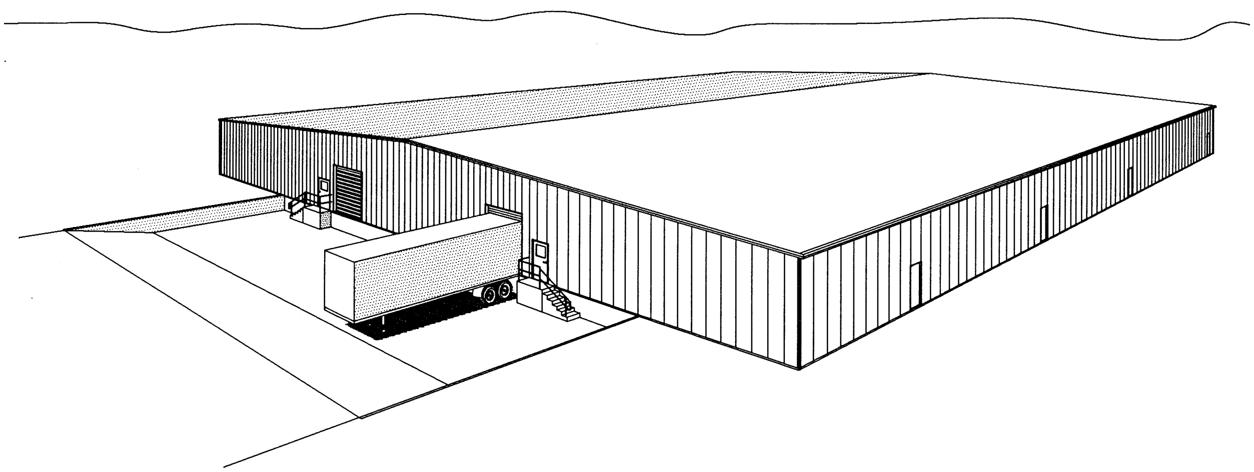
# Appendix F
# Construction of a New Mercury Storage Building

Construction of a new mercury storage building would have additional environmental and socioeconomic impacts beyond those expected if an existing building were used. This appendix describes the characteristics of the new mercury storage building and discusses the potential impacts that would result from construction of this structure.

