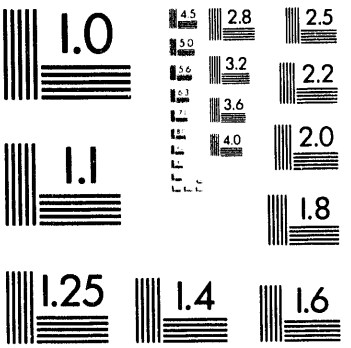
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Y-12

Report No. Y/EN-5214

OAK RIDGE Y-12 PLANT

MARTIN MARIETTA

Federal and State Regulatory Requirements for the D&D of the Alpha-4 Building, Y-12 Plant, Oak Ridge, Tennessee

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FEDERAL AND STATE REGULATORY REQUIREMENTS FOR THE D&D OF THE ALPHA-4 BUILDING, Y-12 PLANT, OAK RIDGE, TENNESSEE

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The U.S. Department of Energy (DOE) has begun the decontamination and decommissioning (D&D) of Building 9201-4 (Alpha-4) at the Oak Ridge Y-12 Plant,* Oak Ridge, Tennessee. The Alpha-4 Building was used from 1953 - 1962 to house a column exchange (Colex) process for lithium isotope separation. This process involved electrochemical and solvent extraction processes that required substantial quantities of mercury.

Presently there is no law or regulation mandating decommissioning at DOE facilities or setting *de minimis* or "below regulatory concern" (BRC) radioactivity levels to guide decommissioning activities at DOE facilities. However, DOE Order 5820.2A, Chap. V (*Decommissioning of Radioactively Contaminated Facilities*), requires that the regulatory status of each project be identified and that technical engineering planning must assure D&D compliance with all environmental regulations during cleanup activities. To assist in the performance of this requirement, this paper gives a brief overview of potential federal and state regulatory requirements related to D&D activities at Alpha-4. Compliance with other federal, state, and local regulations not addressed here may be required, depending on site characterization, actual D&D activities, and wastes generated. Additional drivers for D&D activities may be established through negotiated agreements, such as the Federal Facilities Agreement (FFA) and the DOE/Environmental Protection Agency (EPA) Mixed Waste Federal Facilities Compliance Agreement (FFCA). This paper only addresses federal and state regulatory requirements; it does not attempt to address the DOE Orders or Martin Marietta Energy Systems policy and procedures.

D&D includes decontamination, dismantlement, and disposal of wastes generated. Support activities for D&D operations include surveillance and maintenance and worker protection. Although industrial safety and hygiene and radiation protection are important components of the D&D process, given the tremendous range of worker exposure scenarios possible, this paper will not attempt to define regulatory requirements for worker safety during D&D activities at Alpha-4. However, the Occupational Safety and Health Administration (OSHA) regulations are discussed briefly to provide some insight to acceptable worker exposure levels to specific contaminants at Alpha-4 such as lead or asbestos.

Decontamination activities at Alpha-4 will involve draining of mercury from equipment and associated piping; decontamination of all remaining equipment and

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building materials including removal of any additional Resource Conservation and Recovery Act (RCRA) waste, polychlorinated biphenyls (PCBs), asbestos, and radioactive materials. Based on risk reduction considerations, cost-benefit analysis, and waste minimization concerns, current planning activities are only focused on this decontamination phase and do not address dismantlement to grade.

Dismantlement of Alpha-4 includes removal of remaining RCRA hazardous waste from structural components, machinery, process piping, etc., and disassembly. Further dismantlement activities consist of disassembly, rough cleaning, and proper storage of ancillary equipment and associated materials outside of the building; demolition of the building structure to grade level; and managing the waste through the waste management (WM) Program. There are no technology-specific regulatory requirements governing dismantlement other than worker protection standards. Releases of fugitive dust or asbestos are regulated under the CAA; it is assumed that there will not be any releases to surface water during dismantlement activities at Alpha-4.

Handling, processing, treatment, storage, or disposal of wastes, treatment residues, scrap, and salvage materials are WM issues for D&D of the Alpha-4 Building. These issues are not summarized here.

1. RESOURCE CONSERVATION AND RECOVERY ACT

In general, given that D&D activities at Alpha-4 will only involve building materials, structural components, and process equipment, many of the subparts of Subtitle C will not apply to D&D. The RCRA land disposal restrictions (LDR) as well as the standards for treatment of contaminated debris in "containment buildings" (Subpart DD) or miscellaneous treatment units (Subpart X), may apply to D&D activities at Alpha-4. In any situation where D&D activities generate waste, compliance with federal and state regulations as well as internal Energy Systems policy and procedures becomes the responsibility of WM; as mentioned previously, only those WM requirements that clearly impact decontamination procedures (i.e., the RCRA LDR or site-specific WAC) will be summarized here. WM provisions of RCRA will not be addressed in this paper.

