Chapter 2
Alternatives for the Management of Mercury

Chapter 2 describes the three alternatives evaluated in the *Mercury Management Environmental Impact Statement* for the management of the Defense National Stockpile Center's (DNSC) excess elemental mercury: No Action, Consolidated Storage, and Sales. In general, the analysis shows that the mercury management alternatives are predicted to have negligible-to-minor environmental and socioeconomic impacts. The human health and ecological risks would be negligible for all mercury management alternatives during normal operations. Risks from facility accidents would be moderate for all alternatives except No Action, which would have low risk. Transportation risks are highest for the Sales Alternative. DNSC has identified the Consolidated Storage Alternative as its Preferred Alternative. Consolidated Storage would have negligible-to-minor impacts on the environment at the location where the mercury is consolidated, but would also have beneficial impacts at the existing storage locations after the mercury is removed. The Consolidated Storage Alternative would result in negligible risk from normal operations and moderate risks from facility or transportation accidents.

2.1 MATERIALS ANALYZED IN THIS MERCURY MANAGEMENT ENVIRONMENTAL IMPACT STATEMENT

Mercury is a high-density metallic element that is liquid at room temperature. The mercury stockpiled by the Defense National Stockpile Center (DNSC) is between 99.5 and 99.9 percent pure. It has been accumulated and maintained since the mid-1940s as part of the National Defense Stockpile Program so that it would be available for defense or other critical uses in a national emergency. This mercury came from the United States, Mexico, Spain, Italy, and Japan and, possibly, from Chile and Canada. A total of 4,890 tons (4,436 metric tons) of mercury is stored in 128,662 flasks, each containing 76-lb (34-kg) of mercury, in four locations in the United States. These locations, identified in Chapter 1, Figure 1–1, are the New Haven Depot near New Haven, Indiana; the Somerville Depot near Somerville, New Jersey; the Warren Depot near Warren, Ohio; and the U.S. Department of Energy's (DOE's) Y–12 National Security Complex (Y–12) in Oak Ridge, Tennessee.

2.2 ALTERNATIVES ANALYZED IN THIS MERCURY MANAGEMENT ENVIRONMENTAL IMPACT STATEMENT

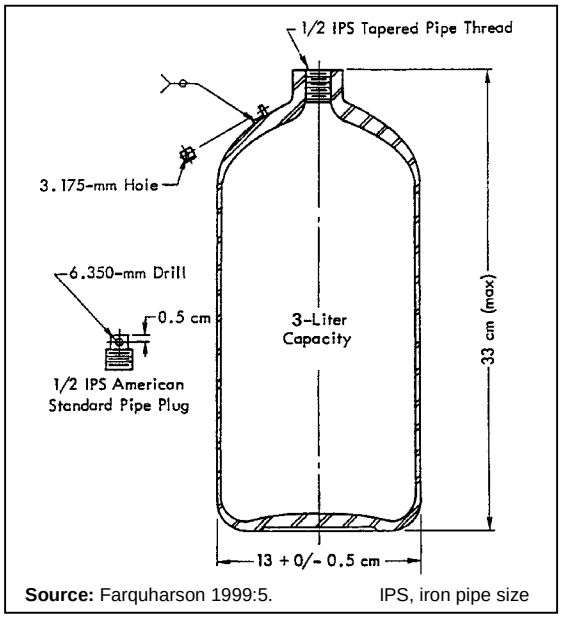
This *Mercury Management Environmental Impact Statement* (MM EIS) analyzes the potential environmental impacts of three categories of alternatives for the management of the DNSC mercury stockpile—No Action, Consolidated Storage, and Sales—as defined below:

- Alternative 1, Continued Storage at Current Mercury Storage Locations (No Action Alternative)
- Alternative 2A, Consolidated Storage at the New Haven Depot
- Alternative 2B, Consolidated Storage at the Somerville Depot
- Alternative 2C, Consolidated Storage at the Warren Depot
- Alternative 2D, Consolidated Storage at the Hawthorne Army Depot
- Alternative 2E, Consolidated Storage at the PEZ Lake Development
- Alternative 2F, Consolidated Storage at the Utah Industrial Depot
- Alternative 3A, Sale of Mercury at the Maximum Allowable Market Rate
- Alternative 3B, Sale of Mercury to Reduce Mercury Mining

A description of the activities associated with each alternative is provided in the following sections. Additional information can be found in Appendix C. The environmental impacts of each alternative are summarized in Section 2.5.

2.2.1 Alternative 1: No Action—Continued Storage at Current Mercury Storage Locations

In the No Action Alternative, DNSC mercury currently stored at the four sites shown in Chapter 1, Figure 1–1, would remain at those locations for 40 years. DNSC assumed a 40-year period to analyze because it has safely stored mercury and other commodities for more than 40 years. DNSC believes that mercury could continue to be safely stored for at least this period of time.



Source: Farquharson 1999:5. IPS, iron pipe size

Figure 2–1. Typical Mercury Storage Flask Dimensions

The mercury inventory is contained in flasks made of 0.2-in (0.5-cm) thick, low-carbon steel. Each flask can hold 76 lb (34 kg) of mercury. The dimensions of a typical flask are shown in Figure 2–1. Each flask is sealed with a threaded pipe plug. In 2001, the flasks at the New Haven, Somerville, and Warren depots were placed in 30-gal (114-l) drums to provide additional containment of the mercury. Placing the flasks in the drums is called "overpacking." Each drum is made of 16-gauge, carbon steel and has a removable lid. Six flasks are stored in each drum. Before being placed in the drum, each flask at the Somerville and Warren depots was removed from its pallet, cleaned by a mercury vacuum cleaner, and checked for leakage.[1] The plug on each flask was also checked to make sure that it was secure.

At the New Haven Depot, in 1997, the flasks were vacuumed, inspected, and placed in individual plastic bags. Before being placed in a drum during the 2001 overpacking project, each plastic bag and enclosed flask was checked. If no leaks were found, the flask and bag were placed in a drum. Of the 108,386 flasks inspected at the New Haven, Somerville, and Warren depots, only eight flasks, all from the New Haven Depot, were found to be leaking. The eight flasks were replaced and the old flasks were placed in a 55-gal (208-1) drum and sent to a licensed commercial facility for treatment and disposal.

Flasks of Mercury

[1] During the overpacking process, each old pallet was vacuumed to remove any dust or mercury residue and each pallet was sampled for mercury by drilling at least 30 holes randomly. The sawdust was collected and combined with the sawdust from other pallets, from which a composite sample was collected. These composite samples were then sent to a laboratory where a toxicity characteristic leaching procedure was performed. The test characterized the pallets as nonhazardous, and all were disposed of in a sanitary landfill. Air samples were also collected and analyzed for mercury concentrations. New pallets were purchased and used for storage of the filled overpack drums.

The drums at each depot are lined with an epoxy-phenolic coating and a 6-mil, plastic bag. The bottom of each drum is covered with an absorbent mat. Cardboard dividers that are 1/4-in (0.64-cm) thick separate the flasks. The dividers also serve as cushions. Each drum is sealed with a steel locking ring and rubber gasket. Overpack drums would likely be opened during the last year of storage. DNSC assumes that some flasks might have leaked and would need to be replaced.

