BWX Technologies, Inc.
a McDermott company

BWXT of Ohio, Inc.
1 Mound Road
P.O. Box 3030
Miamisburg, Ohio 45343-3030
(937) 865-4020

ER-038/02
February 12, 2002

Mr. Richard B. Provencher, Director
Miamisburg Environmental Management Project
U. S. Department of Energy
P. O. Box 66
Miamisburg, OH 45343-0066

ATTENTION: Robert S. Rothman

SUBJECT: Contract No. DE-AC24-97OH20044
ACTION MEMORANDUM ENGINEERING EVALUATION/COST ANALYSIS FOR I BUILDING REMOVAL ACTION – PUBLIC REVIEW DRAFT

REFERENCE: Statement of Work Requirement C 7.1d-Regulator Data Requests

Dear Mr. Provencher:

Robert Rothman of DOE/MEMP has approved the attached Action Memorandum Engineering Evaluation/Cost Analysis for I Building Removal Action – Public Review Draft for distribution to USEPA, Ohio EPA, and ODH. This correspondence documents the distribution based on the agreements in the Federal Facility Agreement.

Also attached to this correspondence is the cover letter that will accompany the document when distributed to the regulatory agencies.

If you or members of your staff have any questions regarding the attached document, or if additional support is needed, please contact me at Extension 4543.

Sincerely,

Monte A. Williams
Manager, Environmental Restoration & Site Transition

MAW/JWN/mlm
Attachment – a/s

cc: James O. Johnson, DOE/MEMP w/o attachments
Frank Schmaltz, DOE/MEMP w/o attachments
John Ebersole, DOE/OH, (1) w/attachments
Tim Fischer, USEPA, (2) w/attachments
Brian Nickel, OEPA, (4) w/attachments
Ruth Vandegrift, ODH, (1) w/attachments
C. D. Thompson, BWXTO, (1) w/attachments
John Nichols, BWXTO, (1) w/attachments
Dan Bird, MMCIC, (3) w/attachments

DCC

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a McDermott company

BWXT of Ohio, Inc.
1 Mound Road
P.O. Box 3030
Miamisburg, Ohio 45343-3030
(937) 865-4020

ER-039/02
February 12, 2002

Mr. Brian Nickel
Ohio EPA
401 E. Fifth Street
Dayton, Ohio 45402-2911

Mr. Tim Fischer
US EPA
SRF-5J
77 W. Jackson
Chicago, Illinois 60604

SUBJECT: Contract No. DE-AC24-9OH20044
ACTION MEMORANDUM ENGINEERING EVALUATION/COST ANALYSIS FOR I BUILDING REMOVAL ACTION – PUBLIC REVIEW DRAFT

Dear Sirs:

Attached you will find the subject Action Memorandum. BWXTO will resolve any questions, incorporate the comments into the final version, and address actions, if any, that will result from your review. Authorization for distribution of this document has been received from Mr. Robert Rothman, Miamisburg Environmental Management Project, DOE.

If you have any questions, please call me at (937) 865-4543.

Sincerely,

Monte A. Williams
Manager, Environmental Restoration & Site Transition

MAW/JWN/mlm

Attachment

cc: DCC

300401-020327000 1

ACTION MEMORANDUM
ENGINEERING EVALUATION/COST ANALYSIS

I BUILDING REMOVAL ACTION

MOUND PLANT
MIAMISBURG, OHIO

FEBRUARY 2002

Public Review Draft

(Revision 0)

Department of Energy

BWXT of Ohio, Inc.

ACTION MEMORANDUM
ENGINEERING EVALUATION/COST ANALYSIS

I BUILDING REMOVAL ACTION

MOUND PLANT
MIAMISBURG, OHIO

FEBRUARY 2002

Prepared for:

U.S. DEPARTMENT OF ENERGY
Miamisburg Environmental Management Project
Miamisburg, Ohio 45343

Prepared by:

BWXT OF OHIO, INC.
P.O. Box 3030
Miamisburg, Ohio 45343-3030
Under Contract #DE-AC24-970H 20044

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Appendix A I Building Related PRS Recommendations

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ACRONYMS

ACM	asbestos-containing material
AM	Action Memorandum
ARARs	Applicable or Relevant and Appropriate Requirements
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
COC(s)	Contaminant(s) of Concern
DOE	Department of Energy
DOT	Department of Transportation
EE/CA	Engineering Evaluation/Cost Analysis
ER	Environmental Restoration
FFA	Federal Facilities Agreement
HEAST	Health Effects Assessment Summary Tables
HEPA	high efficiency particulate air (filter)
HVAC	heating, ventilation, and air conditioning
MARSSIM	Multi-Agency Radiological Survey and Site Investigation Manual
MEMP	Miamisburg Environmental Management Project
MMCIC	Miamisburg Mound Community Improvement Corporation
MOCA	4,4'-methylene-bis(2-chloroaniline)
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
OAC	Ohio Administrative Code
ODH	Ohio Department of Health
OEPA	Ohio Environmental Protection Agency
OSC	On-Scene Coordinator
OSHA	Occupational Safety and Health Administration
PCB(s)	polychlorinated biphenyl(s)
pCi/g	picoCuries per gram
PRS(s)	Potential Release Site(s)
RBGV	Risk-Based Guideline Value
RCRA	Resource Conservation and Recovery Act
RMMA	Radiological Materials Management Area
RREM	Residual Risk Evaluation Methodology
RSE	Removal Site Evaluation
SAP	Sampling and Analysis Plan
SARA	Superfund Amendments and Reauthorization Act
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound

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)* (DOE 1995) dated May 22, 1995. According to this approach, decommissioning activities will be conducted as CERCLA removal actions, unless the circumstances at the facility make it inappropriate. The DOE is the designated lead agency under CERCLA and removal actions at the Mound Plant are implemented as non-Superfund, federal-lead actions with DOE funds instead of the funds available to the USEPA under CERCLA (i.e., non-Superfund). The DOE provides the On-Scene Coordinator (OSC). Non-Superfund, federal-lead removal actions are not subject to USEPA limitations for 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 completed to document the evaluation of site conditions, to propose the action described herein, and to allow public input.

2.0 SITE CONDITIONS AND BACKGROUND

2.1 SITE DESCRIPTION

2.1.1 Physical Location

The Mound Plant is located on the southern border of the city of Miamisburg in Montgomery County, Ohio. The site is approximately 10 miles south-southwest of Dayton and 45 miles north of Cincinnati. The proposed removal action is the decontamination, dismantlement, and demolition of I Building.

2.1.2 Site Characteristics

I Building is located on the western perimeter of the Mound Plant Main Hill. The location of I Building is depicted in Figure 1. I Building is a single story structure with basement (Figure 2) and two separate penthouses. The building currently encompasses 25,736 square feet of floor space. The building is constructed of concrete block walls, with brick face veneer, a concrete deck, and a four-ply built-up metal insulated roof covered with coal tar and carboline membrane. The building contains 68 rooms, including offices, assembly areas, press cells, and mechanical rooms.

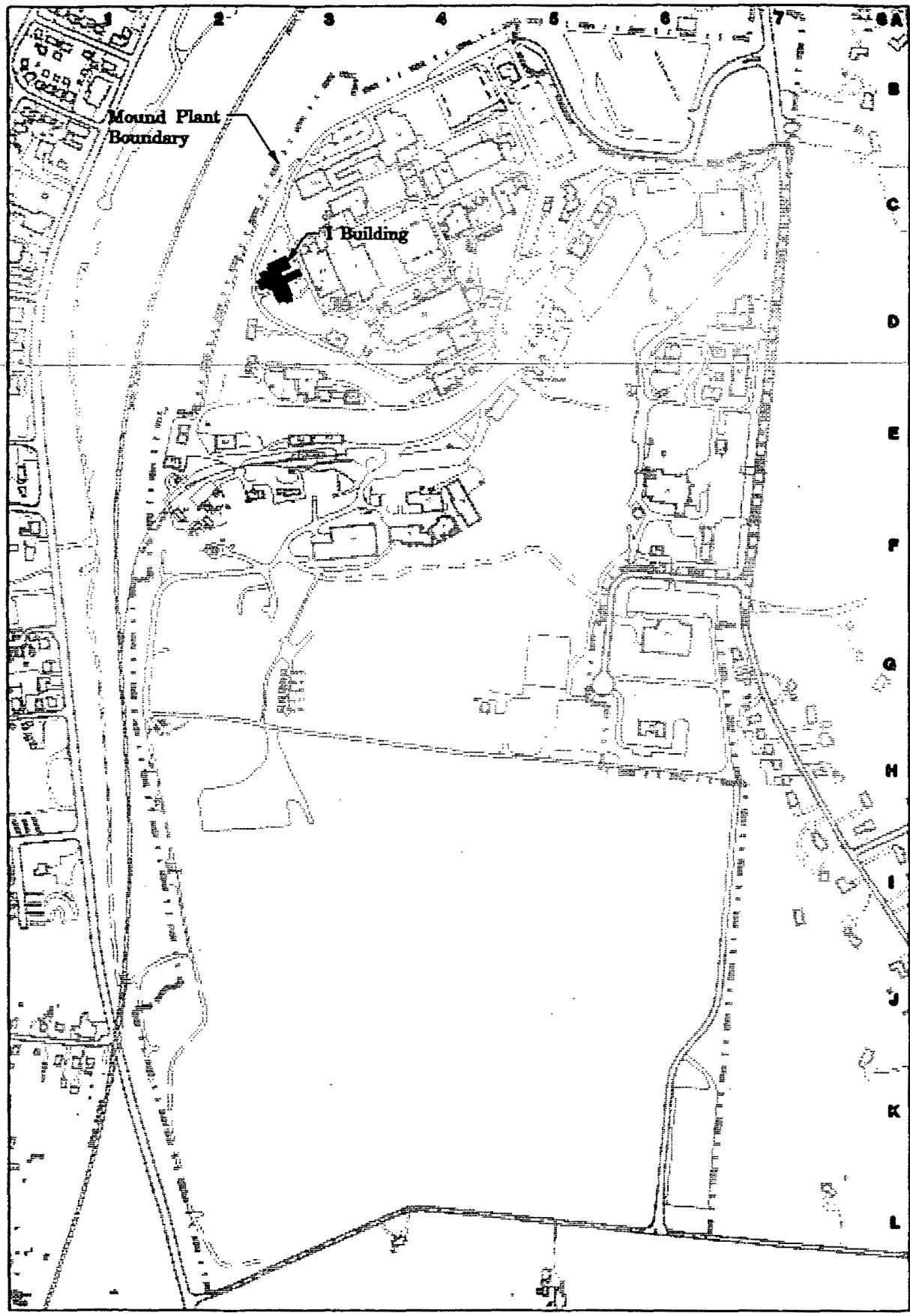
The building is bordered by a sidewalk on the north side, a roadway and SW/58 Building on the east, roadway on the north and west sides, and a concrete pad courtyard on the south. Features local to I Building are shown on Figure 3.

