3589-87-I-DOE-177

**Department of Energy**
Oak Ridge Operations
Weldon Spring Site
Remedial Action Project Office
Route 2, Highway 94 South
St. Charles, Missouri 63303

October 16, 1987



Ms. Katherine Biggs
United States Environmental
Protection Agency
Region VII
726 Minnesota Avenue
Kansas City, Kansas 66101

Dear Ms. Biggs:

INTERIM RESPONSE ACTIONS (IRA'S)

Enclosed are six (6) copies of the documentation for the following four (4) Interim Response Actions:

1. Dismantling of Building 401
2. Dismantling of Building 409
3. Removal of PCB Transformers
4. Debris Consolidation

In addition, we are sending under separate cover, six (6) copies of the technical specifications and drawings from each of the four (4) proposed bid packages.

It is our intention to have copies of these documents in place in the repositories for public inspection, and to provide public notice of their availability on October 19, 1987. This will initiate the twenty one (21) day comment period.

If you have any questions, please give me a call.

Sincerely,

J H McCracken

Rod Nelson
Project Manager
Weldon Spring Site
Remedial Action Project

Enclosures:
As stated

cc w/enclosures:
D. Bedan, MDNR

The public comment period on this interim remedial action ends on November 9, 1987. Comments may be sent to any of the following:

1. Ms. Katherine Biggs
   U. S. Environmental Protection Agency
   Region VII
   726 Minnesota Avenue
   Kansas City, Kansas 66101

2. Mr. David Bedan
   Missouri Department of Natural Resources
   Post Office Box 176
   Jefferson City, Missouri 65102

3. Mr. Rodney R. Nelson
   Weldon Spring Site Remedial Action Project
   Route 2, Highway 94 South
   St. Charles, Missouri 63303

# DISMANTLING OF BUILDING 401

## Site Background

The Weldon Spring site is located in St. Charles County, Missouri, about 48 km (30 mi) west of St. Louis. From 1941 to 1944, the U.S. Department of the Army operated the Weldon Spring Ordnance Works at the site for production of trinitrotoluene and dinitrotoluene. In the mid 1950s, a portion of the property was transferred to the U.S. Atomic Energy Commission (AEC), a predecessor of the U.S. Department of Energy (DOE).

From 1957 to 1966, the AEC operated a uranium processing facility at the Weldon Spring site. Impure uranium ore concentrates and some scrap uranium metal were processed at the chemical plant, and thorium-containing materials were also processed on an intermittent basis. Following closure by the AEC, the Army reacquired the chemical plant in 1967 and began converting the facilities to produce herbicides. The buildings were partially decontaminated and some equipment was dismantled. In 1969, prior to becoming operational, the herbicide project was canceled. Since that time, the plant has remained essentially unused and in caretaker status. The Army returned a portion of the Ordnance Works property to the AEC in 1971 but retained control of the chemical plant buildings. In 1984, the Army repaired several of these buildings; decontaminated some of the floors, walls, and ceilings; and removed some contaminated equipment to areas outside of the buildings. In 1985, custody of the chemical plant property was transferred to DOE.

Building 401, the steam plant, is located in the northwest section of the Weldon Spring site (Fig. 1). The coal-fired steam plant previously provided the energy necessary to support uranium- and thorium-processing activities at the site.

## Site Characterization

Building 401 is a three-story rectangular structure with approximate dimensions of 33 m × 30 m × 12 m (107 ft × 98 ft × 38 ft) and nearly 1,600 $m^2$ (17,500 $ft^2$) of floor space. Equipment and piping within the plant are generally in place and intact.

The first floor of the building contains numerous pieces of process equipment. The second floor contains small offices and an instrument control room and provides access to three external coal-fired boilers. Structural steel frames support the boilers and the induced-draft fans that previously discharged exhaust gases to the atmosphere via two external steel stacks. The building's third floor houses equipment related to its previous use as a service area for the overhead crane and storage tanks.