Drums with Plastic Bag and Cardboard Divider

The drums are banded together so that they are easier to move. They are stored on metal catch trays made of 12-gauge, painted carbon steel. Each catch tray is 1-in (2.5-cm) deep. The catch trays are on 4-ft (1.2-m) square wooden pallets, and each pallet holds five drums. To make inspection easier, pallets are not stacked. The overpack drums meet the U.S. Department of Transportation's (DOT's) packaging requirements for shipping hazardous materials by highway and rail (Title 49 *Code of Federal Regulations* [CFR] 173.164(d)(2)).

The DNSC mercury at Y–12 is contained in newer, seamless flasks that hold 76 lb (34 kg). The flasks are not overpacked. They are stored in groups of 45 on wooden pallets that measure 38 in by 38 in by 20 in (96 cm by 96 cm by 51 cm). The pallets are stacked up to three high (Farquharson 1999).

Mercury Storage at Y–12

Typical Mercury Storage Warehouse

The mercury storage buildings at these sites are not expected to need major upgrades during the 40 years. The warehouses at the Somerville and Warren depots and Y–12 have steel support beams. The warehouse at the New Haven Depot has wood support beams. The warehouse roofs at each site are made of different materials. Single-ply modified bitumen was used at the New Haven Depot. Single-ply mechanically fastened rubber was used at the Somerville Depot, and foam over gypsum board was used at the Warren Depot. The roof at Y–12 is made of gypsum (4-ply and asphalt).

Each section of the warehouses has rollup doors. The warehouses have sealed concrete floors, solid block walls, and ceiling air vents. The fire suppression system uses dry-pipe (water supply). The warehouses do not have floor drains so that spilled materials cannot leak to the environment. In addition, the storage building at Y–12 has a sloped floor and a trough to collect any spilled liquids.

2.2.1.1 New Haven Depot

Warehouses at the New Haven Depot are arranged in rows of three (see Figure 2–2). They are oriented east-west and are next to the northern boundary of the depot. Each warehouse is 960 ft (293 m) long by 180 ft (55 m) wide and 16 ft (5 m) high. Each is divided into four sections of about 180 ft (55 m) by 240 ft (73 m). Mercury is stored in about 4 percent of the warehouse space at the depot (DLA 2000:1-1; Lynch 2002a).

2.2.1.2 Somerville Depot

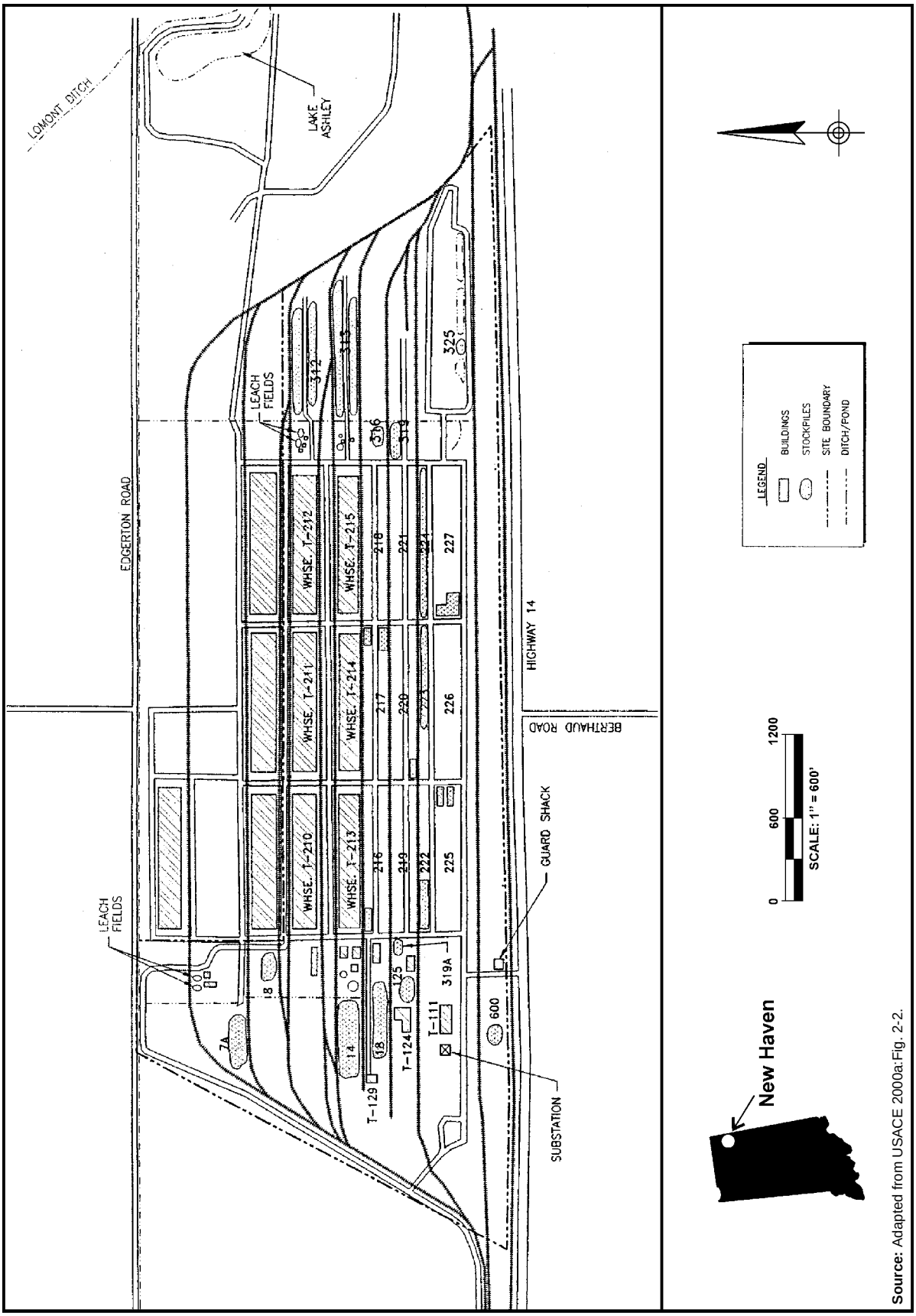
There are four warehouses at the Somerville Depot, arranged in two rows of two (see Figure 2–3). Each warehouse is 1,000 ft (305 m) by 200 ft (61 m) and 15 ft (4.5 m) high. Each is divided into five sections of 200 ft (61 m) by 200 ft (61 m). About 8 percent of the warehouse space at the depot is used to store mercury (Cangro 2002; Lynch 2002a).

2.2.1.3 Warren Depot

There are seven warehouses at the Warren Depot, which is leased from American Premier Underwriters, Inc. (formerly the Penn Central Corporation) (Stacey 2000). The warehouses are arranged in one group of four and one group of three (see Figure 2–4). Each warehouse is 1,000 ft (305 m) by 200 ft (61 m) and 16 ft (5 m) high. Each is divided into five sections of 200 ft (61 m) by 200 ft (61 m). About 3 percent of the warehouse space at the depot is used to store mercury (Cangro 2002; DLA 2000:1-3; Lynch 2002a).