The I Building Historic American Building Survey (DOE 2000) identifies I Building as one of the original buildings constructed in 1948. The original I Building, as constructed, had a reinforced concrete frame and roof, with face brick and masonry walls. The Building was rectangular in shape, having two stories with an overall length of 121'-10" and a width of 61'-10" with a gross floor area of 7,564 square feet. The original building consisted of Rooms I-101 through I-122 on the first floor and Rooms 1 and 2 in the basement.

Two of the additions have penthouses containing heating, ventilation, and air conditioning (HVAC) equipment. The building is served by the central steam system for heat, chilled water for cooling, and electrical service of 480 Volts.

The first addition was the I Building Press Building Addition, also called the North Addition, in 1956. This addition was added on the eastern side and housed four presses for manufacturing explosive pellets (DOE 2000).

The Second Press Room Addition, also known as the East Addition, was completed in 1960 and is located on the east side of the original building, southeast of the North Addition (DOE 2000).



Legend

Structures
Paved roadway
Unpaved roadway
Railroad
Water course
Fence
Mound Plant boundary
Contour line

0 100 200 400 600 800 1000
Scale in Feet

	12/05/01	ISSUE FOR GENERAL USE	SSP			
REV	DATE	REVISION				

MOUND

UNCLASSIFIED

D gen_site_plan.dgn

Figure 1
Location of I Building

gen_site_plan.dgn

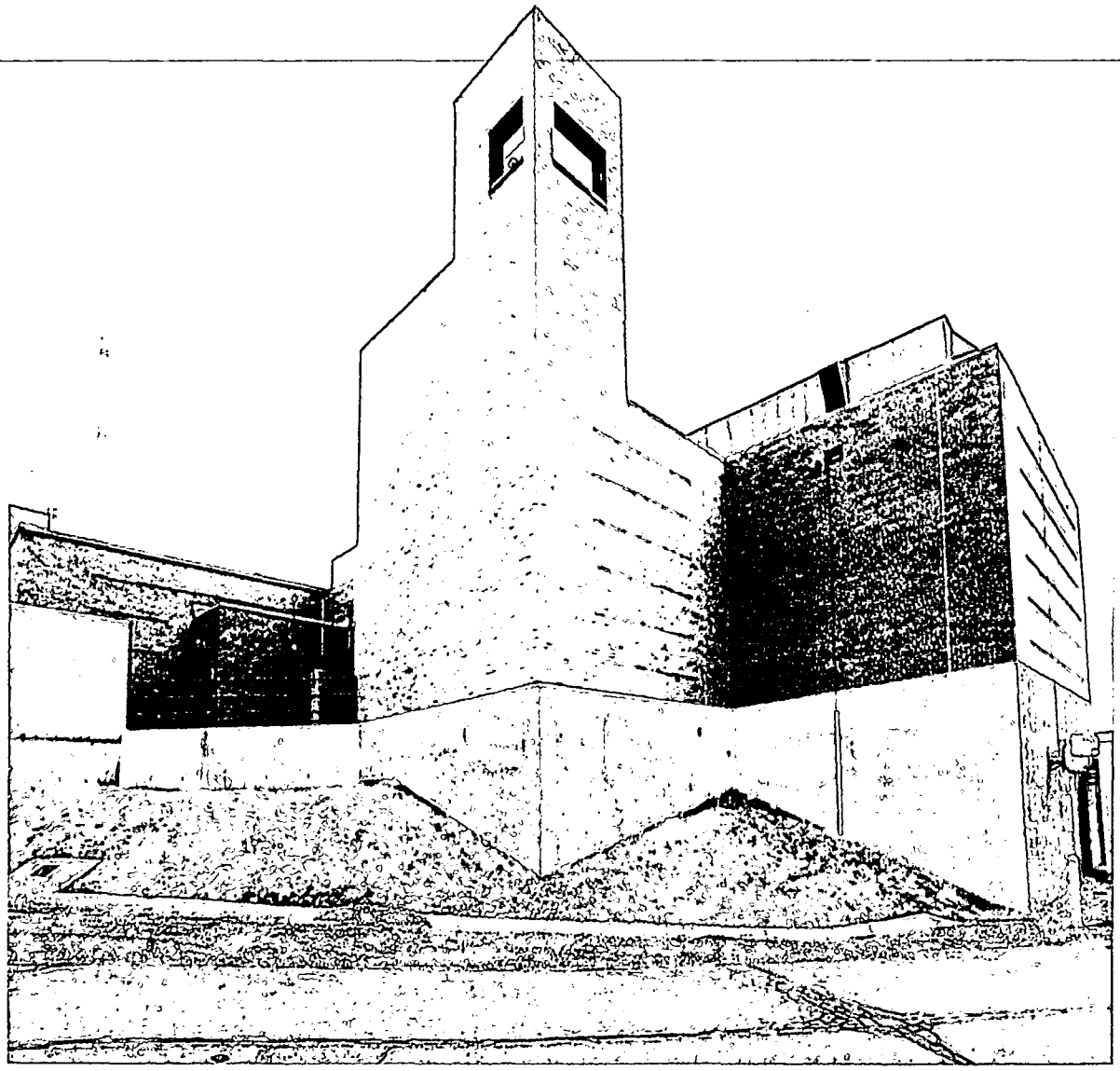
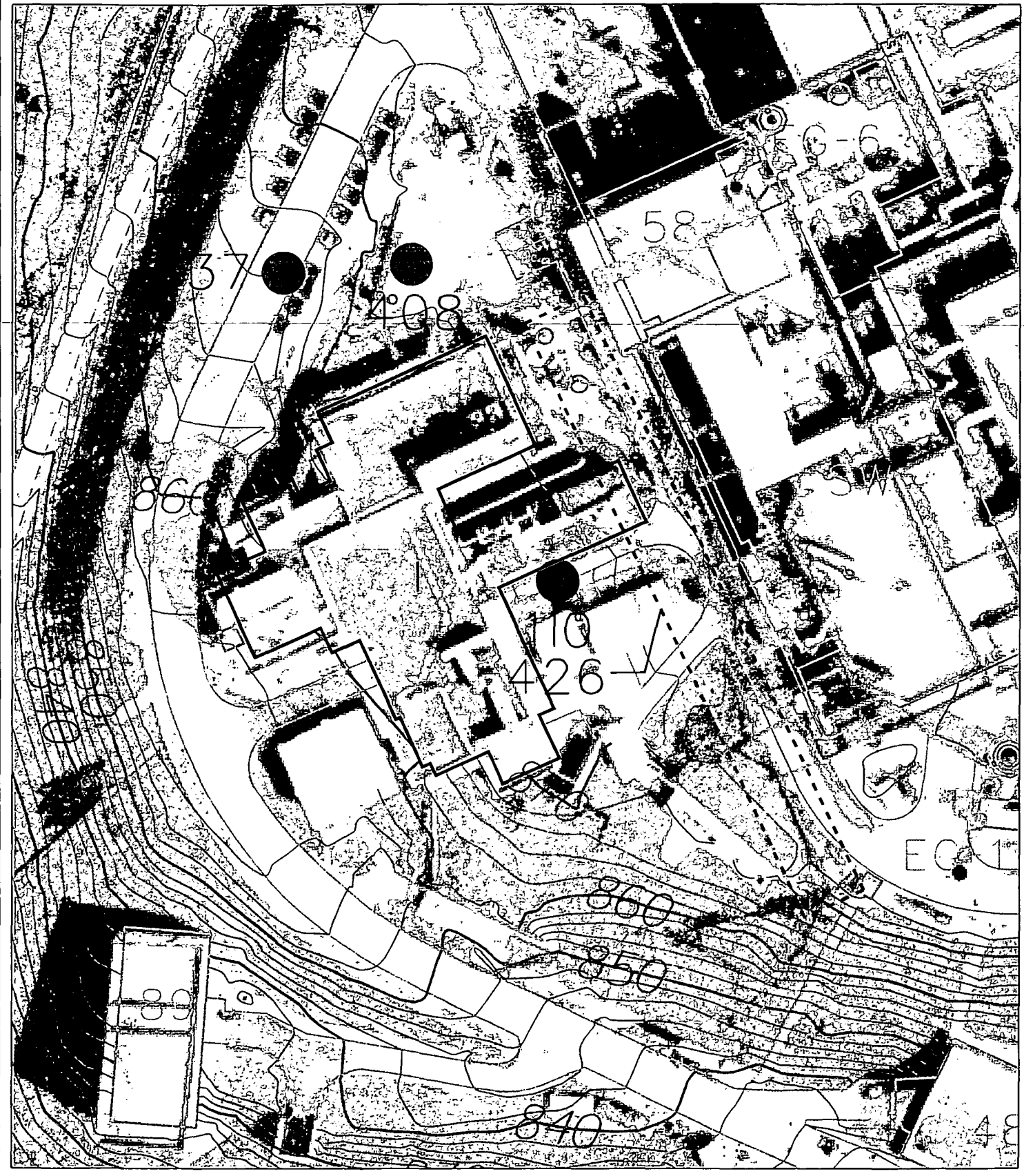


