 CFR 265.171; Ohio Administrative Code (OAC) 3745-55-71	a. Inspection element - containers are in good condition, no evidence of leaks or spillage.
	b. Compatibility of waste with container	b. 40 CFR 265.172; OAC 3745-55-72	b. Inspection element - appropriate container used for storage.

Proposed actions involving waste	Specific actions	ARARs	Implementation of ARARs
	c. Management of containers	c. 40 CFR 265.173; OAC 3745-55-73	c. Inspection element - containers closed except when adding or removing waste.
	d. Inspections	d. 40 CFR 264.15(a) and (c); OAC 3745-54-15 (A) and (C)	d. Document inspections monthly; visual inspections done periodically by personnel in the area.
	e. Requirements for incompatible wastes	e. 40 CFR 265.177; OAC 3745-55-77; 40 CFR 264.13, OAC 3745-54-13	e. Inspection element – incompatible wastes will have adequate segregation if present in the same storage area. Information from MSDS, process knowledge or analytical data will be used to determine compatibility.
	f. Marking requirements	f. 40 CFR 262.34 (c)(1)(ii); OAC 3745-52-34 (C)(1)(b)	f. Inspection element - containers marked with words to indicate contents, or as "hazardous waste."

Proposed actions involving waste	Specific actions	ARARs	Implementation of ARARs
	g. Required equipment	g. 40 CFR 265.32 (a), (b), (c), (d); OAC 3745-54-32 (A), (B), (C), (D)	g. Inspection element - verify that appropriate equipment is available on plant site or in building.
	h. Communication or alarm system	h. 40 CFR 265.34 (a), (b); OAC 3745-54-34 (A), (B)	h. Inspection element - verify that communication devices in the building are operable or that other means of communication are available.
	i. Aisle Space	i. 40 CFR 265.35; OAC 3745-54-35	i. Inspection element – maintain aisle space to allow the unobstructed movement of personnel and equipment.
	j. Training	j. 40 CFR 265.16 (a), (b), (c); OAC 3745-54-16 (A), (B), (C)	j. Personnel will be trained to perform inspections.

Proposed actions involving waste	Specific actions	ARARs	Implementation of ARARs
	k. Treatment	k. Treatment specific ARARs will be determined and submitted	k. See Treatment ARAR
	l. Closure	l. 40 CFR 264.178, OAC 3745-55-78	l. Contaminants of concern and their clean-up objectives will be identified in the Verification Sampling and Analysis Plan.
2. CERCLA hazardous/mixed waste will be characterized to determine RCRA and radiological status.	2. Wastes must be characterized following generation.	2. Characterization ARARs:	
	a. RCRA and Radiological characterization – by sampling or process knowledge.	a. 40 CFR 262.11, OAC 3745-52-11	a. If sampling is done, a copy of the analytical results will be kept in the project file.

TRITIATED OIL (APPROX. 3,000 LITERS)

- End date June 2005
- Location to be treated T5West
- Treatment standard solidification
- Final waste package DOT specification container (typically 30 gal steel drum)
- Final disposal at Nevada Test Site

Proposed actions involving waste	**Specific actions**	**ARARs**	**Implementation of ARARs**
1. Solidify oil with No-char or suitable solidification agent	1. MD-21358, Tritiated Liquid Waste Packing Procedure For SW-149 and MD-10167, Radioactive Waste Procedures.	1. 40 CFR 268.7(a)(1) OAC-3745-270-07(A)(1)	1. Determination treatment is required
		40 CFR 268.9(a) OAC-3745-270-09(A)	Determine waste codes (D006,D008, D009)
		40 CFR 268.7(a)(3) OAC-3745-270-07(A)(3) 40 CFR 268.9(d); OAC-3745-270-09(D);	Notification that treatment met treatment standards
		40 CFR 268.40(a)(1) OAC-3745-270-40(A)(1)	Documentation of treatment. Includes documentation treatment met treatment standards. Sampling per SW-846