1.1 Waste Characterization

The predominant waste present at Alpha-4 is elemental mercury; however, the possibility exists that a leachable form of mercury will be found bearing the RCRA hazardous waste code for toxic characteristic (TC) waste, mercury (D009). Any other wastes encountered during D&D activities (i.e., stored wastes or process wastes), wastes generated during decontamination procedures, treatment residuals, etc., must be characterized to determine if they contain RCRA-listed or characteristic waste (40 CFR 262.11; 40 CFR 264.13) and if they are restricted wastes (40 CFR 268.7). In the case of potentially contaminated debris, the generator can usually determine whether the debris is contaminated with listed waste based on knowledge of process streams and operating procedures at the facility (40 CFR 268.7).

1.2 RCRA Exemptions or Exclusions

RCRA allows for various exemptions or exclusions from Subtitle C requirements based on such things as statutory definitions or compliance with the LDR for contaminated debris. Such exclusions from Subtitle C that may impact D&D of Alpha-4 are as follows.

1.2.1 Scrap metal exemption

EPA has determined that metals are "inherently hazardous" if they contain TC metals in sufficient concentrations to fail the TCLP test. Debris composed of such inherently hazardous metals must be treated to the LDR for the metal constituent and immobilized before land disposal (see preamble to the proposed debris rule, 57 *FR* 990). However, scrap metal is excluded from the requirements of RCRA Parts 262-266, Parts 268, 270, and 124 if it is intended for recycle or reuse [40 CFR 261.6(a)(3)(iv)]. EPA reiterates in the hazardous debris final rule that scrap metal contaminated with a listed waste or TC waste is exempt from Subtitle C if recycled or reused (57 *FR* 37237). This exclusion would seem to directly apply to recycled metal building components contaminated with a RCRA hazardous waste (i.e., lead-based paint or mercury). However, any residues from processing such wastes would remain hazardous under the derived from rule, and persons treating such scrap metal (i.e., smelters, etc.) will become hazardous waste generators and must handle the treatment residues as hazardous waste.

Scrap metal may be accumulated for recycle for a period up to one year, provided that 75% of the scrap by weight or volume is recycled or transferred to another site for recycle during the calendar year [40 CFR 261.1(c)(8)]. Under these conditions, scrap metal is not defined as solid waste, and therefore is not subject to Subtitle C regulation. If this condition is not met, the scrap is assumed to be stored for "speculative accumulation," and the exemption does not apply.

If a generator determines that he is managing a restricted waste that is excluded from the definition of hazardous or solid waste, or exempt from Subtitle C, under 40 CFR 261.2-261.6, he must place a one-time notice stating such generation, exclusion from Subtitle C, and the disposition of the waste, in the facility's file [40 CFR 268.7(a)(6)].

1.2.2 Recycled materials

Materials are not considered solid waste, and therefore are not regulated as hazardous waste under RCRA Subtitle C, if they are recycled by being used or reused as ingredients in an industrial process to make a product, provided the materials are not reclaimed; or used or reused as effective substitutes for commercial products; or returned to the original process from which they were generated, without first being reclaimed [40 CFR 261.2(e)(1)]. A material is reclaimed if it is processed to recover a usable product, or if it is regenerated [40 CFR 261.1(c)(4)]. This exclusion from the definition of solid waste, and therefore

from Subtitle C regulation, would apply to elemental mercury or any other materials recovered from Alpha-4 and recycled.

1.2.3 Hazardous debris

Contained in policy. EPA codified the "contained in" principle for debris in the final rule for debris. That is, debris which no longer "contains" listed hazardous waste or characteristic waste would not be subject to further Subtitle C regulation and so could be reused, returned to the natural environment, or disposed of at a solid waste facility without further treatment. This determination must be made by EPA on a case-by-case basis, upon request [see 57 *FR* 37225 and 40 CFR 261.3(f)(2)].

Clean debris surface. Performance and/or design standards for the alternative treatment technologies listed for hazardous debris require treatment to a "clean debris surface" (40 CFR 268.45). Such a surface is defined as "the surface, when viewed without magnification, shall be free of all visible contaminated soil and hazardous waste except that residual staining from soil and waste consisting of light shadows, slight streaks, or minor discolorations, and soil and waste in cracks, crevices, and pits may be present provided that such staining and waste and soil in cracks, crevices, and pits shall be limited to no more than 5% of each square inch of surface area."

Conditioned exclusion of treated debris. Hazardous debris that has been treated with one of the extraction or destruction technologies, rather than immobilization, to a clean surface and which does not exhibit a characteristic of hazardous waste is no longer considered a hazardous waste and need not be managed in a RCRA Subtitle C facility [40 CFR 268.45(c)].