Figure 2: I Building Northwest Elevation



PRS Point

PRS Area

Contour Line

MOUND

Environmental Restoration Geographic Information System

SHEET	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
ISSUE																					

SHEET	1	2	3	4	5	6
ISSUE	*					

PART CLASSIFICATION

DRAWING CLASSIFICATION: UNCLASSIFIED

SIZE | DRAWING NUMBER: vicinity.dgn | JOB NUMBER

DGN TYPE: STE | PROJ: ER-GIS | CAGEC | SCALE | SHEET 1 OF

STATUS: MD-REL-**/**/** | ORIGIN: MSTATION / J

Figure 3
I Building and Vicinity

ISS	DATE	REVISION	BY	CHKR	DRG	LPREC	APVD	II
	12/06/01		SSP					

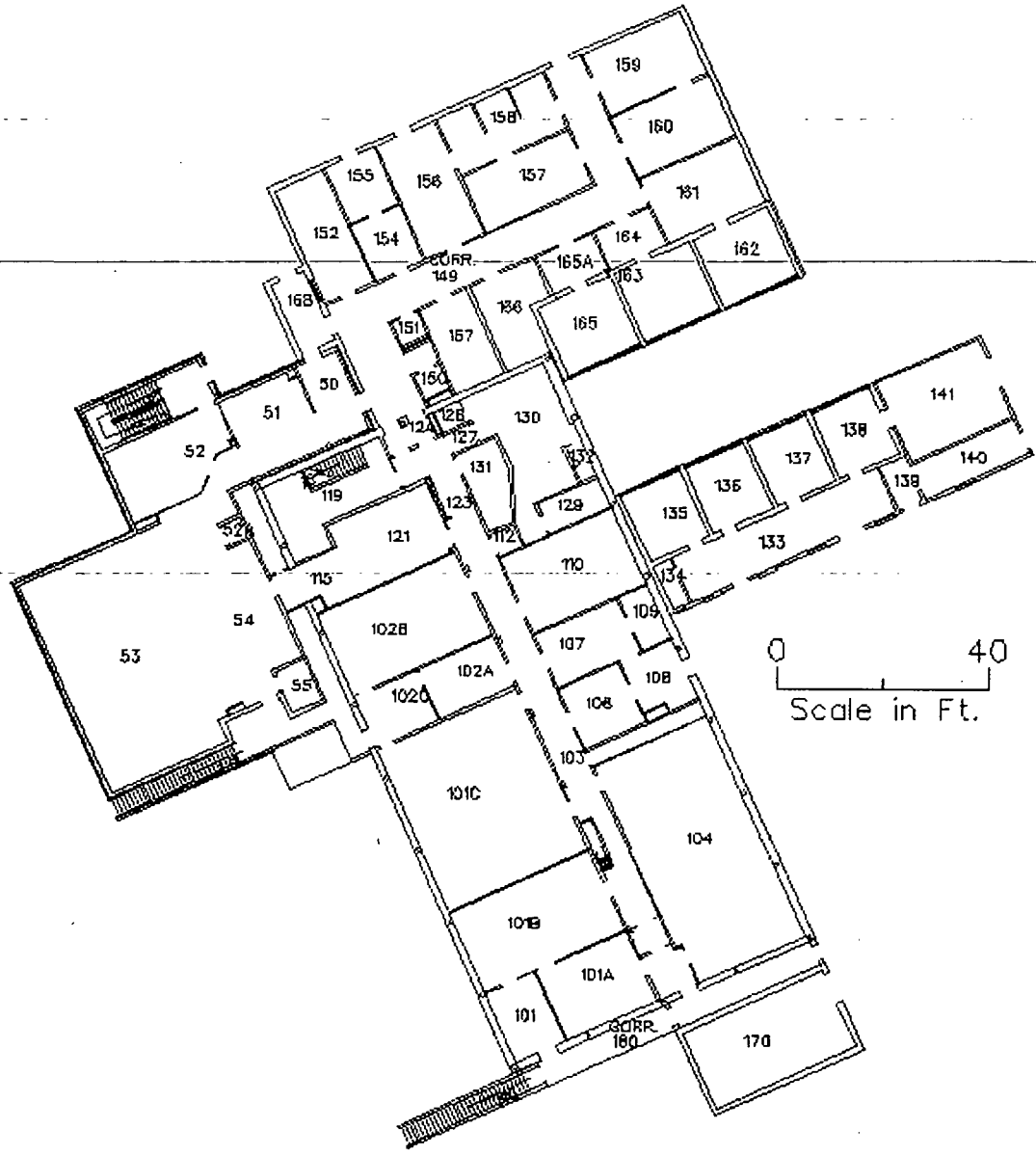


Figure 4: I Building First Floor Plan

The third addition (northeast corner of I Building) was the Production Plant Addition in 1964. This consists of Rooms I-150 through I-168 and Penthouse I-207P (DOE 2000).

The fourth addition (northwest corner of the original I Building), known as the I Building Northwestern Addition, was completed in 1985. This addition included Rooms I-50 through I-55, a basement, and the Guard Post on the roof, (DOE 2000). Figure 4 shows the floor plan for the first floor after all the additions were completed.

Until 1956, I Building was used for radiological bioassay and environmental analysis. After 1956, the building was used for the production of inert and/or plastic components of weapons devices and detonators. I Building is currently unoccupied. Safe Shutdown and building characterization activities are currently underway. Presently, only bulk equipment remains in I Building.

Associated Potential Release Sites (PRSs)

There are four PRSs associated with the area surrounding I Building as shown on Figure 3. These are PRSs 110, 237, 408, and 426.

PRS 110 represents the I Building Soils. PRS 110 was created due to volatile organic compound (VOC) detections found during the quantitative, Operable Unit 5 Reconnaissance Soil Gas Survey. This contamination is believed to have resulted from organic chemical spills from a neighboring storage shed, Building 17. Building 17 was used by Bonded Stores to store chemicals, e.g. toluene.

PRS 237 represents the Site Survey Project Potential Hot Spot, Location S0175. PRS 237 became a PRS due to the elevated detections of cesium-137 and cobalt-60 found during the Site Survey Project.

PRS 408 represents a chemical and lubricating oil contamination soils area located north of I Building. PRS 408 is the result of pump/compressor oil blowdown from the nitrogen tanks of the 'Prism' nitrogen production system. This blowdown was observed being released onto the ground. The engineer who was responsible for the dismantling of the 'Prism' system identified this area as a PRS.

PRS 426 borders the I Building east wing and runs north and south along the roadway between I and SW. PRS 426 is associated with the contaminated waste transfer lines from SW Building. PRS 426 will be remediated by the Soils Project.

The Core Team, consisting of representatives of DOE, USEPA, and the Ohio Environmental Protection Agency (OEPA), determined on April 18, 1996, and May 13, 1997, that PRS 110 and PRS 408, respectively, required No Further Assessment. On July 17, 1996, PRS 237 was determined by the Core Team to require Further Assessment and was later binned as a Removal Action on July 10, 1997. PRS 426 was also binned as a Removal Action on July 18, 2001. Information concerning binning recommendations can be found in Appendix A.