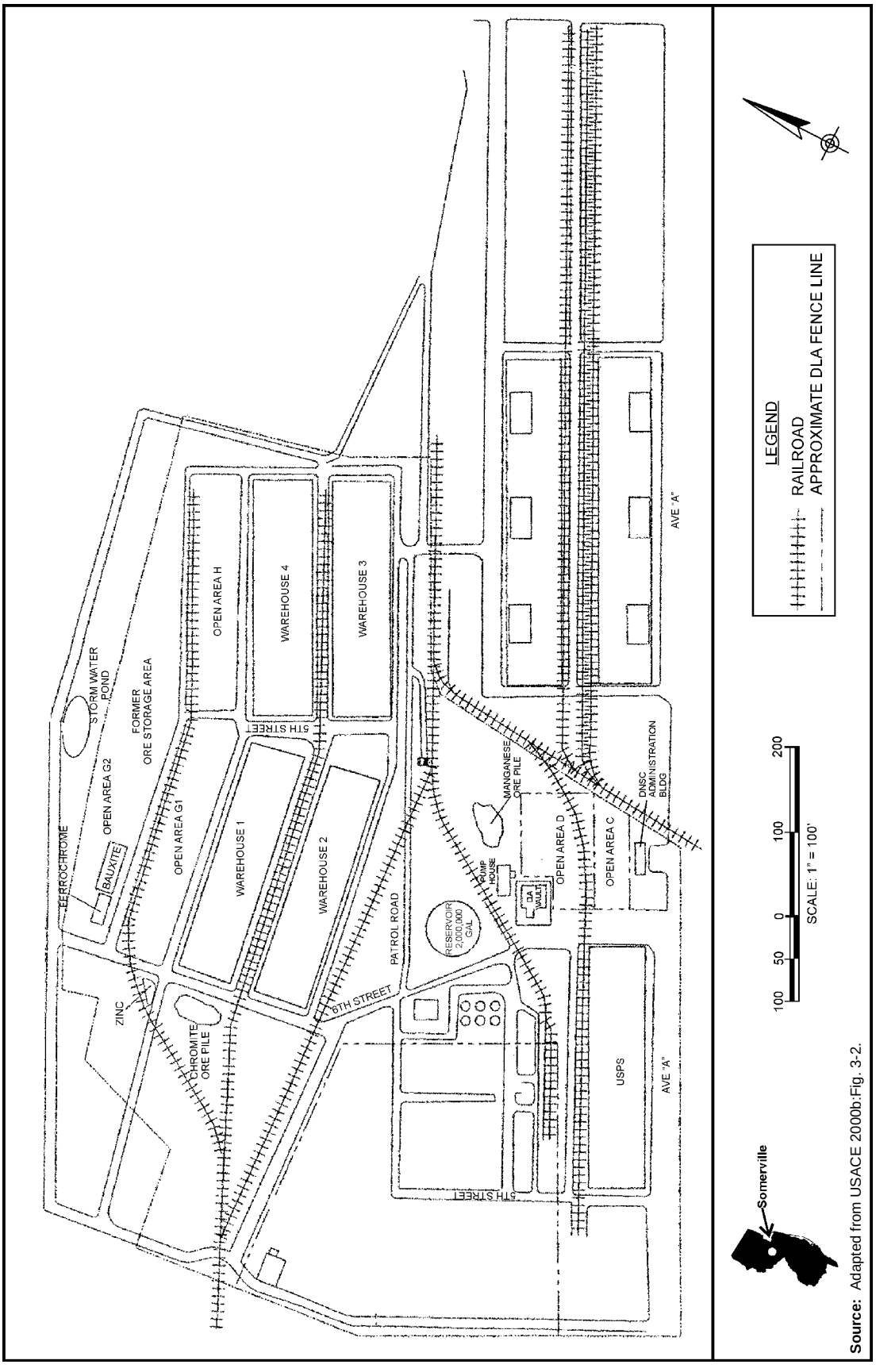
2.2.1.4 Y–12

Mercury is stored in a building in the southern portion of Y–12 (see Figure 2–5). The building is owned and maintained by DOE. DNSC is leasing warehouse space to store the excess mercury. The single-story building is 150 ft (46 m) by 90 ft (27 m) and is about 20 ft (6 m) high. The building is within the Perimeter Intrusion, Detection, and Assessment System that surrounds the west end of Y–12. The building is currently used only for mercury storage, with about 33 percent of the available space storing DNSC mercury (Farquharson 1999; Lynch 2002a).



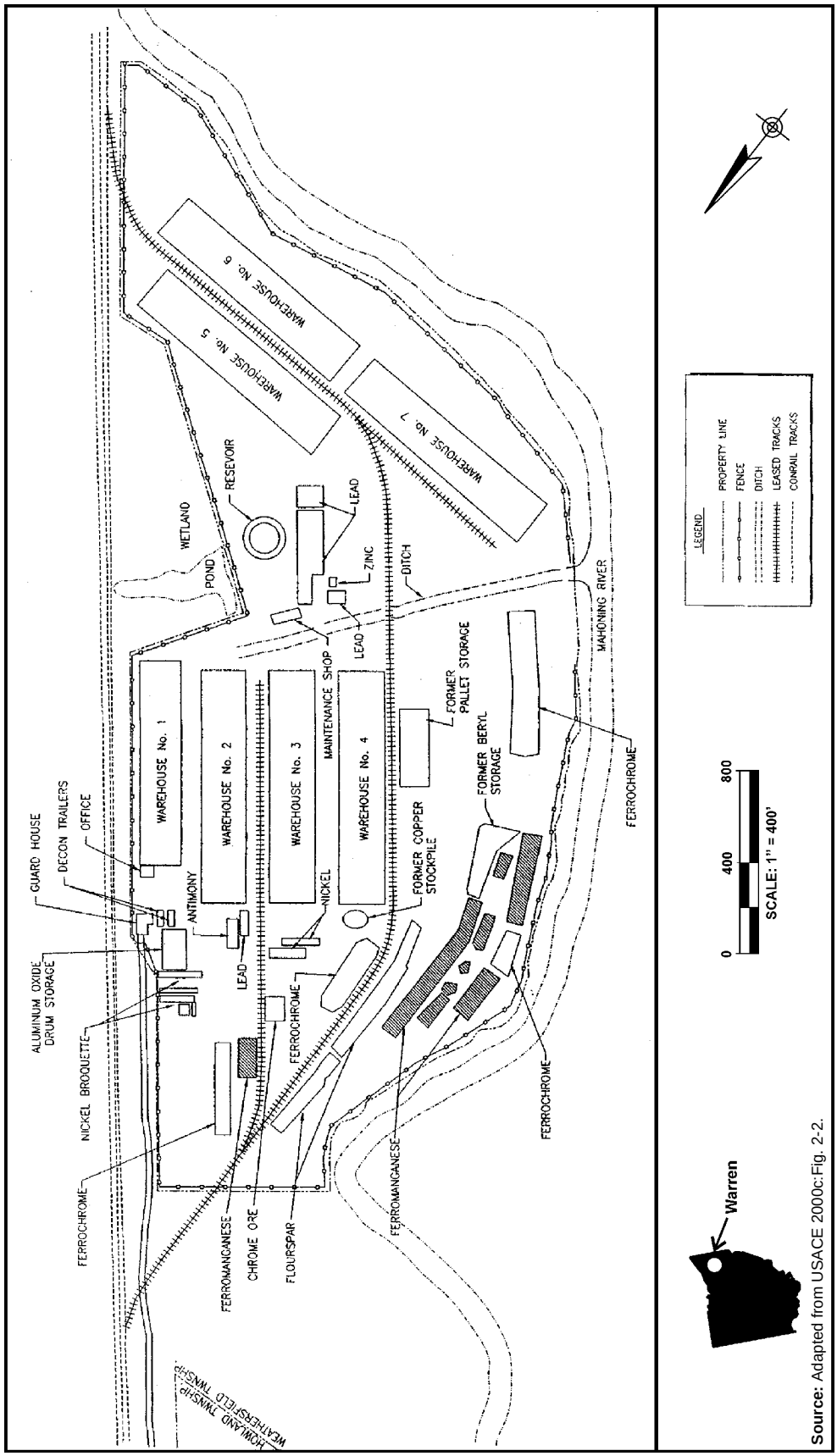
Source: Adapted from USACE 2000a:Fig. 2-2.