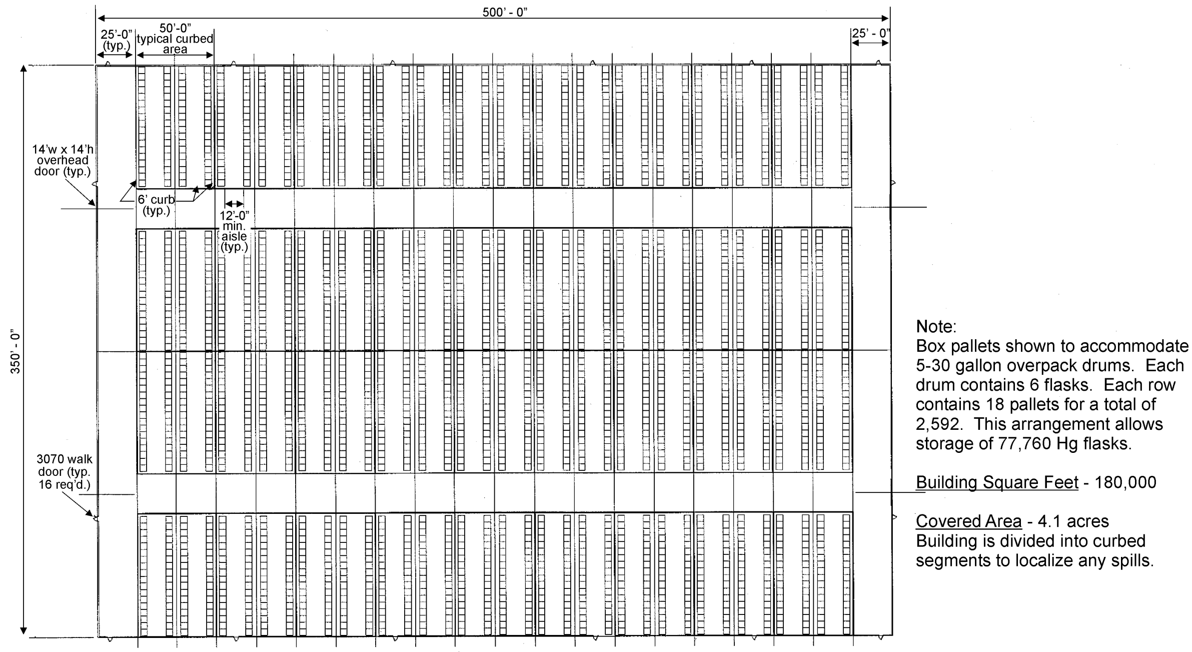
## F.1 FACILITY CHARACTERISTICS

As described in Chapter 2, Alternatives for Management of Mercury, consolidated storage of the entire Defense National Stockpile Center mercury stockpile would require approximately 200,000 $ft^2$ (18,581 $m^2$) of storage space. It is likely that a new mercury storage building would be constructed using concrete floors and walls, a steel support structure, and an aggregate roofing system. Multiple large roll up doors would be used to enhance access. Lighting, ventilation, fire suppression (sprinkler system), and a security system would be included. There would be no floor drains and the concrete floor would be sealed and curbed to reduce the chance that mercury could be released to the environment. Figure F–1 presents an artist's representation of the building exterior. It is estimated that 14 acres (5.7 ha) of land would be disturbed during construction; the storage building would occupy 4.6 acres (1.9 ha). Figure F–2 provides a diagram of the layout of the mercury storage building.



**Source:** TVA 2002.

**Figure F–1. Exterior of Mercury Storage Building**




**Source:** TVA 2002.

**Figure F–2. Typical Mercury Storage Layout**

Table F–1 contains a summary of the quantities of major structural materials required to construct a 200,000-ft$^2$ (18,581-m$^2$) mercury storage building.

**Table F–1. Resource Estimate for Construction of a 200,000-square foot Mercury Storage Building**

| Resource | Quantity |
|---|---|
| **Land disturbed** | |
| Total disturbed | 14 acres |
| Occupied by building | 4.6 acres |
| **Piping** | |
| 8-inch PVC piping | 2,864 linear feet |
| Drainage piping | 56 linear feet |
| **Crushed stone** | |
| 12-inch base | 176,906 square yards |
| 6-inch base | 642 square yards |
| Total | 59,076 cubic yards |
| Aggregate for roofing system | 2,014 square yards |
| **Asphalt** | |
| 3-inch base course | 176,906 square yards |
| 1.5-inch surface course | 176,906 square yards |
| Total | 22,113 cubic yards |

| Resource | Quantity |
|---|---|
| **Rebar** | |
| In concrete walls | 224.2 tons |
| In concrete curbs | 12.1 tons |
| **Concrete** | |
| Exterior wall footings, 36-inch by 12-inch | 212 cubic yards |
| Column spread footings, 3-foot by 3-foot by 2-foot | 171 cubic yards |
| Concrete for floors[a] | 3,700 cubic yards |
| Concrete for walls | 805 cubic yards |
| 6-inch curb and 2-foot gutter | 11,378 linear feet |
| **Steel** | |
| Steel roof deck, 1.5-inch, 18-gauge | 200,000 square feet |
| Structural steel columns | 216 tons |
| Structural steel beams | 438 tons |
| Siding support girts | 153 tons |
| Bar joists and bracing | 211 tons |
| Structural steel | 2 tons |
| **Wood** | |
| Fiberboard, 1-inch | 200,000 square feet |
| Treated wood nailers, 2-inch by 4-inch | 3,818 linear feet |
| Treated wood nailers, 2-inch by 6-inch | 1,909 linear feet |
| Treated wood cant, 4-inch by 4-inch | 7,637 linear feet |
| **Aluminum** | |
| Flashing, 0.032-inch | 3,820 square feet |

[a] Estimated for a 200,000 square foot 6-inch-thick concrete floor.
**Key:** PVC, polyvinyl chloride.
**Source:** Estimated from TVA 2002.

Table F–2 contains a breakdown of the labor required for construction of a new mercury storage building. It is estimated that 52 to 74 workers could construct the new mercury storage building in approximately 125 to 180 days.