2.1.3 Current Conditions

Heating and cooling were provided to I Building via aboveground steam and glycol piping originating from the Powerhouse (P Building). Ventilation was provided to the building through a roof-mounted HVAC system. Potable and fire water and sanitary services were provided by means of the Mound Plant underground domestic water lines, an onsite sanitary treatment plant, and a stormwater sewer system. Other than the sanitary and storm sewers, these systems have been terminated at the I Building boundary as part of the Safe Shutdown Activity. Temporary electrical power for I Building is supplied from the B Building Substation.

The building should no longer contain energetic (explosive) materials, and no chemical or radiological contamination has been identified. The planned asbestos abatement will be performed prior to demolition.

Radiological / Chemical

There are no areas of potential radiological contamination that exist in I Building based on data from the *Mound Site Radionuclides by Location*, (DOE 1998), the *Environmental Appraisal of the Mound Plant*, (EG&G 1996), and the *Phase I Environmental Site Assessment of DOE Mound, I Building*, (HOK/K 1996).

Based on the latest survey data from 1999 and 2000, all readily removable sources of potential radiological contamination have been removed from the building. Radiological surveys for radioactive material management area (RMMA) rollbacks and surveys conducted in accordance with the *Multi-Agency Radiological Survey and Site Investigation Manual* (MARSSIM) have been performed. The *I Building Final Status Survey Plan* (DOE 2001) indicate no radiological contamination being found above the acceptable levels.

The only areas of potential chemical contamination were the energetic materials production rooms and MOCA (4,4'-methylene-bis(2-chloroaniline) labs. These areas have been decontaminated. All potential chemical hazards have been removed in preparation for the I Building demolition.

Asbestos

Asbestos sampling results indicate asbestos-containing material (ACM) in the pipe insulation, some fumehood linings, floor tile, and some ceiling tiles. The walls were sampled and the results confirmed that they are free of ACM.

PCBs

There are several transformers, which could possibly contain polychlorinated biphenyls (PCBs) in I Building. The only other suspected source of PCBs is fluorescent light ballast manufactured before 1979.

Lead

Recent surveys indicate lead paint was used in I Building but in very low levels. The walls in Room I-109 used for x-ray analysis are lead-lined and a lead lined pit may still exist in the floor.

Freon

Freon may also be found in building water coolers and HVAC compressors on the roof.

Monitoring Requirements

Asbestos will be monitored in accordance with the Mound Industrial Safety and Health Department's *Asbestos Program Manual* (DOE 1999).

The Radiological Control Department will survey inaccessible areas for radiological contamination during equipment disposition activity.

2.1.4 Release or Threatened Release into the Environment

The hazardous materials found in I Building are ACM in the pipe insulation and in both ceiling and floor tile, PCBs assumed to be contained in lighting ballast and transformers, lead paint is assumed to be inside the building along with lead sheeting, freon, and potentially undiscovered energetic material.

Radiological surveys in I Building to date indicate no contamination.

2.1.5 National Priorities List Status

The USEPA placed the Mound Plant in Miamisburg, Ohio 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 between the DOE, OEPA, and USEPA. A Federal Facilities Agreement (FFA) under CERCLA Section 120 was executed between DOE and USEPA Region V on October 12, 1990. It was revised on July 15, 1993 (EPA Administrative Docket No. OH-890-008984) to include OEPA as a signatory. The general purposes of this agreement are to:

- ensure that the environmental impacts associated with past and present activities at the site are thoroughly investigated and appropriate remedial action 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

The previous removal action performed in the vicinity of I Building was PRS 408 (lubricating oil spill at the R/SW Building nitrogen storage tanks). Excavation of chemically contaminated soils was completed on December 18, 1996.

2.2.2 Current Actions

Asbestos and lead inventories were performed in preparation for their abatement that leads up to the building demolition. A complete asbestos inventory was developed by Helix Environmental and was used in the Asbestos Abatement Contract Request for Proposal. All ACM will be removed, with exception of the non-friable floor tile and roofing material.

The lead sheets in I-109 was removed, boxed, and turned over to Waste Management for disposal/recycling. The fluorescent lighting ballast suspected of containing PCBs will be removed prior to demolition. Equipment remaining on or inside the building will be drained of refrigerants and hydraulic fluids prior to disposition or demolition. There will be no hazardous chemicals in I Building at the time of demolition. The removal and disposal of these materials will be performed in accordance with the applicable or relevant and appropriate requirements (ARARs) for RCRA as identified in Appendix B. These activities will be conducted as part of the building decontamination activities, unless they present an immediate hazard. Any immediate hazards will be removed as soon as safely possible.

Materials and equipment not sold or donated will be demolished and removed as construction debris along with the I Building structure. This will be the procedure unless it is necessary to remove them to perform radiological surveys or as part of the decontamination or asbestos abatement activities. Any remaining equipment or piping will be drained of all fluids. Among those items to remain are the following: several presses, fumehoods, sinks and cabinets, some furniture, windows, doors, plumbing fixtures, non-ACM ceiling tile, floor tile (non-ACM and non-friable ACM), air handling units and their associated ductwork.

I Building has non-active potable water, compressed air, telephone, computer network connections (Molan), wet fire sprinkler system, and steam. The storm sewer and sanitary sewer lines associated with I Building will be plugged at the nearest manhole. The I Building floor drains have been grouted. The I Building electrical power has been terminated. I Building is currently on temporary power. The only service still active is the fire alarm system.

The bulk of all energetic materials were removed during a previous safe shutdown effort. As part of this project a visual inspection of all of the press rooms and the flushing of all vacuum lines and chambers used in the energetic material labs was performed. This effort revealed negative results. In the event that any energetic material is found during the demolition it will be contained and handled accordingly.

Radiological surveys are ongoing with no significant results to date. MARSSIM pre-disposition surveys have been conducted. Following the precedent of B and E Buildings, the Core Team will review these results when the sampling and analysis plan (SAP) is being developed. At that time, results of building characterization will be used to update the contaminants of concern (COCs) list and will determine the radiological isotopes and chemicals included in the soil analysis. Drain piping associated with the bioassay labs will be surveyed for radiological contamination and removed and disposed of during the floor slab demolition.

2.3 STATE AND LOCAL AUTHORITIES' ROLES

2.3.1 State and Local Action to Date

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

2.3.2 Potential for Continued State and Local Response

Eventual release of this area for industrial use is planned. Periodic environmental monitoring of the area may be required until a final Record of Decision is implemented for the entire Mound site. This monitoring would need to be coordinated with local, state, and federal authorities. Current plant-wide environmental monitoring programs will continue until such time as remediation is completed. OEPA will continue its oversight role until all terms of the FFA have been completed.

3.0 THREAT TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT

3.1 THREATS TO PUBLIC HEALTH OR WELFARE

The potential release of radioactive and/or chemical contamination may create a potential threat to the public health or welfare if not properly removed via demolition.

3.2 THREATS TO THE ENVIRONMENT

The potential release of radioactive and/or chemical contamination may create a potential threat to the environment.

3.2.1 Removal Site Evaluation

The Removal Site Evaluation (RSE) requirements, as outlined under EPA's NCP regulations in 40 CFR 300.415, are presented throughout this AM/EE/CA.

An evaluation by public health agencies has not been performed for this area and therefore, is not included in this AM/EE/CA. The determination of the need for a removal action is outlined in this section and in Table 1.

The NCP identified 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 1.

Table 1: Evaluation of Removal Action Appropriateness Criteria

CRITERIA	RESPONSE
(1) "...potential exposure to nearby human populations, animals, or the food chain..."	Discovery of contamination could potentially expose nearby human populations, animals, or the food chain from chemical and/or radionuclides when present institutional controls are relaxed.
(2) "Actual or potential contamination of drinking water supplies..."	There is no expectation that contaminated drain lines have leaked into the ground at the floor drains in I Building. There is no expectation for chemical and/or radiological contamination to be present in the soil near the drain lines and beneath the floor. This conclusion is based on radiological surveys and the integrity of the lines in the basement and crawlspace.
(3) "Hazardous substances or pollutants or contaminants in drums, barrels, tanks, or other bulk storage containers, that may pose a threat of release;"	None.
(4) "High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface, that may migrate;"	None.
(5) "Weather conditions that may cause hazardous substances to migrate to be released;"	None.
(6) "Threat of fire or explosion;"	None.
(7) "The availability of other appropriate federal or state response mechanisms to respond to the release;"	There are no other appropriate federal or state mechanisms to respond. The FFA established a combined state and federal mechanism to respond under CERCLA. DOE is the designated lead agency at Mound under CERCLA.
(8) "Other situations or factors that may pose threats to public health or welfare or the environment."	Public health and welfare could be exposed to unknown potential chemical and radiological contamination if the building was to be reused.

Items 1-8 are identified in 40 CFR 300.415 (b) (2), National Oil and Hazardous Substances Pollution Contingency Plan, Final, March 8, 1990.

4.0 ENDANGERMENT DETERMINATION

As this location is currently configured and access controlled, actual or threatened releases of pollutants and contaminants from this site 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 and structure is appropriate.

5.0 PROPOSED ACTION AND ESTIMATED COSTS

5.1 PROPOSED ACTION

The proposed action is to perform the safe shutdown of I Building and then demolish the building in accordance with all DOE, Occupational Safety and Health Administration (OSHA), OEPA, USEPA, Ohio Department of Health (ODH), and other applicable procedures, regulations, and requirements.