Proposed actions involving waste	Specific actions	ARARs	Implementation of ARARs
		40 CFR 264.192(a)(b)(d)(e)(g) OAC-3745-55-92(A)(B)(D)(E)(G) 40 CFR 264.193(a) OAC-3745-55-93(A)	Documentation that system passed helium leak check.
		40 CFR 264.193(a)(1)(3)(b)(1)(2)(c)(1)(2)(3)(d)(2)(e)(2)(f) OAC-3745-55-93(A)(1)(3) (B)(1)(2)(C)(1)(2)(3)(D)(2)(E)(2)(F)	Documentation that system passed helium leak check. Containment of oils in existing system is continuously monitored by monitoring for tritium
		40 CFR 264.194(a)(b)(2) OAC-3745-55-94(A)(B)(2)	System is approved only for use of oil or water. Level sensing devices and alarms are provided on systems
		40 CFR 264.195 OAC-3745-55-95	Systems are continuously monitored for tritium release. Daily inspections are conducted on monitoring equipment per Nuclear Safety Facility Authorization Basis Requirements
		40 CFR 264.196 OAC-3745-55-96	Spill response provided through site emergency response procedures
		40 CFR 264.197(a)(b) OAC-3745-55-97(A)(B)	Process equipment will be disposed of as waste. In the event of a actual release clean-up will be satisfied with OEPA approved Verification Sampling and Analysis Plan

Proposed actions involving waste	Specific actions	ARARs	Implementation of ARARs
	a. Condition of containers	a. 40 CFR 265.171; Ohio Administrative Code (OAC) 3745-55-71	a. Inspection element - containers are in good condition, no evidence of leaks or spillage.
	b. Compatibility of waste with container	b. 40 CFR 265.172; OAC 3745-55-72	b. Inspection element - appropriate container used for storage
	c. Management of containers	c. 40 CFR 265.173; OAC 3745-55-73	c. Inspection element - containers closed except when adding or removing waste.
	d. Inspections	d. 40 CFR 264.15(a) and (c); OAC 3745-54-15 (A) and (C)	d. Document inspections monthly; visual inspections done periodically by personnel in the area.
	e. Containment	e. 40 CFR 264.175 (b)(3) OAC 3745-55-75 (b)(3)	e. Secondary containment will be provided with sufficient capacity.
	f. Marking requirements	f. 40 CFR 262.34 (c)(1)(ii); OAC 3745-52-34 (C)(1)(b)	f. Inspection element - containers marked with words to indicate contents, or as "hazardous waste."

Proposed actions involving waste	Specific actions	ARARs	Implementation of ARARs
	g. Required equipment	g. 40 CFR 265.32 (a), (b), (c), (d); OAC 3745-54-32 (A), (B), (C), (D)	g. Inspection element - verify that appropriate equipment is available on plant site or in building.
	h. Communication or alarm system	h. 40 CFR 265.34 (a), (b); OAC 3745-54-34 (A), (B)	h. Inspection element - verify that communication devices in the building are operable or that other means of communication are available.
	i. Aisle Space	i. 40 CFR 265.35; OAC 3745-54-35	i. Inspection element – maintain aisle space to allow the unobstructed movement of personnel and equipment.
	j. Training	j. 40 CFR 265.16 (a), (b), (c); OAC 3745-54-16 (A), (B), (C)	j. Personnel will be trained to perform inspections.
	k. Treatment	k. Treatment specific ARARs will be determined and submitted	k. See Treatment ARAR
	l. Closure	l. 40 CFR 264.178, OAC 3745-55-78	l. Contaminants of concern and their clean-up objectives will be identified in the Verification Sampling and Analysis Plan.

Table 7 - ARAR Table for Air Quality

40 CFR Part 61 Subpart H: National Emissions Standards for Emissions of Radionuclides other than Radon from Department of Energy Facilities.
40 CFR Part 61 Subpart M: National Emission Standards for Asbestos.
Ohio Administrative Code (OAC) 3745-15-07(A): Air Pollution Nuisances Prohibited.
OAC 3745-17-02 (A,B,C): Particulate Ambient Air Quality Standards.
OAC 3745-17-05: Particulate Non-Degradation Policy.
OAC 3745-17-08: (A1), (A2), (B), (D): Emission Restrictions for Fugitive Dust.
OAC 3745-20: Asbestos Emission Control.