The roof of Building 401 consists of three tiers constructed of metal decking, insulation, and built-up tar and gravel. The floors are concrete, and the walls are composed of corrugated cement-asbestos siding attached to structural steel and concrete. An associated coal conveyor system also contains asbestos siding, and a major portion of the plant's boilers and steam and process equipment lines are insulated with

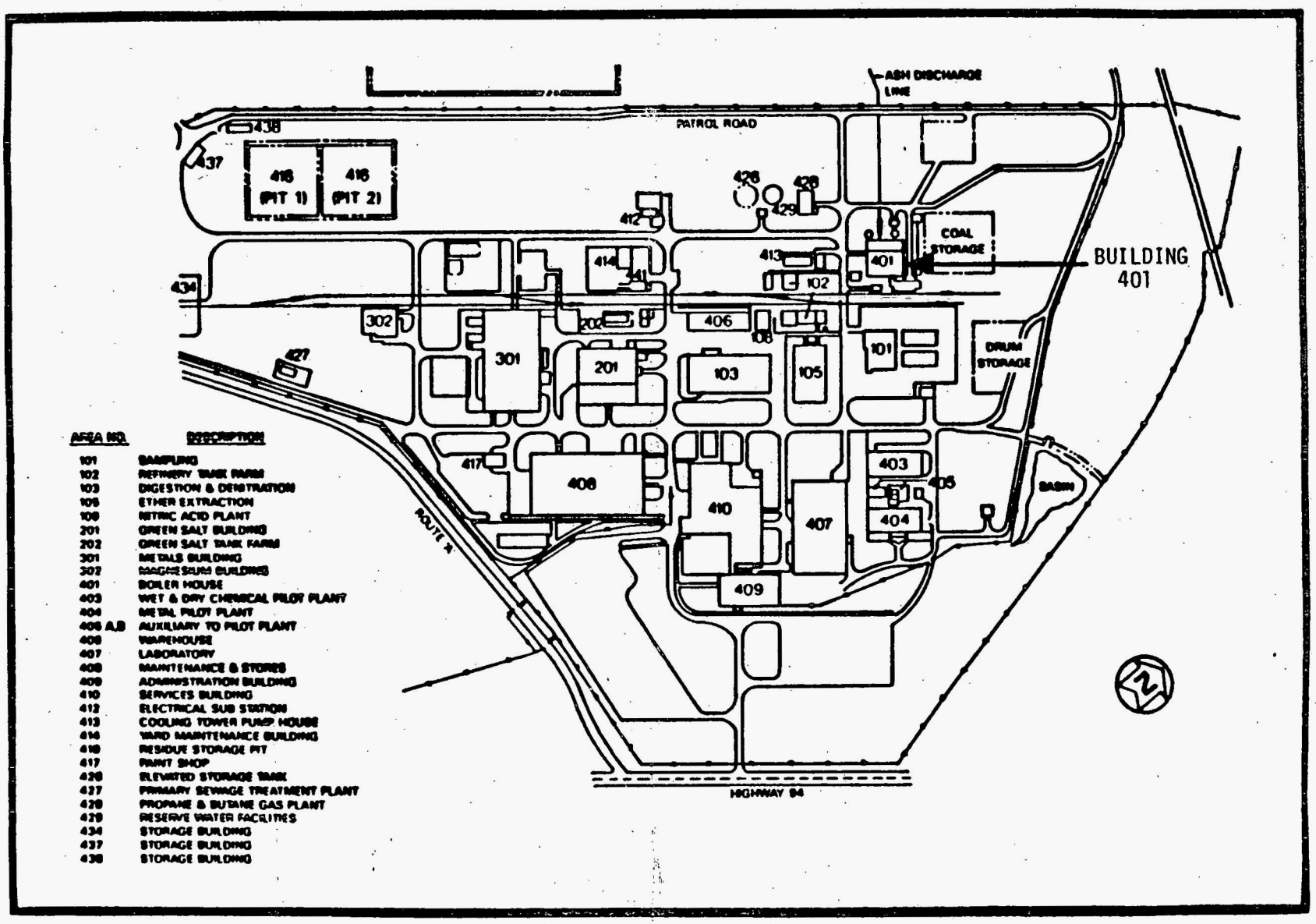


**FIGURE 1 Location of Major Structures at the Weldon Spring Site (Source: Bechtel National 1986)**

asbestos-containing materials. Although the siding is currently intact and most of the insulating material is in good condition, portions of the insulation have deteriorated and fallen to the floor in some areas.

Steam was produced in Building 401 by the combustion of coal. Coal combustion involves no radioactive material other than the very low concentrations of radioactive materials that occur naturally in coal. Therefore, the potential for radiological contamination of the building's interior would have resulted only from the movement of personnel and equipment into and out of the building, and the radiological survey of the plant was conducted with emphasis on traffic areas and portable equipment.