5.1.1 Proposed Action Description

5.1.1.1 Work Planning Activities

Site Preparation

This step includes establishing work area boundaries, radiological postings, and barriers (as required) access and egress routes, material and supply storage, waste container staging, and placement of all necessary permits.

Building Preparation

This includes the establishing of evacuation routes and assembly points, removing ACM, removing designated abandoned process systems, process and utility piping and conduit, disconnecting utility feeds to all abandoned equipment and systems, and removing excess equipment and material, as necessary.

If a florescent light ballast is not labeled 'No PCBs', it will be removed and disposed of as a PCB-containing ballast in an approved landfill.

Lead shielding associated with x-ray machines located in Room I-109 will be removed and properly disposed of prior to demolition. After the building is demolished, any debris containing suspect lead or lead paint will be disposed of as construction debris in a local landfill. Manual handling and dust generation will be minimized.

Any freon-containing vessel will be purged and the freon properly disposition prior to demolition.

Building Decontamination Activities

Building decontamination will include the following activities.

1. Remove all ACM insulation throughout the building.
2. Isolate utilities; drain all systems of liquid.
3. Remove excess equipment and surplus materials, which can be sold or donated.

4. Remove any contaminated fans and ductwork.
5. Perform decon of energetic materials.
6. Perform decontamination of Room I-101 for MOCA contamination.

During decontamination activities, continuing inspections by the Project Supervisor will be made as work progresses to detect hazards resulting from weakened or deteriorated floors, walls, or loosened material.

Mobilization

Industrial Hygiene will be working with the project and contractor until all asbestos is removed prior to demolition. This activity will include the set-up of decontamination airlocks, portable high efficiency particulate air (HEPA) exhausters, as required, for asbestos removal, establishing staging and waste loading areas, relocation of equipment to the demolition site, delivery of waste containers, monitoring equipment and water misters.

Radiological Surveys

A building and foundation-sampling plan is being developed and will be submitted to the Core Team. The COCs for the sampling plan will be based on historical information reviewed. The action levels will be based on DOE 5400.5 guidelines for surface activity. If contaminants are detected in I Building, then DOE 5400.5 guidelines for surface activity will be the default values for action levels.

The results of the RMMA Rollback and MARSSIM surveys showed no radiological contamination above background levels (DOE 2001).

5.1.1.2 Demolition Activities

Demolition activities will be as specified in the Work Plan as summarized below.

Demolish Building

1. Demolish the roof and walls.
2. Remove the building floor slab.
3. Remove drains and associated piping, if contaminated
4. Remove soil under the slab, if contaminated.
5. Remove the foundation, down to 2' below grade.
6. Remove inactive drain lines and underground piping, down to 2' below grade.
7. Backfill and grade the area to meet the necessary drainage requirements.

Verification

This step includes among other activities, sampling and analysis of soil at the excavation to determine the residual contaminant concentration and verifying that the residual contaminant concentration is within acceptable limits. The SAP will further define the sampling, analysis, and evaluation process.

COCs selected for I Building are listed in Table 2 along with the risk-based cleanup objectives. These contaminants were selected due to the proximity of PRS 237 and SW Building. None of the COCs are a result of operations conducted in I Building.

As with tritium, uranium-233 was processed in SW Building. Uranium-233 was part of the Rare Isotope Program. The program developed separations technology to be used in the separation and purification of special heavy element isotopes. Uranium-233 was a source material used for the recovery of one those rare isotopes (DOE 1993a). The cleanup objective for tritium in soil is currently under evaluation with respect to its impact on groundwater. Based on this evaluation, the soil cleanup objective for tritium could be lower than what is currently listed in Table 2. In addition, groundwater data from Seep 601 will be monitored for impact from I Building demolition and site restoration. If the Core Team determines there is an impact, additional project controls will be implemented.

The planned approach for soil sampling of the I Building footprint and associated 15-foot perimeter is to take radiological samples, at key areas based on process knowledge. In addition to these, samples will be taken along the sanitary sewer line, where I Building drains.

Information obtained during decontamination and demolition phases could identify additional contaminants of concern or could indicate that one or more of the primary COCs are not present. If multiple contaminants are present in the soil due to activities within or near I Building, the data will be reviewed to determine if cumulative risk is acceptable. This will be addressed and documented in the SAP. The SAP will also include hot spot criteria. Currently, a result that exceeds three times the 10^{-5} Risk-Based Guideline Value (RBGV) plus background indicates a hot spot and the need for further excavation at that location.

Table 2: I Building Cleanup Objectives for Soil (pCi/g)

COC	10-5 RBGV [1]	Background Value [2]	Cleanup Objective [3]
Cesium-137 +D	3.4	0.42	3.8
Cobalt-60	0.7	NC	0.7
Tritium	180,000	1.6	180,000 [4]
Uranium-233 +D	4.8	NA	16.0
Plutonium-238	55 [5]	0.13	55

Radionuclides labeled with a +D indicate that pertinent daughters are included within the risk calculation.
COC: Contaminant of Concern
NC: Not Calculated
pCi/g: pico Curies per gram

(1) The RBGV are based on the more restrictive of the Construction Worker and Site Employee Values. These values were calculated using the methodology contained in Risk-Based Guidelines, Mound Plant, Miamisburg, Ohio, March 1997, Final (Revision 4) but were performed using April 2001 Health Effects Assessment Summary Tables (HEAST) slope factors.
(2) Mound 2000 Residual Risk Evaluation Methodology (RREM), Final, Revision 0, January 6, 1997.
(3) Sum of 10^{-5} RBGV and background, where applicable.
(4) Cleanup objective is being evaluated to determine the impact to groundwater.
(5) Based on April 2001 HEAST slope factors, the 10^{-5} RBGV for Pu-238 is 61 pCi/g; however, 55 pCi/g was retained because of its familiarity to the public.

Site Restoration

This activity includes reducing the work zone area and the placement of the area in a safe condition. Equipment, materials, waste containers, and barriers will be removed. Any excavated area outside the building walls will be back-filled and compacted to the contours and elevation specified in the I Building Grading Plan.

Documentation of Completion

All Project documentation will be forwarded to the Project Engineer and maintained in the project file. The OSC Report will document the completion of the removal action.

Upon completion of the project, the project notebook or a copy of the project records will be forwarded to the document management system. Land within the project boundaries is designated for future industrial land use. The boundaries of this project include the entire footprint of I Building in addition to a 15 foot perimeter surrounding the building, excepting areas which are within the 15 foot perimeter of remaining, surrounding structures such as PRS 426.

5.1.1.3 Rationale, Technical Feasibility, and Effectiveness

The removal action chosen is necessary for the removal of potential energetic material, MOCA, lead, PCB, or asbestos contamination internal to I Building and its' associated utilities. This action also prevents further deterioration of the building and the eventual migration of contamination that might endanger future Mound site inhabitants and the public.

5.1.1.4 Monitoring

Health and safety monitoring will be performed throughout the removal action according to standard Mound procedures. Sampling analysis of excavated soil will be described in more detail in the I Building Work Plan or SAP.

5.1.1.5 Uncertainties

The major uncertainties are the level of and extent of contamination in and beneath the I Building floor from migration from adjacent nuclear facilities and PRS 426. The minor uncertainties include location of utilities in the area of the project.

5.1.1.6 Institutional Controls

DOE will remain in control of the subject area until the parcel is transferred. However, portions of the Mound Plant may be released to non-DOE uses in the foreseeable future. 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.

5.1.1.7 Post-Removal Site Control

DOE will provide post-removal site control. See Institutional Controls above.

5.1.1.8 Cross-Media Relationships and Potential Adverse Impacts

The potential cross-media impact associated with the removal action is the potential for unintended release of contaminated materials into the atmosphere. Careful monitoring and control by misting will be implemented as necessary during the removal action.

No potential adverse impacts of performing the removal action have been identified.

5.1.2 Contribution to Future Remedial Actions

To facilitate further assessments in or near the site of the removal action, the exact dimensions of the excavation and the levels of contamination on the ground surface will be documented. The excavation will be documented by utilizing photographs, record drawings, the OSC Report, and other information collected during the removal action.

The Miamisburg Environmental Management Project (MEMP) is anticipated to be cleaned up via removal actions. Demolition of I Building is planned to be performed as one of these removal actions. If the cleanup objectives are met, the property will be transitioned over to the Miamisburg Mound Community Improvement Corporation (MMCIC) by DOE. The information obtained, as a result of this removal, will be used in determining the availability of the I Building site for final disposition of the Mound site and will be subject to review in the subsequent 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 follow.

5.1.3.1 No Action

The No Action approach was eliminated from consideration. The level and extent of contamination in soils under I Building could potentially be unacceptable.

5.1.3.2 Institutional Controls

Institutional controls implemented for I Building were eliminated. This option was not feasible to future site plans. I Building will be demolished.

5.1.4 Engineering Evaluation/Cost Analysis

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

5.1.5 Applicable or Relevant and Appropriate Requirements

Mound ARARs for the ER Program have been identified in a letter from OEPA to DOE (OEPA 1998). CERCLA regulations require that removal actions comply with ARARs.