Figure 2–2. New Haven Depot Site Layout



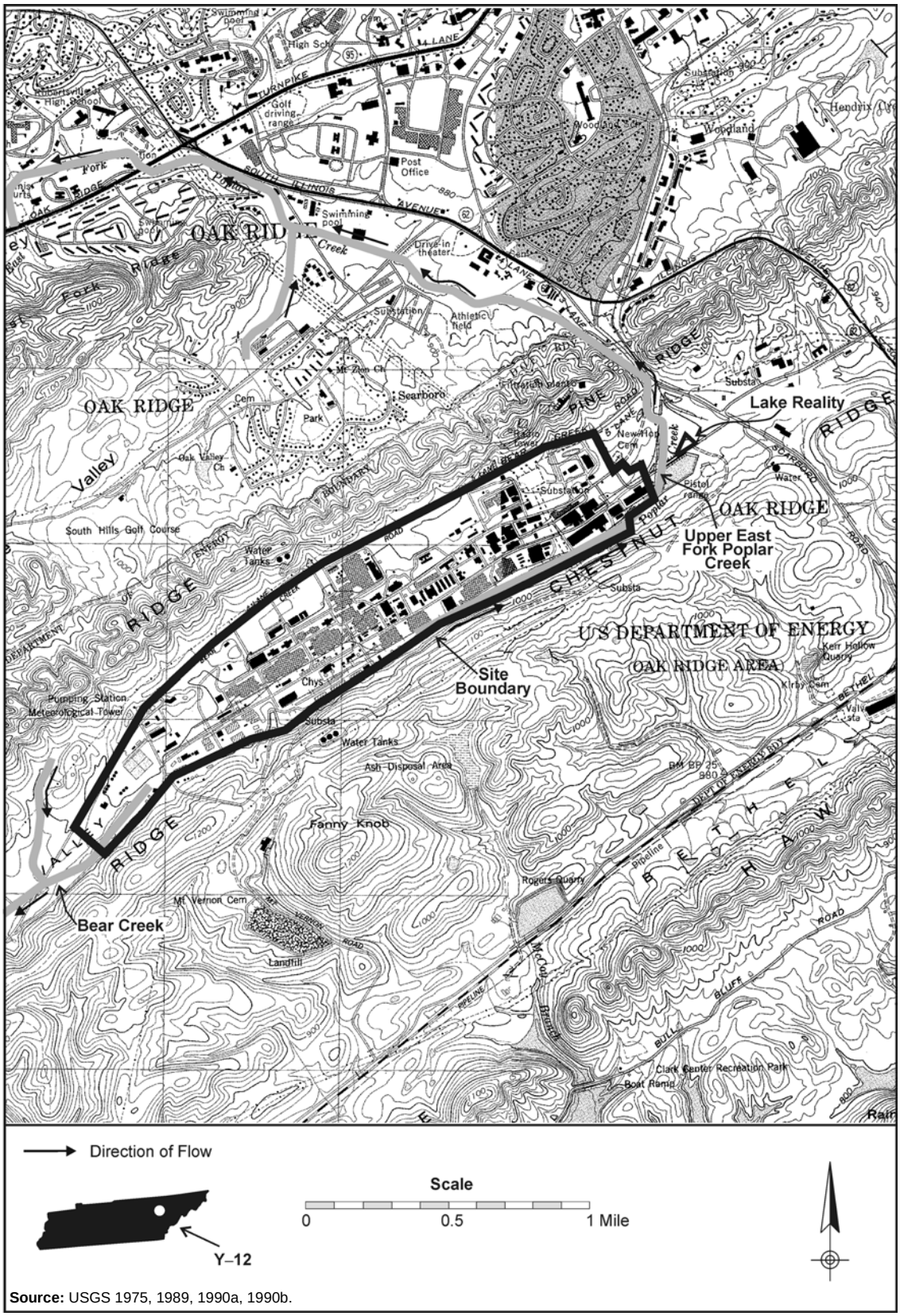
Source: Adapted from USACE 2000b:Fig. 3-2.

Figure 2–3. Somerville Depot Site Layout



Source: Adapted from USACE 2000c:Fig. 2-2.

Figure 2–4. Warren Depot Site Layout



Source: USGS 1975, 1989, 1990a, 1990b.

Figure 2–5. U.S. Department of Energy's Y–12 National Security Complex Area

2.2.2 Alternative 2: Consolidated Storage

The *Scope of the Mercury Management Environmental Impact Statement* (DLA 2001a) identified an alternative that would require consolidated long-term storage of the DNSC's excess mercury at one site. The Consolidated Storage Alternative would involve moving the mercury currently stored at the New Haven, Somerville, and Warren depots and at Y–12 to one site for storage. Each of the three DNSC depots is being considered as a Consolidated Storage Alternative as follows:

Alternative 2A: Consolidated Storage at the New Haven Depot
Alternative 2B: Consolidated Storage at the Somerville Depot
Alternative 2C: Consolidated Storage at the Warren Depot

Y−12 is not being considered as an alternative for consolidated storage. It does not have enough space for all the mercury, and long-term storage of mercury is not part of Y−12's national security mission.

DNSC decided to identify other organizations that had suitable locations and that would be willing to store the mercury. To notify Federal agencies of its search, DNSC published an *Expression of Interest, Alternative Locations for the Long Term Storage of Mercury* in the March 5, 2001, *Federal Register.* After the notice was issued, DNSC sent a letter to Federal land management agencies reiterating its storage requirements and requesting a response. The Office of the Under Secretary of Defense also issued a memorandum that requested U. S. Department of Defense organizations to determine if they had potentially suitable sites.

The Council on Environmental Quality regulations and court decisions suggest that a range of reasonable alternatives be evaluated. DNSC developed site-screening criteria to select representative sites for analysis in this MM EIS. The screening criteria included, but were not limited to, aspects of site infrastructure, environmental conditions, and the availability of environmental documentation. The criteria identified preferred site characteristics and, where meaningful, provided qualitative measures.

Preliminary visits were made to six sites:

- East Tennessee Technology Park, Oak Ridge, Tennessee
- General Services Administration Facility, Clearfield, Utah
- General Services Administration Facility, South San Francisco, California
- Hawthorne Army Depot, Hawthorne, Nevada
- PEZ Lake Development, Romulus, New York
- Utah Industrial Depot, Tooele, Utah

During these visits, DNSC personnel made preliminary assessments of the quality and adequacy of site environmental information, as well as the suitability of the facility for consolidated long-term storage. Each site was evaluated against the site screening criteria. Three sites met the criteria to a higher degree than the others: the Hawthorne Army Depot, the PEZ Lake Development, and the Utah Industrial Depot. DNSC's process for selecting these sites for analysis in this MM EIS is documented in the *Mercury*

Management Environmental Impact Statement Potential Consolidation Sites Alternatives Report (DLA 2002). Each is being considered as a consolidated storage alternative in this MM EIS:

Alternative 2D: Consolidated Storage at the Hawthorne Army Depot
Alternative 2E: Consolidated Storage at the PEZ Lake Development
Alternative 2F: Consolidated Storage at the Utah Industrial Depot

The three sites were selected because:

- They could provide approximately 200,000 ft^2 (18,581 m^2) of forklift-accessible flat space inside a weather-tight structure(s).
- They did not require any new construction to meet the needs for dedicated mercury storage.
- The floors of the proposed structure(s) are capable of supporting mercury loadings and capable of being sealed to prevent mercury infiltration.
- The proposed structure(s) are located on a full-service facility.
- The site(s) are not in proximity to a major airport.
- The site(s) have readily available NEPA and Comprehensive Environmental Response, Compensation, and Liability Act documents.