**Table F–2. Labor Estimate for Construction of a 200,000-square foot Mercury Storage Building**

| Construction Phase | Construction Duration (Days) | | Estimated Number of Construction Workers | |
|---|---|---|---|---|
| | Low | High | Low | High |
| Site preparation | 20 | 30 | 9 | 13 |
| Foundation and concrete floor | 20 | 30 | 3 | 4 |
| Block walls | 45 | 60 | 14 | 19 |
| Roofing and insulation | 20 | 30 | 11 | 16 |
| Finishing—HVAC, electric, plumbing, painting | 20 | 30 | 15 | 22 |
| **Total** | 125 | 180 | 52 | 74 |

**Key:** HVAC, heating, ventilating, and air conditioning.
**Source:** Johnson 2002a, 2002b; TVA 2002.

## F.2 POTENTIAL ENVIRONMENTAL IMPACTS

The impacts of construction of a new mercury storage building would be expected to be similar to those that would occur during the construction of a similar sized commercial warehouse, office building, or department store. The potential environmental impacts of construction of a new mercury storage building are described below. Because no actual location has been proposed for construction of a new mercury storage building, impacts to a specific site are not discussed. The cost of constructing a new storage building is discussed in Appendix D, Cost Analysis.

### F.2.1 Meteorology, Air Quality, and Noise

The construction of a mercury storage building could result in minor increases in seasonal temperatures around the facility, but no long-term changes in the climatology of the area are expected. Minor increases in seasonal temperatures in the area around the building would result from removal of vegetation from the site and covering large areas with pavement and roofing.

Air quality impacts from construction of a mercury storage building could result from operation of heavy construction equipment and other activities at the site. Air pollutant emissions would include particulate matter from equipment activity on exposed soil, earth moving activity, and wind blown soil; air pollutant emissions from the exhaust of motorized earth moving equipment and other equipment; air pollutant emissions from construction worker vehicles and vehicles delivering materials; and air pollutant emissions from welding and other activities. The greatest air pollutant emissions typically occur during site clearing and excavation and building erection phases of a construction project. As shown in Table F–2, these phases are expected to occur over a period of about 150 days. Construction emissions from this project would be expected to be typical for commercial building construction. Appropriate mitigation measures (e.g., watering, paving, and revegetation) would be used to control emissions of particulate matter from the site during construction.

Noise impacts could result from the operation of heavy construction equipment and other activities at the site. Noise sources would include earth moving and material handling equipment, equipment backup alarms, employee cars and trucks, and cutting and fastening equipment. Traffic noise from construction worker vehicles and material shipments would occur along roads leading to the site. Noise from onsite construction activities could result in increased noise levels at nearby noise sensitive areas (e.g., residences, schools, and wildlife habitat). Noise impacts from construction cannot be assessed in more detail without information on the proximity of the construction to noise sensitive areas. As shown in Table F–2, construction activities would be limited to a period of 180 days.

### F.2.2 Waste Management

Nonhazardous waste would be generated during construction. Wastes would include scrap construction materials (e.g., wood, concrete, steel, aluminum, copper wire, and polyvinyl chloride plastic pipe), office garbage and food wastes, and sanitary wastewater. Recyclable wastes would be collected and sent to commercial recycling facilities. Other nonhazardous wastes would be sent to a local landfill for disposal. Sanitary wastewater would be collected in portable toilets and disposed by a commercial contractor.

A small quantity of hazardous waste may be generated during construction. This waste could include spent solvents, paints, and contaminated rags and wipes. These wastes would be sent to a commercial hazardous waste management facility for treatment and disposal. Therefore, wastes generated by construction of a new mercury storage building would be expected to have minimal impacts.

### F.2.3 Socioeconomics

Construction of a new storage building is expected to have only minor, positive socioeconomic impacts on the community where the building would be constructed. As shown in Table F–2, the storage building is expected to take no more than 180 days to construct; and during any phase of the construction, no more than 22 workers will be working on site. If the building is constructed in a rural or geographically remote community, workers for some construction trades may need to be drawn from a wider geographic area. If these workers require temporary lodging in local hotels or motels, there will be a positive impact on the local economy through the purchase of goods and services. If the building is constructed in an urban area, most, if not all, construction workers will be drawn from the local workforce. This will also have a positive socioeconomic impact on the local urban community, but to a lesser degree than the rural community scenario. In addition, money used for the purchase of goods and materials for building construction would be a small boost to the local economy.

### F.2.4 Health and Safety

Construction of a new mercury storage building could result in accidents with possible injury to construction personnel. These would be normal construction accidents that could occur during the construction of any similar sized warehouse, office building, or department store.

Increased traffic on local roads during construction could increase the likelihood of vehicle accidents. As shown in Table F–2, the storage facility is expected to take no more than 180 days to construct, and during any phase of the construction, no more than 22 workers will be working on site. Some additional truck traffic would be expected in addition to the traffic due to construction employees. Most of these truck trips would be associated with the delivery of building materials (e.g., structural steel, lumber, crushed stone, asphalt, and concrete), and would tend to be concentrated during the second, third, and fourth months of the 6-month construction schedule (Table F–2). Because of the relatively small number of vehicle trips, increased traffic is unlikely to result in additional accidents near the construction site.