Results of the radiological survey, summarized in Table 1, indicate that contamination levels of the building's floors, walls, and equipment are below DOE's release limits for unrestricted use. These limits are 1,000 disintegrations per minute (dpm)/100 $cm^2$ removable alpha contamination and 5,000 dpm/100 $cm^2$ total alpha contamination (U.S. Department of Energy 1987). In fact, the highest reported value for total (fixed plus removable) contamination is below the lower removable contamination limit.

Results of a beta-gamma radiological survey of the roof, summarized in Table 2, indicate the presence of radioactive contaminants in the tar and gravel layer. The contamination resulted from airborne releases of radioactive dust (primarily containing uranium and its decay products) that occurred during the chemical plant processing period. Because the contamination has likely migrated into the tar (resulting in attenuation of alpha particles), beta-gamma activity was measured to provide an indication of the alpha activity associated with the roof layer. Survey results indicate that the contamination levels in the built-up tar/gravel roofing material will require that these materials be disposed of as radioactive waste. To confirm the need to treat the roofing material as radioactive waste, two samples of the tar/gravel layer were collected and analyzed by gamma spectrometry. The results, presented in Table 3, show that the primary contaminant is uranium.

## Threat to Public Health and the Environment

Although most of Building 401 remains intact, some deterioration has occurred during the past two decades of disuse. At certain locations, asbestos-containing material has begun to deteriorate and fall to the floor. Interior air monitoring results indicate that concentrations of asbestos fibers do not currently pose a significant inhalation hazard. However, if deterioration of the building continues, the potential threat to public health posed by asbestos exposure will increase. In addition, the radiological contamination of the roof's tar/gravel layer poses an exposure hazard to workers in the area.

**TABLE 1 Summary of Alpha Contamination in Building 401[a]**

| | | Measured Total (Fixed plus Removable) Alpha Activity | |
|---|---|---|---|
| Level | Surface | Range (dpm/100 $cm^2$) | Average (dpm/100 $cm^2$) |
| 1 | Floor | 0-224 | 81 |
| | Walls | 0-143 | 75 |
| | Equipment | 0-265 | 118 |
| 2 | Floor | 20-673 | 200 |
| | Walls | 41-673 | 206 |
| | Equipment | 20-224 | 124 |
| 3 | Floor | 61-388 | 226 |
| | Walls | 41-224 | 135 |
| | Equipment | 20-143 | 82 |

[a]Does not include the roof.

Source: Data from MK-Ferguson and Jacobs (1987b).

**TABLE 2 Summary of Radioactivity Measurements on the Roof (Tar/Gravel) of Building 401**

| | Beta-Gamma Measurements | |
|---|---|---|
| Tier | Range (dpm/100 $cm^2$) | Average (dpm/100 $cm^2$) |
| 1 | 1,997-5,414 | 3,627 |
| 2 | 3,341-5,261 | 4,077 |
| 3 | 3,533-3,955 | 3,763 |

Source: Data from MK-Ferguson and Jacobs (1987b).

**TABLE 3 Gamma Spectrometry Measurements of the Tar/Gravel Roof Layer of Building 401**

| | Radionuclide Concentration (pCi/g) | | |
|---|---|---|---|
| Sample | Uranium-238 | Radium-226 | Radium-228 |
| 1 | 106.3 | 3.1 | 1.6 |
| 2 | 58.1 | 2.4 | 1.3 |

Source: Data from MK-Ferguson and Jacobs (1987a).

## Response Objectives

The objectives of this response action are as follows:

1. Reduction of the potential health hazard due to asbestos exposure from asbestos-containing materials in Building 401;

2. Reduction of the potential health hazard due to radiation exposure associated with uranium contamination of the roof's tar/gravel layer; and

3. Removal of the potential safety hazard to on-site personnel associated with the deteriorating building.

## Proposed Response Action Alternatives

Interim response actions are designed to ensure the health and safety of on-site personnel and to minimize or preclude off-site releases of contamination. These actions are limited to those that can be performed under the Comprehensive Environmental Response, Compensation, and Liability Act/Superfund Amendments and Reauthorization Act and remain within the constraints of the Council on Environmental Quality's regulations for the National Environmental Policy Act (i.e., actions will be limited to those that do not have an adverse environmental impact nor limit the choice of reasonable alternatives).

Alternative response actions identified for Building 401 are:

1. No action;

2. Removal of the tar/gravel roof layer for on-site storage, in-situ stabilization of asbestos-containing material, and repair of the building's structural deficiencies;

3. Removal of the tar/gravel roof layer for on-site storage, removal of asbestos-containing material for off-site disposal, and repair of the building's structural deficiencies;

4. Dismantlement of Building 401, with on-site storage of all material that exceeds the radiological criteria for unrestricted release (i.e., the tar/gravel roof layer) and on-site disposal of all other material; or

5. Dismantlement of Building 401, with off-site disposal of all material except that which exceeds the radiological criteria for unrestricted release (i.e., the tar/gravel roof layer, which will be stored on-site), and reclamation of reusable materials that are not radiologically or chemically contaminated for salvage or on-site use.