The South San Francisco, East Tennessee Technology Park, and Clearfield, Utah, sites were not recommended for evaluation in this MM EIS because they did not meet the preferred characteristics to the same degree as the selected sites.

The selected sites, along with the three existing storage depots, afford a wide variety of environmental conditions. In addition, because they are in different parts of the United States, a range of transportation distances can be analyzed. DNSC determined that the six sites would cover the range of environmental impacts that need to be evaluated for consolidation. Analysis of these sites does not preclude the selection of other sites in the future, via an appropriate contractual process. If a site is considered for selection that was not evaluated in this EIS, an environmental review, tiering off this EIS, would be conducted. At this time, DNSC does not have a preferred consolidation site.

It is likely that it would take no more than a year to stage and move the mercury drums from the current locations to a consolidated storage site. The mercury flasks from Y–12 would be placed in drums (as was done at the other three locations) before they are stored at a consolidated storage site.

Both truck and rail transport could be used to move the mercury. The overpack drums meet the packaging requirements of the DOT for shipping hazardous materials by highway or rail (49 CFR 173.164(d)(2)). The drums provide an additional layer of leak protection for the mercury storage flasks that are also allowable shipping containers under the DOT regulations. A forklift would be used to place the pallets in 40,000-lb (18,000-kg) capacity closed truck trailers, or in standard 75-ton (68-metric ton) rail boxcars. It would take about 268 trucks to move the mercury inventory to the New Haven Depot, 126 trucks to the Somerville Depot, 267 trucks to the Warren Depot, and 308 trucks to any of the remaining three sites. If rail were used, about 134 railcars would be needed to move the mercury to the New Haven or Warren depots, 63 railcars to the Somerville Depot, and 154 railcars to any of the remaining three sites.

In order for pallets to be easily inspected, they would not be stacked at the consolidation site. Overpacked mercury would be stored at a consolidated storage site for 40 years. DNSC assumes that the overpack drums would not fail during that time. The overpack drums would be opened during the last year of

storage, and the flasks would be checked for leaks. DNSC assumes that some flasks would leak and would need to be replaced. Waste flasks would be moved to a treatment facility for retort and reclamation of scrap metal. The treatment and disposal or recycling of wastes are not evaluated in this MM EIS because these activities would occur in commercial facilities with permits for routinely performing these types of activities.

Existing storage buildings at a consolidated storage site are not expected to need major upgrades during the 40 years. If necessary, minor upgrades would be made to the warehouses at the Hawthorne Army Depot, the PEZ Lake Development, and the Utah Industrial Depot. Upgrades might include better lighting, installation of fire suppression systems, and floors sealed to resist penetration by mercury.

2.2.2.1 Alternative 2A: Consolidated Storage at the New Haven Depot

Mercury would be moved to the New Haven Depot from the Somerville and Warren depots and Y–12. The mercury would be stored in five warehouse sections. Each section measures 180 ft (55 m) by 240 ft (73 m) (Cangro 2001; Lynch 2002a). (See Appendix C, Table C–1 for more information on this alternative.)

2.2.2.2 Alternative 2B: Consolidated Storage at the Somerville Depot

Mercury would be moved to the Somerville Depot from the New Haven and Warren depots and Y–12. The mercury would be stored in five warehouse sections. Each section measures 200 ft (61 m) by 200 ft (61 m) (Cangro 2001; Lynch 2002a). (See Appendix C, Table C–1 for more information on this alternative.)

2.2.2.3 Alternative 2C: Consolidated Storage at the Warren Depot

Mercury would be moved to the Warren Depot from the New Haven and Somerville depots and Y–12. The mercury would be stored in five warehouse sections. Each section measures 200 ft (61 m) by 200 ft (61 m) (Cangro 2001). (See Appendix C, Table C–1 for more information on this alternative.)

2.2.2.4 Alternative 2D: Consolidated Storage at the Hawthorne Army Depot

Mercury would be moved to the Hawthorne Army Depot from the New Haven, Somerville, and Warren depots and Y−12. The Hawthorne Army Depot is adjacent to the town of Hawthorne, Nevada (see Figure 1–1 and Figure 2–6). The mercury could be stored in 20 warehouses. The warehouses are 200 ft (61 m) by 50 ft (15 m) and 35 ft (11 m) high. They are made with concrete support columns, steel roof trusses, and transite roofing. The warehouses have concrete floors and walls. (See Appendix C, Table C–2 for more information on this alternative.)

Another option at the Hawthorne Army Depot is the use of earth-mounded storage buildings (igloos). The site has 393 empty, usable igloos. They vary in length (80 ft [24 m], 40 ft [12 m], and 20 ft [6 m]), are 25 ft (8 m) wide, and have a maximum height of 13 ft (4 m). The igloos are made of steel-reinforced concrete and covered with about 2 ft (1 m) of soil. The mercury could be stored in about 125 igloos.