1.3 Land Disposal Restrictions

For each hazardous waste, EPA has established treatment standards that are protective of human health and the environment when the wastes are disposed of on land. Wastes may be disposed of on land if they have been treated with the best demonstrated available technology (BDAT) set by EPA and if they meet the treatment standards set out in 40 *CFR* 268. These LDR would apply to disposal of any RCRA-listed or -characteristic wastes generated during D&D activities at Alpha-4.

Any building materials, rubble, etc. generated meeting the regulatory definition of debris, defined as "solid material exceeding a 60 mm particle size that is intended for disposal, and is a manufactured object; plant or animal matter; or natural geologic material" (40 *CFR* 268.2) may be restricted waste under the LDR for debris if it contains RCRA-listed or -characteristic waste. To determine whether the debris exhibits a characteristic of hazardous waste, the generator must use either best process knowledge or, as practicable, analysis of a representative sample of the debris using the TCLP (40 CFR 268.7).

Hazardous debris must be treated by specified technologies based on the type of debris and type of contaminants, or, as an alternative, must meet the LDR

for the specified prohibited listed or characteristic waste with which it is contaminated. Such treated debris will no longer be subject to the LDR standards or other Subtitle C regulation, and could be reused, returned to the natural environment, or disposed of at a Subtitle D facility. The rule requires that contaminated debris be treated prior to land disposal using physical or chemical extraction, destruction, or immobilization technologies (40 *CFR* 268.45). However, since immobilization does not remove contaminants, immobilized debris must still be land disposed as hazardous waste (i.e., at a Subtitle C facility). Debris treated by either extraction or destruction technologies is no longer considered hazardous waste if it does not contain a characteristic waste, and may be managed outside of Subtitle C requirements.

1.3.1 Mixed Waste

Mixed wastes are defined as those containing a RCRA hazardous waste as defined in 40 *CFR* 261 and a radioactive waste subject to the Atomic Energy Act (AEA). Debris contaminated with both hazardous and radioactive waste must comply with the RCRA treatability standards for contaminated debris as well as those under the AEA. 40 *CFR* 268.42 presents technology-based standards for specific radioactive hazardous mixed waste. The waste codes of probable importance to D&D activities at Alpha-4 are as follows: D009 and U151 waste codes for elemental mercury contaminated with radionuclides; D009 waste code for hydraulic oil contaminated with mercury and radioactive materials.

In June 1992, EPA and DOE signed an FFCA to bring mixed waste generation and storage facilities on the reservation into compliance with environmental law (the DOE/EPA Mixed Waste FFCA). The mixed waste FFCA allows facilities at the DOE Oak Ridge Reservation (ORR) to continue to generate and store mixed wastes while addressing LDR mixed waste compliance issues.

1.3.2 Treatment Units

Treatment of contaminated structural components may be required before D&D of Alpha-4 is complete. This may occur while the building is in place, or the components may be disassembled and treated in an adjacent area. EPA established a new treatment unit for treating contaminated debris. "Containment building" has been added to the definitions of 40 *CFR* 260.10 to provide for storage and treatment of contaminated debris that does not contain free liquids and is not amenable to treatment in tanks or containers. Performance standards for the design and operation of such containment buildings are promulgated in a new Subpart DD (40 *CFR* 264.1101). These standards would apply to any D&D activities involving dismantlement of structures and subsequent decontamination in an adjacent building. If decontamination of a structure occurs in place (i.e., before dismantlement), physical extraction technologies (such as abrasive blasting, spalling, or scabbling used to treat debris in place that is intended for discard) are subject to the permit standards of 40 *CFR* 264, Subpart X for miscellaneous units (preamble to the final rule, 57 *FR* 37241).

New treatment processes or additional treatment capacity may be added to an existing RCRA permit (Part B or interim status) by applying for a permit modification under 40 *CFR* 270.42. This permit modification would be required for use of either a containment building, or treatment within an existing building [i.e., a "miscellaneous treatment unit." Submittal of a Class 2 or 3 permit modification would most likely be required (see preamble to the final debris rule, 57 *FR* 37241-42).

2. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

Federal construction activities involving potential for toxic substance exposure are covered by the OSHA standards in 29 *CFR* 1926 (*Construction Industry*) and 29 *CFR* 1910 (*General Industry*). The State of Tennessee has in place an OSHA-approved plan listing the Permissible Exposure Limits (PELs) under TDEC 0800-1-1-.1000. Engineering controls and work practices mandated by OSHA are designed to reduce and maintain worker exposure to or below PELs listed in 29 *CFR* 1910.1000. OSHA standards for the protection of workers involved in construction, demolition, removal, alteration, or repair activities involving asbestos-containing materials are listed in 29 *CFR* 1926.58 and would be applicable to D&D activities involving these materials.