**Analysis of Alternatives**

Alternative 1 affords no reduction in the potential health threat posed by radioactive and asbestos-containing material associated with Building 401. There would be no improvement in environmental conditions at the site if no action were taken. This alternative presents no technical barriers and costs nothing in the short term. However, the building is scheduled for eventual demolition. The costs associated with deferred dismantlement would be higher than those for dismantlement at the current time, due to periodic maintenance activities required until future dismantlement. Most importantly, Alternative 1 is effectively precluded by institutional factors related to the community's strong desire for timely response actions at the Weldon Spring site.

Alternatives 2 through 5 are all technically feasible. Each of these alternatives reduces the potential hazard associated with asbestos and radiation exposure. Implementation of Alternatives 2 and 3 would be more expensive in the long term, due to the need to repair structural deficiencies and perform future maintenance activities at Building 401. In addition, Alternatives 2 and 3 do not fully address the public sentiment for expedited response at the site. Even though Alternative 4 would be less expensive than Alternative 5, it is not consistent with DOE's intention to dispose of all non-radioactive waste off-site. Therefore, following the screening and analysis process for interim response action alternatives, Alternative 5 has been identified as the preferred alternative.

**Description of Proposed Action**

The proposed interim response action involves demolition of Building 401 with off-site disposal of all material meeting the criteria for unrestricted release -- including asbestos-containing material. The response action will include the following operations.

1. Removal of the tar/gravel roofing material to a depth of approximately 5 cm (2 in.) for controlled on-site storage in a dry,

concrete-floored building currently located at the Weldon Spring site; and

2. Removal of all asbestos-containing material, equipment, and piping, and dismantlement of the remainder of Building 401 and ancillary structures, i.e., the external stacks and boilers, followed by scrap recovery and off-site disposal of the resultant waste material at a licensed sanitary landfill in Missouri.

The foundation and below-grade piping are not part of this action and will be addressed at a later date.

Under the proposed action, Building 401 will be dismantled in full compliance with all applicable regulations and procedures, with off-site disposal of all nonradioactive material (material that exceeds the radiological criteria for unrestricted release will be stored on-site). A representative fraction of material to be disposed of off-site will be radiologically surveyed prior to release. Asbestos removal and removal of the radioactively contaminated roof layer will be also performed in accordance with all applicable requirements. This compliance will ensure protection of the safety and health of on-site workers as well as limit off-site releases of contaminants.

Demolition of Building 401 will proceed in accordance with all safety requirements and practices. Demolition at this time will preclude the associated adverse impacts on health and the environment resulting from continued deterioration of the building. Removal of the demolition debris will be consistent with DOE's goal of removing all nonradioactive waste from the site.

The total waste volume is estimated to be 2,800 $m^3$ (3,600 $yd^3$), of which about 400 $m^3$ (500 $yd^3$) is asbestos-containing material and 40 $m^3$ (50 $yd^3$) is radioactive waste. The nonradioactive waste will be shipped to a licensed sanitary landfill in Missouri, requiring an estimated 250 truckloads.

## References

Bechtel National, Inc., 1986, *Characterization Plan for the Weldon Spring Chemical Plant*, DOE/OR/20722-95, prepared by Advanced Technology Division for U.S. Department of Energy, Oak Ridge Operations Office, Oak Ridge, Tenn. (Draft, Feb.).

MK-Ferguson Company and Jacobs Engineering Group, 1987a, *Weldon Spring Site Remedial Action Project, Hp Ge Radio-Isotope Analysis*, ES-19-01-12, prepared by Environmental, Safety, and Health Department, Weldon Spring, Mo. (July).

MK-Ferguson Company and Jacobs Engineering Group, 1987b, *Radiological Survey Report for the Weldon Spring Chemical Plant Steam Production Facility*, prepared for U.S. Department of Energy, Oak Ridge Operations Office, Oak Ridge, Tenn. (Sept.).

U.S. Department of Energy, 1987, *U.S. Department of Energy Guidelines for Residual Radioactivity at Formerly Utilized Sites Remedial Action Program and Remote Surplus Facilities Management Program Sites* (Revision 2, March).