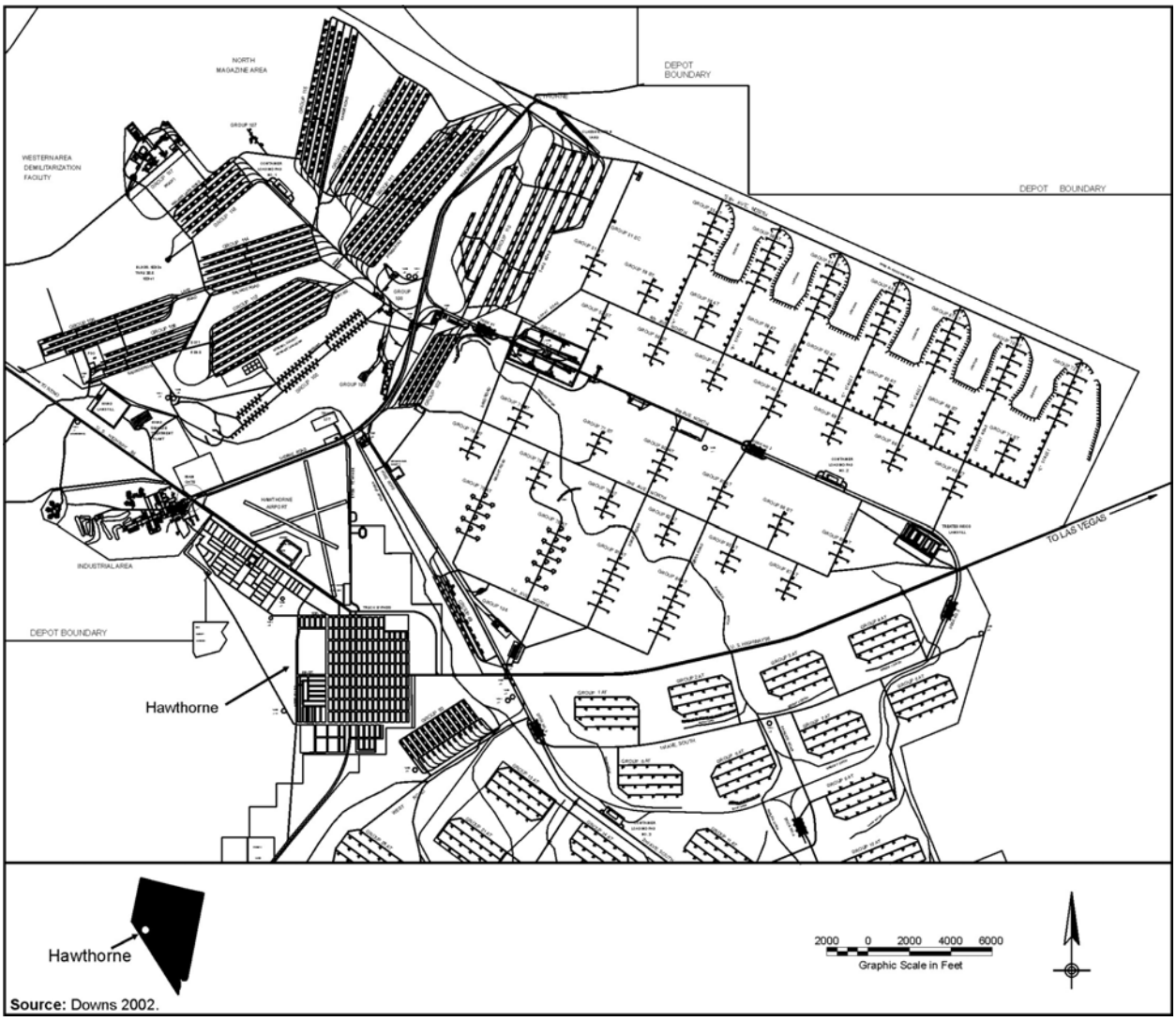
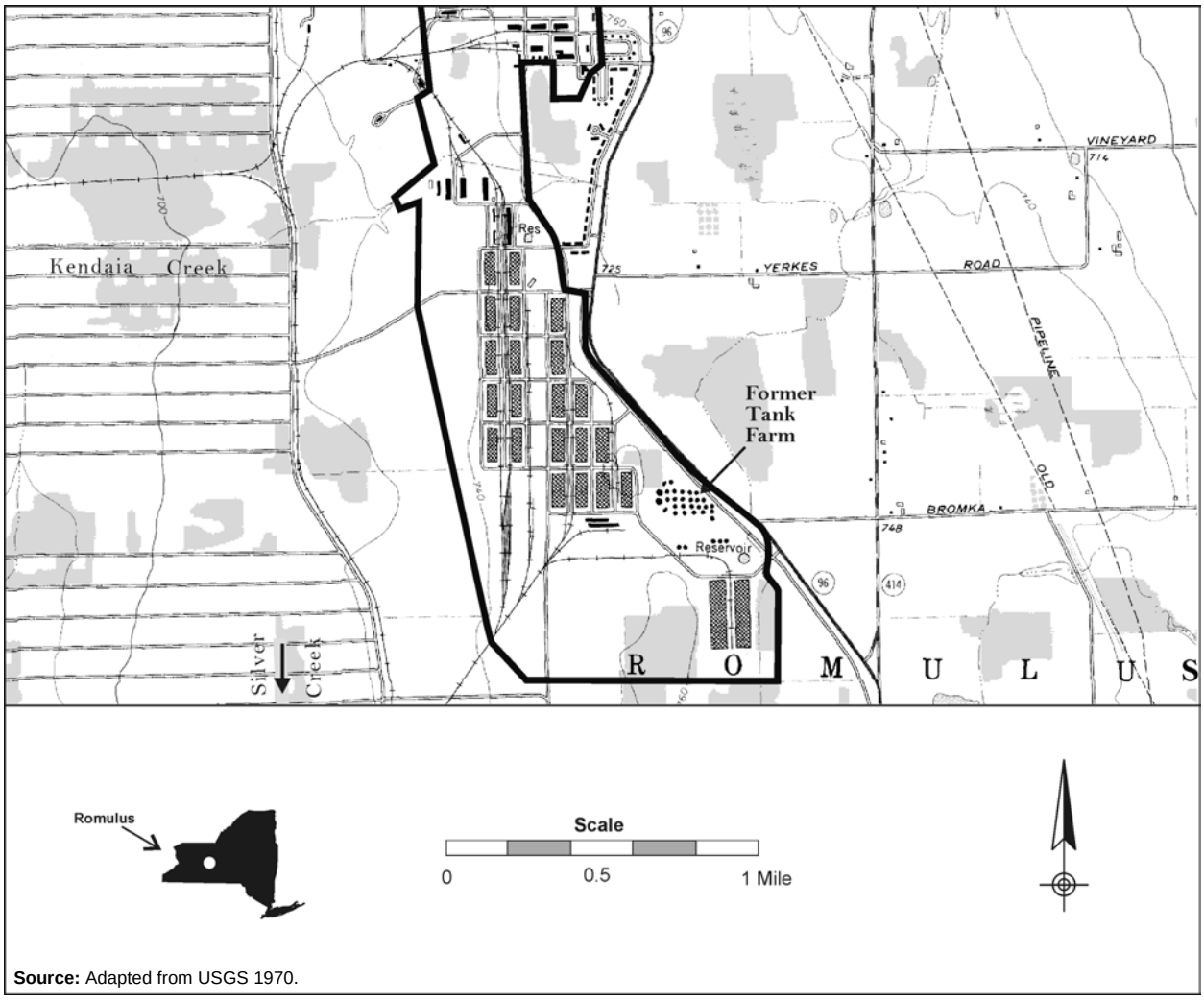


Figure 2–6. Hawthorne Army Depot Site Layout

2.2.2.5 Alternative 2E: Consolidated Storage at the PEZ Lake Development

The PEZ Lake Development in Romulus, New York, is analyzed in the MM EIS as one of the sites representing a range of environmental and socioeconomic settings; however the site is no longer under consideration as a consolidated storage site. The Advantage Group, which manages and will own the site, withdrew it from consideration based on business and site development plans.

The PEZ Lake Development is on the former Seneca Army Depot, to the west of Romulus, New York (see Figure 1–1 and Figure 2–7). The mercury could be stored in warehouses in the southern portion of the site. The warehouses are 500 ft (152 m) by 180 ft (55 m) and 24 ft (7 m) high. They are made of wood support beams and roof trusses and have an asphalt roof with a washed stone aggregate top. The warehouse has concrete floors and walls. (See Appendix C, Table C–2 for more information on this alternative.)