### F.2.5 Geology and Soils

Ground disturbance associated with the construction of a mercury storage building would have a small impact on geologic and soils resources. As shown in Table F–1, the new facility would require about 4.6 acres (1.9 ha) of land. In addition, construction activities could also temporarily disturb up to about 9.2 acres (3.7 ha) of land outside the facility footprint for material lay down, storage, and temporary roads and vehicle parking. As soil types, surficial geology, and associated geologic resources could vary widely depending on the building location, potential impacts on geology and soils cannot be precisely assessed. In general, soils and surficial geologic strata in the construction area would be disturbed along with the conversion of that portion of the disturbed area within the building footprint to impervious surface, effectively resulting in the loss of soil and any geologic resources within the footprint. Appropriate best management practices, including compliance with local soil erosion and sediment control requirements, would be observed to minimize soil erosion in the construction area. For example, exposed soils could be revegetated to minimize soil erosion after construction. While surface materials would be disturbed in the construction area, it is expected that site grading, compaction, and excavation work would be confined to a relatively shallow area necessary to prepare for placement of the new building's concrete footings. As the facility would not have a basement, blasting should not be necessary to remove bedrock. Nevertheless, constructing the new facility in a previously disturbed area could further mitigate any potential site impacts. In addition, appropriate site selection and analysis would ensure that the facility does not affect rare or otherwise valuable geologic or soil resources.

The new mercury storage building could be constructed in an area having a minimal to relatively high seismic risk, with the site further susceptible to a wide range of other geologic hazards. Also, soils and surficial geologic materials can vary widely in engineering suitability over a relatively short distance. Thus, appropriate surveys and subsurface investigations would be conducted to identify subsurface conditions and any geologic hazards, (e.g., seismic and volcanic features, landslide areas, sinkholes, and unstable soils) as part of the site selection process. A new mercury storage building would be designed and constructed in accordance with applicable local and U.S. Department of Defense standards, and in accordance with the *International Building Code* (ICC 2000).

As shown in Table F–1, geologic resources required for construction would include approximately 61,090 $yd^3$ (46,706 $m^3$) of crushed stone and aggregate for road, curbing, and parking area construction and for roofing base. This quantity would not be expected to deplete local deposits of these materials, as they are readily available in most localities. Approximately 5,400 $yd^3$ (4,128 $m^3$) of concrete would also be required for footings, walls, floors, and curbing. It is anticipated that concrete would be supplied from an offsite batch plant rather than mixed on site.

### F.2.6 Water Resources

The potential for impacts on water resources would depend on the location and distribution of surface water bodies and groundwater aquifers, the relative availability of water from these sources at the construction site, and the quality of surface water and/or groundwater for required uses. Construction-related ground disturbance as described in Section F.2.5 could potentially impact surface water quality near construction areas. Storm water runoff from disturbed areas would have the potential to convey sediments and other pollutants (e.g., construction materials) to nearby surface waters. Similarly, spills of petroleum, oils, and lubricants from construction equipment could impact surface waters or infiltrate the subsurface and impact the underlying groundwater. Appropriate soil erosion and sediment control measures (e.g., silt fences and mulching disturbed areas) and spill prevention and waste management practices would be employed during construction to minimize any water quality impacts.

Water would be required during construction for soil compaction, dust control, equipment wash down and, to a lesser degree, to meet the potable and sanitary needs of construction personnel. Total construction water use is estimated to be about 406,000 gal (1,536,872 l) over the projected 180-day construction period. Of this total, approximately 2,040 gal (7,722 l) of potable water will be required to meet the needs of construction employees. It has been assumed that portable toilets would be provided for construction personnel, as is standard practice, which reduces the expected potable water demand and negates the need for onsite wastewater treatment during construction. As a result, the impact of construction-related water demands on existing users and sources would likely be small to negligible due to the relatively small volumes of water required.

Some locations could be affected by flooding, requiring appropriate site selection and analysis. Applicable regulatory requirements would be followed to site the mercury storage building, including compliance with Executive Order 11988, Floodplain Management. In addition, site-specific analysis of water resources would be conducted in tiered National Environmental Policy Act documentation if new construction were required.