The following areas have been identified, as applicable, or relevant and appropriate to this removal action:

- 49 Code of Federal Regulations (CFR) 127, 173: Department of Transportation (DOT) Hazardous Material Transportation and Employee Training Requirements.
- RCRA (See Appendix B)

5.1.5.1 Air Quality

- 49 CFR Part 61 Subpart H: National Emissions Standards for Emissions of Radionuclides other than Radon from Department of Energy facilities.
- 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: (A)(1), (A)(2), (B), (D): Emission Restrictions for Fugitive Dust.
- OAC 3745-20: Asbestos Emission Control.

5.1.5.2 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.

5.1.5.3 Worker Safety

- 29 CFR Part 1910: OSHA - General Industry Standards.
- 29 CFR Part 1926: OSHA - Safety and Health Standards.
- 29 CFR Part 1904: OSHA - Record Keeping, Reporting, and Related Regulations

5.1.6 Other Standards and Requirements

Other standards or requirements related to the actual implementation of the removal action may be identified subsequently during the design phase and will be incorporated into the Work Plan for I Building decontamination and demolition.

5.1.7 Project Schedule

The proposed schedule established for planning and implementing the removal action is shown in Table 3. The proposed schedule summary is depicted in Figure 5.

5.2 ESTIMATED COSTS

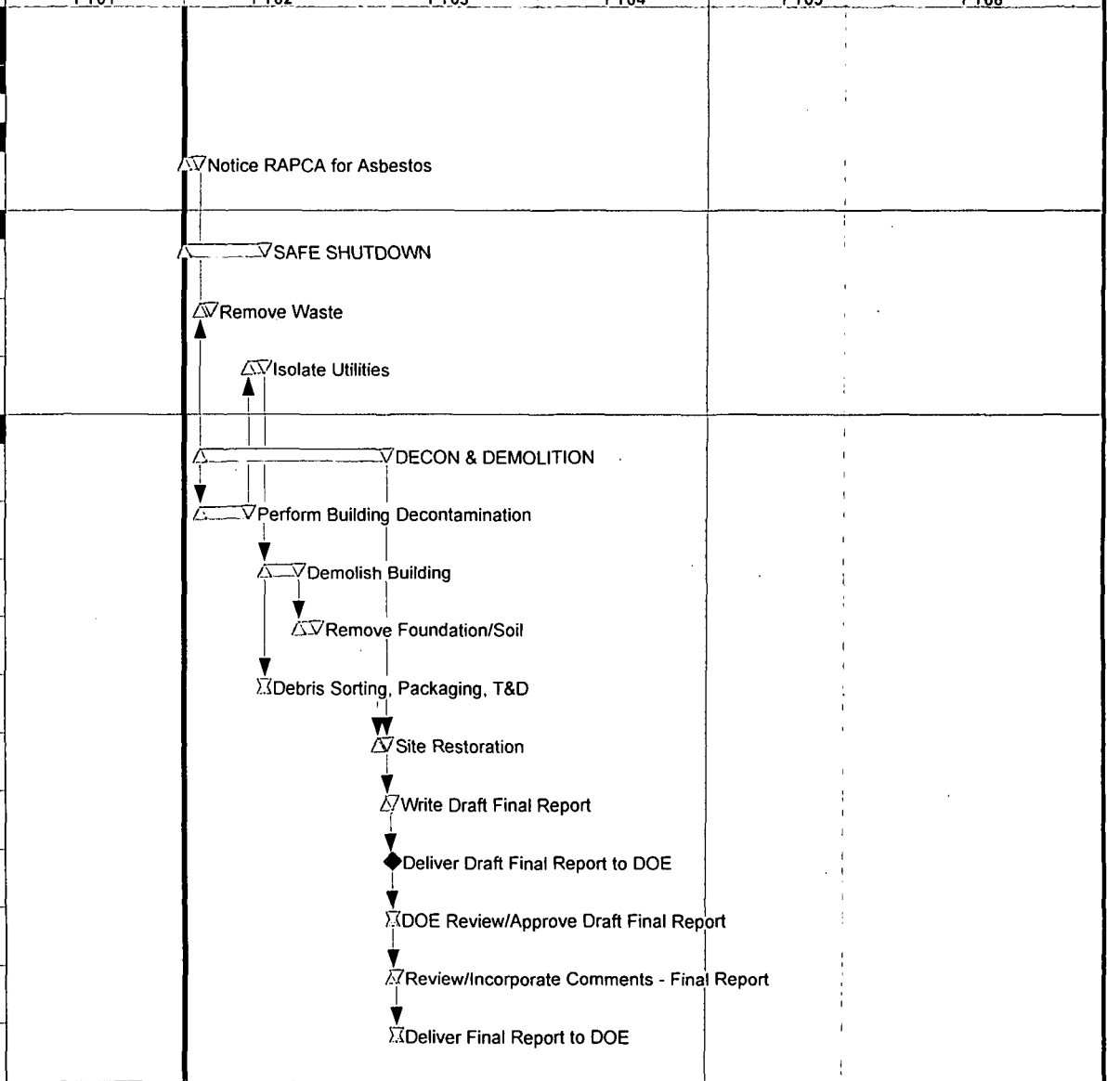
The project schedule and cost estimate to perform the removal action is shown in Table 3. The costs include the decontamination and demolition activities, all engineering and decontamination and demolition management, waste disposal, and site restoration.

Table 3: Project Schedule and Cost Estimate

Activity	From	To	Estimated Cost
Work Planning	10/01/01	11/01/01	$64,671
Safe Shutdown	10/01/01	03/18/02	$39,487
Building Characterization	10/01/01	02/28/02	$89,303
Decontamination	11/05/01	02/11/02	$447,395
Demolition	03/19/02	05/28/02	$306,425
Foundation/Soil Characterization	06/03/02	07/08/02	$25,484
Site Restoration	11/02/02	11/26/02	$6,557
OSC Report*	11/27/02	12/12/02	$2,311
TOTAL			**$981,633**

* All data for the OSC Report will be compiled during six-month period after the start of the site restoration activities.

Activity ID	Activity Description	Orig Dur	Early Start	Early Finish
Mound Exit Project				
Main Hill Project				
Main Hill NR Project				
Building I				
Work Planning				
MN00IWP035	Notice RAPCA for Asbestos	20	01OCT01	01NOV01
Safe Shutdown				
MN00ISS000	SAFE SHUTDOWN	90	01OCT01	18MAR02
MN00ISS025	Remove Waste	12	05NOV01	26NOV01
MN00ISS040	Isolate Utilities	20	12FEB02	18MAR02
Decon & Demolition				
MN00IDD000	DECON & DEMOLITION	211	05NOV01*	26NOV02
MN00IDD010	Perform Building Decontamination	50	05NOV01	11FEB02
MN00IDD015	Demolish Building	40	19MAR02	28MAY02
MN00IDD020	Remove Foundation/Soil	20	29MAY02	02JUL02
MN00IDD045	Debris Sorting, Packaging, T&D	1	19MAR02	19MAR02
MN00IDD047	Site Restoration	10	07NOV02	26NOV02
MN00IDD050	Write Draft Final Report	5	27NOV02	04DEC02
MN00IDD055	Deliver Draft Final Report to DOE	0		04DEC02
MN00IDD060	DOE Review/Approve Draft Final Report	0	05DEC02	04DEC02
MN00IDD065	Review/Incorporate Comments - Final Report	4	05DEC02	11DEC02
MN00IDD070	Deliver Final Report to DOE	1	12DEC02	12DEC02*



Start Date	01OCT97
Finish Date	21AUG06
Data Date	01OCT01
Run Date	15JAN02 06:22

Early Bar
Progress Bar
Critical Activity

BWXT of Ohio

Project Schedule
Building "I"

Figure 5

01-Oct-97@15:00

Date	Revision	Checked	Approved

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

Potential radioactive and/or chemical hazardous waste contamination, if present in the soil, could migrate to groundwater.

7.0 OUTSTANDING POLICY ISSUES

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

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 the CERCLA and NCP, for the performance of this removal action. The funding for this removal action 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 I Building site, 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 action and we recommend initiation of the removal action.

Approved:

Robert S. Rothman, Remedial Project Manager, DOE/MEMP Date

Timothy J. Fischer, Remedial Project Manager, US EPA 2/5/02 Date

Brian K. Nickel, Project Manager, OEPA 2/11/02 Date

10.0 REFERENCES

DOE 1993a Operable Unit 9, Site Scoping Report: Volume 7 – Waste Management, Final, Revision 0, February 1993.

DOE 1993b Federal Facilities Agreement, July 15, 1993.

DOE 1995 Policy on Decommissioning Department of Energy Facilities Under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), U.S. Department of Energy, U.S. Environmental Protection Agency, May 22, 1995.

EG&G 1996 Environmental Appraisal Report of the Mound Plant, March 1996.

HOK/K 1996 Phase I Environmental Site Assessment of DOE Mound, I Building, July1996.

DOE 1998 Mound Site Radionuclides by Location, Technical Manual MD-22153, Issue 2, March 1998.