On May 4, 1993, OSHA promulgated an interim final standard for the protection of workers in the construction industry who are exposed to lead (58 FR 26590). The scope of the rule broadly defines construction to include activities commonly performed during D&D. Specifically, construction is defined to include: demolition or salvage of structures where lead or lead-containing materials are present; removal or encapsulation of materials containing lead; and alteration or renovation of structures containing lead (58 FR 26597). Removal of structural components with lead-based paint may trigger these requirements. Any employer who falls under the scope of the rule and has employees who may be occupationally exposed to lead is required to perform an exposure assessment to determine if any worker will be exposed to lead at or above the "action level" of 30 $\mu g/m^3$, computed as the 8-hr time-weighted average (TWA) [29 *CFR* 1926.62(b)]. If the exposure assessment shows exposure exceeds the PEL, employers must institute engineering and administrative controls to reduce employee exposure; in addition, this rule contains very specific respiratory requirements [29 *CFR* 1926.62(f)].

3. CLEAN AIR ACT

Treatment technologies or demolition techniques utilized during D&D of Alpha-4 might result in the release of air emissions that are regulated under federal and state law. Elevation of particulate concentrations may result from demolition activities occurring during D&D. Tennessee has promulgated regulations governing fugitive dust emissions (TDEC 1200-3-8-.010). An operator must take reasonable precautions to prevent particulate matter from becoming airborne. In addition, fugitive dust may not be emitted as visible emissions beyond property boundary lines for more than 5 min/hr or 20 min/day. The design standards for containment buildings used to treat contaminated debris include controls sufficient to ensure

that there are no visible fugitive dust emissions from any openings (doors, windows, vents, cracks). Additionally, all associated particulate collection devices must be operated and maintained with sound air pollution control devices.

Subpart H of 40 *CFR* 61 addresses atmospheric radionuclide emissions from DOE facilities and may be applicable to airborne emissions during D&D activities. EPA has issued a final National Emission Standard for Hazardous Air Pollutants (NESHAP) rule that limits emissions of radionuclides to the ambient air from DOE facilities to amounts that would not cause any member of the public to receive an effective dose equivalent of 10 mrem/year or more (40 *CFR* 61.92).

In addition, the NESHAPs for asbestos includes standards for demolition and renovation of buildings that contain regulated asbestos-containing material (RACM) in several forms; these standards may be applicable for D&D activities at Alpha-4 that involve asbestos materials [40 *CFR* 61.145(c)].

4. TOXIC SUBSTANCES CONTROL ACT

The regulations found in TSCA contain storage, disposal, and cleanup requirements for materials contaminated with PCBs. The provisions of 40 *CFR* 761 generally apply to PCBs only if they occur in concentrations of 50 ppm and above. Any PCB container undergoing decontamination shall have the internal surfaces flushed in accordance with the requirements of 40 *CFR* 761.79(a). Movable equipment used in storage areas shall be decontaminated by swabbing surfaces contaminated with PCBs with a solvent meeting the same criteria as for containers [40 *CFR* 761.79(b)]. Note, that in most instances, 40 *CFR* 761.60 requires that equipment and machinery contaminated with PCBs be drained of all free-flowing liquid that must be disposed of in an incinerator, chemical waste landfill, or high efficiency boiler per 40 *CFR* 761.60(a).

EPA's Spill Cleanup Policy establishes criteria EPA will use to determine the adequacy of cleanup of spills resulting from the release of materials containing PCBs at concentrations of 50 ppm or greater. This policy does not apply to spills that occurred prior to May 4, 1987; spills that occurred prior to the effective date of the policy are to be decontaminated to requirements established at the discretion of EPA, usually through the Regional office (40 *CFR* 761.120).

Section 40 *CFR* 761.125 (b) provides specific guidance for cleanup of low-concentration spills that involve less than 1 pound of PCBs by weight, and 40 *CFR* 761.125 (c) provides guidance for high concentration spills or low-concentration spills greater than 1 pound or more PCBs by weight, respectively. The PCB spill cleanup policy delineates requirements for various types of spills based on public access, and specifies notification, record-keeping, and certification requirements.

5. NATIONAL ENVIRONMENTAL POLICY ACT

The National Environmental Policy Act (NEPA) of 1969 [42 United States Code (USC) 4321 *et seq.*] establishes policies and goals for the protection of the environment; the Council on Environmental Quality (CEQ) is charged with promulgating regulations to implement the requirements of NEPA.

DOE has established procedures at 10 *CFR* 1021 for complying with NEPA as well as the CEQ requirements found at 40 *CFR* 1500-1508 (57 *FR* 15122, April 24, 1992). An Environmental Assessment (EA) for dismantlement activities at Alpha-4 is under preparation.

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