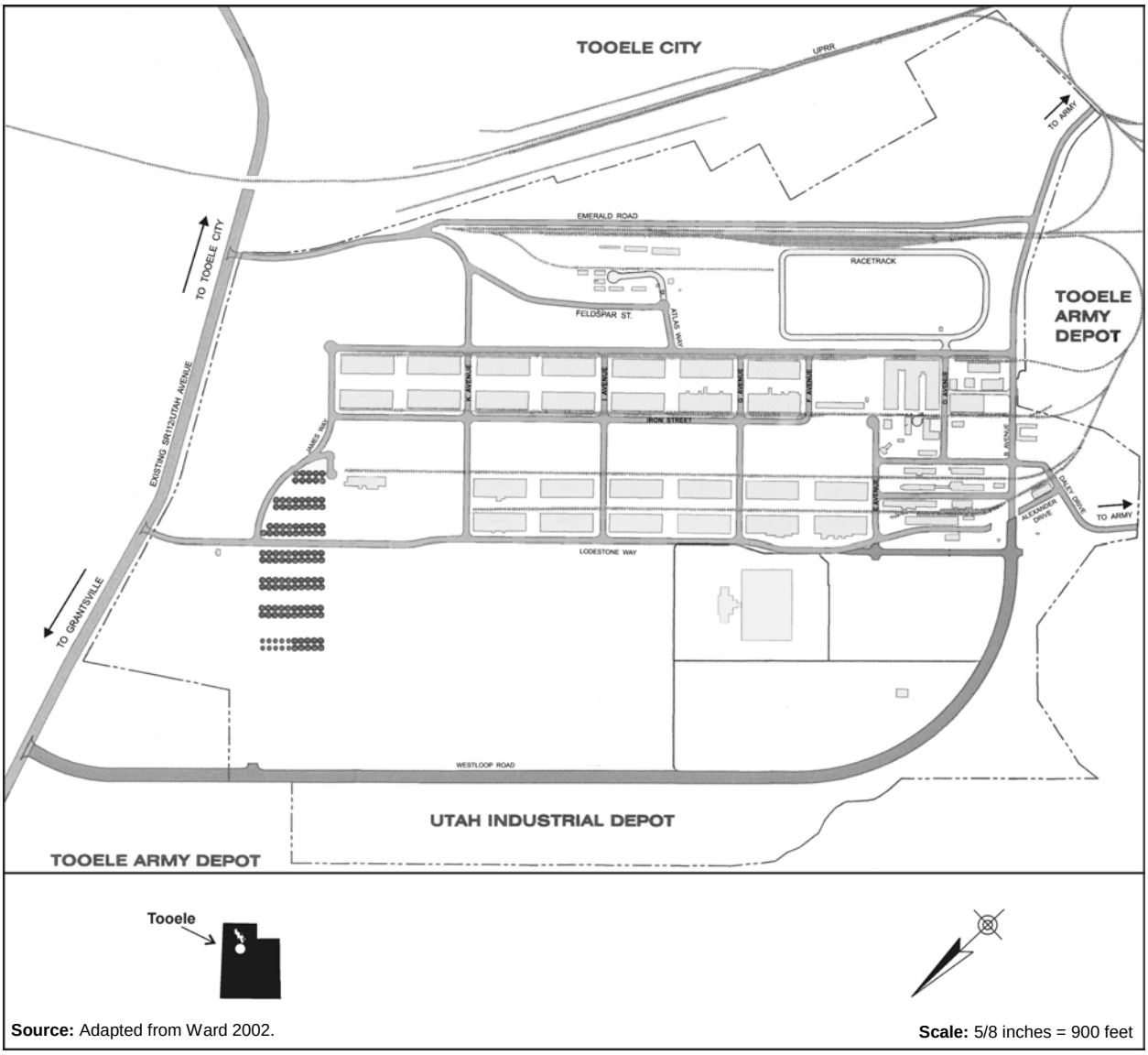


Source: Adapted from USGS 1970.

Figure 2–7. PEZ Lake Development Site Layout

2.2.2.6 Alternative 2F: Consolidated Storage at the Utah Industrial Depot

Mercury would be moved to the Utah Industrial Depot from the New Haven, Somerville, and Warren depots and Y–12. The Utah Industrial Depot is west of Tooele, Utah (see Figure 1–1). The mercury would be stored in buildings, which are arranged in two rows of six and two rows of seven, in the central portion of the depot (see Figure 2–8). Each building is 500 ft (152 m) by 180 ft (55 m) and 16 ft (5 m) high. They are made with wood support beams and roof trusses. The buildings have concrete floors and wood walls. The exterior is protected by concrete or asbestos shake siding. (See Appendix C, Table C–2 for more information on this alternative.)



Source: Adapted from Ward 2002.

Scale: 5/8 inches = 900 feet

Figure 2–8. Utah Industrial Depot Site Layout

2.2.3 Alternative 3: Sales of Mercury Inventory

The Sales Alternative would involve the resumption of sales of the mercury stockpile. DNSC is required by the Strategic and Critical Materials Stock Piling Act of 1939, as amended (50 U.S.C. 98 et seq.) to sell mercury at a rate that will not unduly disrupt the world mercury market. It is assumed that mercury would be sold from existing storage locations (the New Haven, Somerville, and Warren depots and Y–12). Because actual buyers of the mercury inventory cannot be identified at this time, a representative set of buyer locations was selected for the purpose of impact analysis. The representative set of buyers (Europe and Asia) was selected so that the greatest amount of travel distance could be analyzed. This assumption ensures that the analysis of environmental impacts is thorough by including the worst conditions that are reasonably possible. The locations of major mercury users were considered when representative buyer locations were selected.

Although buyers would be responsible for the transport of purchased mercury, this MM EIS analyzes the impacts of commercial transport of mercury by truck or rail from the storage locations to the representative buyers' locations. For buyers outside of the United States, shipping overseas to the buyer is analyzed. All mercury would be shipped from commercial coastal ports. Ports in the western (San Francisco) and eastern (New York) United States are used in the analysis to maximize overland transportation distance between current storage locations and the ports. It is assumed that overseas buyers will transport mercury in a responsible manner, per applicable international requirements, outside U.S. borders with adequate financial assets for cleanup if an accident were to occur. (See the separately published *Human Health and Ecological Risk Assessment Report for the Mercury Management Environmental Impact Statement* (DLA 2004), which summarizes the risk analysis for transporting mercury for the Sales Alternative.) All transportation of purchased mercury will be in accordance with applicable requirements, including the DOT and international regulations. Disposal of packaging materials, including drums and flasks is the responsibility of the buyer. It is assumed that this activity will occur in permitted, commercial facilities, and therefore, is not analyzed in this MM EIS.

Mercury price projections for the Sales Alternative is based on a range that includes current market prices. Both a high and low case is assumed for mercury sale prices—$195 and $58 per flask, based on the current market value for mercury and the low price paid in previous DNSC sales between 1992 and 1994, respectively.

2.2.3.1 Alternative 3A: Sale of Mercury at Maximum Allowable Market Rate

Under Alternative 3A, excess mercury would be sold at the maximum allowable market rate[2] that would not result in undue disruption of the world mercury market. A range of 1,000 to 5,000 flasks of mercury per year was proposed as the rate of sales. This is based on estimated current U.S. (330 tons [300 metric tons]) and world (2,205 tons [2,000 metric tons]) consumption (EPA 2002a). In order to address the total number of flasks that might be sold, the analysis is based on the sale of 5,000 flasks (190 tons [172 metric tons]) per year.

For purposes of analysis in this MM EIS, it is assumed that mercury would be sold at a rate of 1,250 flasks per year per site from the existing four storage locations until the mercury is gone from one site. Mercury would then be sold at a rate of 1,666 flasks per year from the three remaining sites, and so on until the entire inventory of excess mercury is sold. It would take a total of 26 years to sell all the mercury; 13 years to sell the mercury inventory from the New Haven Depot, 14 years from the Warren Depot, 15 years from Y–12, and 26 years from the Somerville Depot.