### F.2.7 Ecological Resources

As described in Table F–1, construction activities are expected to disturb about 14 acres (5.7 ha) of land. Terrestrial habitats would be directly impacted and the associated animal populations would be affected. Plants and some of the less mobile or established animals within the construction zone could perish during land-clearing activities and from increased vehicular traffic. Furthermore, activities and noise associated with construction activities could cause larger mammals and birds to relocate to similar habitats in the area. Likewise, animal species inhabiting the surrounding areas could be disturbed by the increased noise and vehicular traffic and could result in higher mortality for individual members of local animal populations. If the building is located in an urban or industrial area, it is likely that the site has already been disturbed by construction. Under these conditions, only a limited subset of native plants and animals would remain at the site.

If land clearing were scheduled during the nesting season, prior to construction, the proposed site would be surveyed for nests of migratory birds, in accordance with the Migratory Bird Treaty Act. Other preconstruction surveys and consultations with the U.S. Fish and Wildlife Service and appropriate state-level organization would be conducted, as appropriate, to ensure that impacts on any sensitive animal or plant species living in the area are negligible, and that appropriate mitigation measures are implemented as required. Mitigation measures might include the avoidance of species and their habitats entirely or just during critical timeframes (e.g., during nesting/breeding season), or the relocation of sensitive species away from the areas likely to be disturbed. Appropriate mitigation measures would be coordinated with regulatory agencies as part of the consultation process.

Impacts to potential aquatic habitats would be minimized through best management practices for soil erosion and sediment control to prevent construction runoff from impacting these habitats; and direct construction disturbance would be avoided to the extent practical. In addition, little or no impacts would be expected to nearby aquatic habitats from surface water consumption because the building contractor would truck water required for construction to the site.

### F.2.8 Cultural Resources

As described in Table F–1, constructing a new 200,000-$ft^2$ (18,581-$m^2$) mercury storage building would disturb about 14 acres (5.7 ha) and could potentially unearth prehistoric, historic, and Native American artifacts. If the building is located in an urban or industrial area, the site, in all probability, has already been disturbed by construction. It is unlikely that any architectural, archaeological, historical, or Native American artifacts would be discovered during new construction. If the building is located on a major Federal installation, cultural resource management plans, most likely, are in place to address construction issues. Commercial sites or smaller Federal facilities are less likely to have cultural resource management plans, and are less likely to have previously conducted historic or cultural resources surveys. If not currently available, surveys would be conducted in accordance with applicable Federal and state laws and regulations, including Section 106 of the National Historic Preservation Act. Pre-survey research would include consultations with State Historic Preservation Officers and any tribal representatives.

### F.2.9 Land Use and Visual Resources

Impacts on land use and visual resources could occur should construction of a new mercury storage building be required. It is expected that this new building would be a single-story structure. The magnitude of the associated potential impact to land use and visual resources would largely depend on the overall size of the site, the degree to which the site has already been developed, and the compatibility of construction activities with adjacent communities, natural resource areas, and local land-use and zoning restrictions. Appropriate mitigation measures would be implemented, as necessary, to reduce or eliminate any impacts that could be significant.

### F.2.10 Infrastructure

Construction of a new mercury storage building would require some utility and resources use. Gasoline and diesel fuel would be required to power the heavy equipment and electrical generators. Electricity would be needed for the office trailer, for facility lighting, and to power hand tools. As described in Section F.2.6, water would be needed for potable and sanitary purposes, vehicle washing, soil compaction, and dust suppression. Infrastructure usage would be relatively small and would be similar to the usage that occurs during the construction of a similar sized commercial warehouse, office building, or department store. Therefore, construction of a new storage building is expected to have only minor impacts on the local infrastructure.

### F.2.11 Environmental Justice

Evaluations of environmental justice are necessarily site-specific and cannot be performed in detail for unspecified locations. In the event that construction of a new storage building is required, an additional environmental justice analysis at the selected building site and transportation route would be conducted prior to implementation.

## F.3 REFERENCES

ICC (International Code Council, Inc.), 2000, *International Building Code,* Falls Church, VA, March.

Johnson, J., 2002a, Tennessee Valley Authority, personal communication (e-mail) to J. DiMarzio, Science Applications International Corporation, Germantown, MD, "Consolidated Storage Site," March 25.

Johnson, J., 2002b, Tennessee Valley Authority, personal communication (e-mail) to J. DiMarzio, Science Applications International Corporation, Germantown, MD, "Mercury Storage Building - Construction FTEs," April 12.

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