OEPA 1998 List of Ohio Administrative Code and Ohio Revised Code ARARs, letter from Nickel to Kleinrath, August 19, 1998.

DOE 1999 Asbestos Program Manual, Technical Manual MD-10391, Issue 6, June 1999.

DOE 2000 I Building Historic American Building Survey, Mound Document MD-22153, Draft, October 2000.

DOE 2001 Mound Site Exit Project, I Building Final Status Survey Plan, March 2001.

Appendix A

I Building Related PRS Recommendations

MOUND PLANT
PRS 110
SOIL CONTAMINATION -I BUILDING

RECOMMENDATION:

PRS 110 was created due to VOC detections found during the quantitative OU5, Reconnaissance Soil Gas Survey.

Toluene was detected at 4,788 ppb, whereas the calculated guideline criteria is 414,800 ppb. PCE (tetrachloroethene) was found at 1,117 ppb (vs. 3,100 ppb calculated guideline criteria). 1,1,1,-TCA (trichloroethane) was detected at 148 ppb (vs. 173,400 ppb calculated guideline criteria). Freon-113 was detected at 2,934 ppb (no guideline criteria exists for freon-113).

This PRS was included in the Radiological Site Survey. Plutonium was found at 1.87 pCi/g, vs. a guideline of 25 pCi/g ALARA. Thorium was below 2 pCi/g (vs. 5 pCi/g guideline). Tritium was also found at 1,160 pCi/L in the soil moisture (vs. 20,000 pCi/L MCL).

The organic chemicals detected are below the calculated acceptable guideline criteria, and the radiation survey in the area found the radionuclides to be below the guidelines or regulatory standards. Therefore, NO FURTHER ASSESSMENT is recommended for PRS 110.

CONCURRENCE:

DOE/MB: Arthur W. Kleinrath 3/18/97
Arthur W. Kleinrath, Remedial Project Manager (date)

USEPA: Timothy J. Fischer 3/18/97
Timothy J. Fischer, Remedial Project Manager (date)

OEPA: Brian K. Nickel 3/18/97
Brian K. Nickel, Project Manager (date)

SUMMARY OF COMMENTS AND RESPONSES:

Comment period from 5/8/97 to 6/16/97

☒ No comments were received during the comment period.

☐ Comment responses can be found on page _____ of this package.

MOUND PLANT
PRS 237
Soil Contamination B Area North of I Building

RECOMMENDATION:

Potential Release Site (PRS) 237 became a PRS due to the elevated detections of cesium-137 and cobalt-60 found during the Site Survey Project. Cesium-137 was found at 10 pCI/g and Cobalt-60 at 82 pCi/g as compared to the Guideline Value of 0.46 pC/g and 0.1pCi/g respectively. Subsequent sampling in 1995 detected no radioactive contamination in the surrounding area. PRS 237 is located approximately 100 feet northwest of I Building at the edge of the road.

I Building was the location of explosive research, testing and manufacturing in the late 1950s and early 1960s. No additional contamination generating processes or activities are known to have occurred in this area.

The Core Team originally recommended Further Assessment for PRS 237. Subsequently, the cost of further investigation versus the cost of removing the potentially contaminated soils was evaluated. Cost estimates indicate that the cost of removal is not significantly greater than the cost of further assessment at PRS 237. Additionally Further Assessment findings may indicate the need for a Response (removal) Action, resulting in costs associated with both Further Assessment and Response Action. Therefore, the Core Team recommends a <u>RESPONSE ACTION</u> as a more cost-effective course of action for PRS 237.

CONCURRENCE:

DOE/MEMP: _____ 9/30/97
Arthur W. Kleinrath, Remedial Project Manager (date)

USEPA: Timothy J. Fischer 9/26/97
Timothy J. Fischer, Remedial Project Manager (date)

OEPA: Brian K. Nickel 9/23/97
Brian K. Nickel, Project Manager (date)

SUMMARY OF COMMENTS AND RESPONSES:

MOUND PLANT
PRS 408

RECOMMENDATION:

PRS 408 is a chemical (Shell Rotella 10W lubricating oil) contamination soils area located in Release Block R, north of I Building. It was the blowdown area for the nitrogen tanks of the "Prism" nitrogen production membrane system, which supplied house nitrogen to R and SW buildings. The system operated for about two years from 1989 to 1991. Pump/compressor oil was released onto the ground during the blowdown process of the nitrogen tanks which relieved pressure in the tanks.

The 1983 OU3, Radiological Site Survey analyzed surface soil samples in and around PRS 408. All plutonium sampling results were below the guideline criteria of 25 pCi/g. All thorium levels were below the 5 /15 pCi/g regulatory standard.

Excavation of chemically contaminated soils was completed on December 18, 1996. Approximately 23 cu. yd. of soil was excavated and staged at the Mound ER Bioremediation facility. Verification sampling of the site performed on December 18, 1996 confirmed that contamination levels were below the clean-up criteria. Metals normally found in lubricating oil including chromium, copper and nickel were below background levels.

Therefore, NO FURTHER ASSESSMENT is recommended for PRS 408.

CONCURRENCE:

DOE/MB: Arthur W Kleinrath 5/13/97
Arthur W. Kleinrath, Remedial Project Manager (date)

USEPA: Timothy J. Fischer 5/13/97
Timothy J. Fischer, Remedial Project Manager (date)

OEPA: Brian K. Nickel 5/14/97
Brian K. Nickel, Project Manager (date)

SUMMARY OF COMMENTS AND RESPONSES:

Comment period from 6/17/97 to 7/18/97

☐ No comments were received during the comment period.

☒ Comment responses can be found on page 1-2 of this package.

MOUND PLANT
PRS #423, 424, 425, 426, 427, 428
MAIN HILL UNDERGROUND LINES
H Building to WD Building

RECOMMENDATION:

PRS 423, 424, 425, 426, 427, and 428 were identified because the underground line segments carried radioactively contaminated effluent from H Building operations to the Waste Disposal building (WD).

Therefore, a RESPONSE ACTION is recommended for PRS 423, 424, 425, 426, 427, and 428.

CONCURRENCE:

DOE/MEMP: _____ 7/18/01
Robert S. Rothman, Remedial Project Manager (date)

USEPA: _____ 7/18/01
Timothy J. Fischer, Remedial Project Manager (date)

OEPA: _____ 7/18/01
Brian K. Nickel, Project Manager (date)

SUMMARY OF COMMENTS AND RESPONSES:

Comment period from _____ to _____

☐ No comments were received during the comment period.

☐ Comment responses can be found on page _____ of this package.

R

Appendix B

Application of ARARs to Wastes Expected from I Building Removal Action

I 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 done in a manner that is protective of human health and the environment. The regulation that is applied to the management of hazardous waste generated at a CERCLA remediation site is RCRA. The following ARARs (Applicable, or Relevant and Appropriate Requirements) table is the regulatory analysis of how RCRA will be applied to the management of hazardous waste during the maintenance, decommissioning, and demolition of I Building.

Demolition of a facility takes time and planning to accomplish, and during that time the facility must be maintained in a safe condition. Hazardous waste that may be generated in I Building during the maintenance time period is anticipated to be lead acid batteries from back-up electrical systems and waste oil from vacuum pumps. Decommissioning activities take place in preparation for building demolition. Hazardous waste that could be generated from this activity include lead sheeting, PCB light ballast, energetic materials, freon-containing compressors, oil in pumps and reservoirs, MOCA (4,4'-methylene-bis(2-chloroaniline)), tritium exit signs, mercury vapor lights, smoke detectors (1 micro Ci of Am-241 each), and friable asbestos insulation.

Waste from maintenance and decommissioning activities will be managed in accordance with the ARAR table until sufficient amounts are generated for transfer to an onsite hazardous waste facility. These amounts are typically 55 gallons for liquids and a 4-foot by 4-foot wooden skid for solids. Once the building has been decommissioned, the actual deconstruction / demolition of the building occurs. This activity involves the removal of the structure and the foundation. Hazardous waste generated from this last activity will be approximately 100 lead pipe joints and one-lead lined sump approximately 16x16x12 inches. This waste will be managed at the job site and then transferred to an onsite hazardous waste storage facility.

The lead and oil wastes were collected and staged in various site locations for disposition by the Waste Management Group. The lead sheeting and batteries have been removed and packaged for shipment to a hazardous waste site. Waste oil is bulked and sent to Waste Management for disposal at an off site hazardous waste incinerator. Potential for exposure to workers or the public is extremely low, since waste staging areas are unoccupied and secured from unauthorized entry.

Current schedules have all work associated with I Building demolition completed by June 2002.

Proposed Actions Involving Waste	Specific Actions	ARARs	Implementation of ARARs
Solids: Includes: - lead pipe joints (approx. 100) - lead-acid batteries (1 dozen) - light ballasts (approximately. 300) - smoke detectors Am-241 (17) - additional solid waste materials not previously considered - lead sheeting (250 sq-ft) - lead-lined pit - mercury vapor lights (5) - tritium exit signs (35)			
1. Following generation, solid hazardous wastes will be stored in drums, on pallets, or in other appropriate containers pending characterization and disposition.	1. Storage of solids will comply with the following RCRA requirements:	1. Hazardous waste storage ARARs:	1. An appropriate checklist will be developed for waste material based on physical form and types of waste stored. This checklist will be documented either in the building manager's logbook or designated project files.
	a. Condition of containers	a. 40 CFR 265.171; OAC 3745-55-71	a. Checklist 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. Container incompatibility is not expected for solids listed.
	c. Management of containers	c. 40 CFR 265.173; OAC 3745-55-73	c. Checklist element - containers closed except when adding or removing waste.

Proposed Actions Involving Waste	Specific Actions	ARARs	Implementation of ARARs
	d. Inspections	d. 40 CFR 265.174; OAC 3745-55-74: 40 CFR 264.15 (a), (c); OAC 3745-54-15 (A), (C)	d. Document inspections quarterly in Building Manager's log or designated project files; visual inspections done periodically by personnel in the area.
	e. Requirements for incompatible wastes	e. 40 CFR 265.177; OAC 3745-55-77	e. Checklist element – incompatible wastes will have adequate segregation if present in the same storage area.
	f. Marking requirements	f. 40 CFR 262.34 (a) (3), (c) (1) (ii); OAC 3745-52-34 (A) (3), (C) (1) (b)	f. Checklist element - containers marked with words to indicate contents, or as "hazardous waste".
	g. Required Equipment	g. 40 CFR 265.32 (a), (b), (c), (d); OAC 3745-54-32 (A), (B), (C), (D)	g. Checklist 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. Checklist element - verify that communication devices in the building are operable or that other means of communication are available.

Proposed Actions Involving Waste	Specific Actions	ARARs	Implementation of ARARs
	i. Training	i. 40 CFR 265.16(a),(b),(c); OAC 3745-54-16 (A),(B), (C)	i. Personnel will be trained to perform inspections.
	j. Treatment	j. Specific ARARs will be determined at the time treatment is proposed and the treatment plan is submitted	
2. Solids were surveyed and/or sampled to determine hazardous and radiological characteristics.	2. Wastes must be characterized following generation.	2. Characterization ARARs:	
	a. RCRA 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 kept in the project file.
	b. Radiological characterization	b. No RCRA ARARs apply	
Liquids: Including: - Vacuum pump oil / (less than 55 gallons) - Vacuum pump oil (5 gallons) - Additional liquid waste materials not previously considered			
1. Potentially hazardous liquids were contained and packaged during the safe shutdown activities.	1. Pumps were drained as part of the safe shutdown activity prior to demolition.	1. RCRA ARARs do not apply to the systems.	1.

Proposed Actions Involving Waste	Specific Actions	ARARs	Implementation of ARARs
2. Liquids have been characterized to determine RCRA and radiological status.	2. Liquids must be characterized following generation.	2. Characterization ARARs:	2.
	a. RCRA 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.
	b. Radiological characterization	b. No RCRA ARARs apply.	
3. When generated, liquids were bulked and stored pending treatment (if necessary), and disposition.	3. Storage of hazardous waste liquids will comply with the following RCRA requirements:	3. Hazardous waste storage ARARs:	3. An appropriate checklist will be developed for waste material based on physical form and types of waste stored. This checklist will be documented either in the building manager's logbook or designated project files.
	a. Condition of containers	a. 40 CFR 265.171; OAC 3745-55-71	a. Checklist 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. Checklist element - appropriate container used for storage of liquids (typically metal or poly container).

Proposed Actions Involving Waste	Specific Actions	ARARs	Implementation of ARARs
	c. Management of containers	c. 40 CFR 265.173; OAC 3745-55-73	c. Checklist element - containers closed except when adding or removing waste.
	d. Inspections	d. 40 CFR 265.174; OAC 3745-55-74 40 CFR 264.15 (a), (c); OAC 3745-54-15 (A), (C)	d. Document inspections monthly in Building Managers log or designated project files; visual inspections done periodically by personnel in the area.
	e. Requirements for incompatible wastes	e. 40 CFR 265.177; OAC 3745-55-77	e. Checklist element – incompatible wastes will have adequate segregation if present in the same storage area.
	f. Marking requirements	f. 40 CFR 262.34 (a) (3), (c) (1) (ii); OAC 3745-52-34 (A) (3), (C) (1) (b)	f. Checklist element - containers marked with words to indicate contents, or as "hazardous waste".
	g. Required Equipment	g. 40 CFR 265.32 (a), (b), (c), (d); OAC 3745-54-32 (A), (B), (C), (D)	g. Checklist element - verify that appropriate equipment is available on plant site or in building.

Proposed Actions Involving Waste	Specific Actions	ARARs	Implementation of ARARs
	h. Communication or Alarm System	h. 40 CFR 265.34 (a), (b); OAC 3745-54-34 (A), (B)	h. Checklist element - verify that communication devices in the building are operable or that other means of communication are available.
	i. Training	i. 40 CFR 265.16 (a), (b), (c); OAC 3745-54-16 (A), (B), (C)	i. Person will be trained to performs inspections.
	j. Treatment	j. Specific ARARs will be determined at the time treatment is proposed and the treatment plan is submitted	

Appendix C

Risk-Based Guideline Value Calculations for Uranium-233 and Tritium

Construction Worker - Soil/Sediment Exposure Pathway

Variables defined in Table 4.1.3 p93 RBGV Report 3/97
Equations listed in Table 4.1.3 p92 RBGV Report 3/97

Enter the following:

Series U-233 to Bi-209

Target Risk	1.00E-05	
Oral Cancer Slope Factor	1.45E-09	risk/pCi
Inhalation Cancer Slope Factor	2.37E-07	risk/pCi
External Cancer Slope Factor	1.17E-06	risk/pCi

Cancer Slope Factors
HEAST Table 4 (April 2001)

Series Segment		Ingestion	Inhalation	External Exp
U-233	Th-229	1.60E-10	1.16E-08	9.82E-10
Th-229	Bi-209	1.29E-09	2.25E-07	1.17E-06
	Total	1.45E-09	2.37E-07	1.17E-06

Ingestion			
Target Risk	TR	1.00E-05	
Exposure Duration 1	ED_1	5	yrs
Exposure Frequency	EF	250	days/yr
Oral Cancer Slope factor	SF_0	1.45E-09	risk/pCi
Conversion Factor 1	CF_1	0.001	g/mg
Ingestion rate - Soil	IR_{soil}	480	mg/day
Radionuclide Concentration in Soil (Ingestion)	CS_{ing}	11.49	pCi/g
Inhalation			
Inhalation Cancer Slope factor	SF_i	2.37E-07	risk/pCi
Conversion Factor 2	CF_2	1000	g/kg
Inhalation Rate	IR_{air}	20	m^3/day
Soil to Air Volatilization Factor	VF	1	m^3/kg
Particulate Emission Factor	PEF	4.28E+09	m^3/kg
Radionuclide Concentration in Soil (Inhalation)	CS_{inh}	7.24E+03	pCi/g
External			
External Cancer Slope Factor	SF_e	1.17E-06	risk/pCi
Exposure Duration 2	ED_2	3.425	yrs
Gamma Shielding Factor	S_e	0.1	
Gamma Exposure Time factor	T_e	0.33	
Radionuclide Concentration in Soil (External Exposure)		8.32	pCi/g
Total			
	CS_{TOTAL}	4.83E+00	pCi/g

Construction Worker - Soil/Sediment Exposure Pathway

Variables defined in Table 4.1.3 p93 RBGV Report 3/97
Equations listed in Table 4.1.3 p92 RBGV Report 3/97
Slope Factors from HEAST Table 4

Enter the following:

Radionuclide		Tritium
Target Risk		1.00E-05
Oral Cancer Slope Factor		7.15E-14 risk/pCi
Inhalation Cancer Slope Factor		9.59E-14 risk/pCi
External Cancer Slope Factor		0.00E+00 risk/pCi

Ingestion

Target Risk	TR	1.00E-05	
Exposure Duration 1	ED_1	5	yrs
Exposure Frequency	EF	250	days/yr
Oral Cancer Slope factor	SF_0	7.15E-14	risk/pCi
Conversion Factor 1	CF_1	0.001	g/mg
Ingestion rate - Soil	IR_{soil}	480	mg/day
Radionuclide Concentration in Soil (Ingestion)	CS_{ing}	233100.23	pCi/g

Inhalation

Inhalation Cancer Slope factor	SF_i	9.59E-14	risk/pCi
Conversion Factor 2	CF_2	1000	g/kg
Inhalation Rate	IR_{air}	20	m^3/day
Soil to Air Volatilization Factor	VF	1	m^3/kg
Particulate Emission Factor	PEF	4.28E+09	m^3/kg
Radionuclide Concentration in Soil (Inhalation)	CS_{inh}	1.79E+10	pCi/g

External

External Cancer Slope Factor	SF_e	0.00E+00	risk/pCi
Exposure Duration 2	ED_2	3.425	yrs
Gamma Shielding Factor	S_e	0.1	
Gamma Exposure Time factor	T_e	0.33	
Radionuclide Concentration in Soil (External Exposure)		#DIV/0!	pCi/g

Total

	CS_{TOTAL}	2.33E+05	pCi/g