If this Sales Alternative is chosen, the Market Impact Committee would determine the actual amount of mercury that would be sold each year. The Market Impact Committee is an interagency committee that advises the U.S. Department of Defense on proposed stockpile transactions. The committee would publish the recommended amount of mercury to be sold in the *Federal Register* for public comment. A maximum would then be established and included in DNSC's *Annual Materials Plan* (Lynch 2002b; UNEP 2002:96).

Under Alternative 3A, the mercury would be sold to mercury producers and/or users. Producers include primary and secondary mercury mining and refining companies and companies that recover and reclaim mercury. Users include chemical processing companies, including the chlor-alkali industry, and manufacturers that use mercury in their products (e.g., lighting, switches, thermometers, dental amalgam,

[2] The maximum allowable market rate is the rate that mercury can be sold without undue disruption of the usual markets of producers, processors, and consumers of mercury.

and medicine). Mercury can also be sold to traders or brokers, who then sell the mercury to users and producers. (See Appendix C, Table C–3**,** for more information on this alternative.)

2.2.3.2 Alternative 3B: Sale of Mercury to Reduce Mercury Mining

Under this alternative, the entire inventory of excess mercury would be sold to a mercury mining company with the agreement that mining would be reduced proportionately to compensate for the release of the DNSC mercury. It is expected that an agreement would be negotiated that would require the purchaser to sell DNSC mercury at a rate no greater than the rate of sale for newly mined mercury. Therefore, this alternative would also meet the requirements of the Strategic and Critical Materials Stock Piling Act of 1939, as amended (50 U.S.C. 98 et seq.) in that sales would not result in undue disruption of the mercury market. This option is also being considered by the European chlor-alkali industry, where mercury from closing chlor-alkali plants would be sold to a mercury mining company. Alternative 3B would be similar to the model proposed in the Commission of the European Communities "Report from the Commission to the Council Concerning Mercury from the Chlor-alkali Industry" (CEC 2002:9-12).

It is assumed that the buyer of DNSC mercury would be overseas (in either Europe or Asia), where most mercury mining operations are located. Mercury is mined primarily in Spain, Algeria, and Kyrgyzstan (USGS 2003). Mercury is no longer mined in the United States, although small amounts are still produced as a byproduct of the mining of other metals. (See Appendix C, Table C–4 for more information on this alternative.)

2.2.4 Monitoring and Maintenance Requirements for All Alternatives

As described in the statement of proposed action, the mercury management alternatives require mercury to be stored for periods up to 40 years in dedicated storage facilities. Periodic maintenance activities and inspections of the stored mercury would be performed to ensure that it is safe and secure. Inspections would be conducted by trained personnel. Methods would include visual examinations and mercury vapor monitoring using state-of-the-art equipment. Public access to the mercury would be restricted by a security system, including guards, locked warehouses, and other measures. These measures have been recently upgraded at the DNSC storage depots (Lynch 2002a). If needed, security upgrades would be made to the storage buildings at the Hawthorne Army Depot, the PEZ Lake Development, and the Utah Industrial Depot.

In 2002, DNSC issued the *Environmental Inspection Plan for Mercury in Storage* (Appendix 4–A in the Defense National Stockpile Operations and Logistics Storage Manual [DNSC 2002]). The purpose of the plan is to improve the inspection and reporting process for mercury storage. The plan also documents the correct storage and control measures that are required for the protection, safety, and health of workers and the public, and protection of the environment. Operational procedures are provided for:

- Frequency of inspections
- Temperature, barometric pressure, and humidity measurement
- Vapor monitoring
- Visual inspection
- Documentation and records
- Corrective action

If a vapor monitoring reading is found to be above the DNSC action level (0.025 mg Hg/m^3) or if metallic mercury is found during a visual inspection, an investigation would be initiated to determine the cause.

Corrective action would take place to reduce mercury vapors in the air to below the action level and to clean up any metallic mercury and prevent future leakage (DNSC 2002).

2.3 PREFERRED ALTERNATIVE

Agencies are required by law to identify a preferred alternative in the final EIS and are encouraged to identify one as early as possible in the NEPA process. DNSC has selected Alternative 2, Consolidated Storage, as its preferred alternative. Consolidating mercury at one location would meet the objectives of the proposed action, as described in Section 1.3. Selection of this alternative gives consideration to environmental, economic, and technical factors; national policy; and public and stakeholder comments as follows:

- Consolidating the excess DNSC mercury inventory at one site is not predicted to result in significant environmental impacts at that site and would improve environmental conditions at any sites where the mercury would be removed.
- Consolidating the excess mercury inventory would simplify storage operations and result in economies of scale (e.g., fewer resources required to maintain the mercury inventory).
- Consolidating the excess mercury inventory would facilitate DNSC's long-term closure strategy.
- The stored DNSC mercury would be available for future beneficial uses.

At this time, DNSC does not have a preference for one of the consolidated storage locations evaluated. However, the sites analyzed demonstrate that mercury consolidation and storage do not pose an environmental concern across a wide range of environmental settings. The environmental analysis presented in the MM EIS is sufficient to allow selection of one of these sites in the Record of Decision. However, the consolidated site ultimately chosen may not be one of those analyzed in this MM EIS. If a site that was not evaluated in this MM EIS is considered for selection as a consolidation location, additional environmental documentation may be needed, with additional public notification and review.

2.4 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

A number of alternatives were considered but were not evaluated in detail. As required in the Council on Environmental Quality regulations (40 CFR 1502.14(a)), the reasons for elimination from detailed study are discussed in this section. Alternatives may be eliminated from further consideration because of technical immaturity, prohibitive cost, regulatory unacceptability, or because they do not support the purpose and need of the proposed action.

2.4.1 Storage Related Options

Alternatives for consolidated storage at multiple (two to three) locations are not evaluated in detail in this MM EIS. This MM EIS evaluates continued storage of the mercury stockpile at the four current locations (No Action Alternative) and storage of the entire mercury stockpile at one location (Consolidated Storage Alternative). The analysis of the impacts of the No Action and Consolidated Storage Alternatives covers the potential impacts of storage at multiple (two to three) locations. Therefore, the range of alternatives evaluated encompasses alternatives for storage at two to three sites.

This MM EIS evaluates consolidated storage of excess DNSC mercury in warehouses and igloos. Alternatives for consolidated storage in below-ground facilities such as bunkers and mines are considered but are not evaluated. It is expected that conditions in below-ground facilities such as bunkers would be

similar to the igloos at Hawthorne, which are evaluated in this MM EIS. Therefore, the analysis of the impacts of storage in igloos at Hawthorne can be used to represent other forms of below-ground storage. Because of the limited availability of existing mines, inspection considerations, additional material handling, and regulatory issues, the use of mines for storage of excess DNSC mercury is not considered to be a reasonable alternative.

DNSC considered evaluating the construction of a new storage building. This alternative was eliminated from detailed evaluation because existing facilities are currently available that would not need major modifications, eliminating the impacts that could occur during construction of a new building. For comparison, construction specifications, resource needs, and potential impacts for construction of a new building are provided in Appendix F.

2.4.2 Treatment and Storage

DNSC considered evaluating a treatment and storage alternative. This alternative would have involved processing the mercury to a less toxic stabilized form and then storing the processed material in anticipation of future beneficial uses. This alternative is eliminated for two reasons: (1) mercury can be safely stored in its elemental form, and (2) elemental mercury is the preferred form in most industrial processes that require mercury. Processing may preclude some future uses of mercury or at least make them more difficult and more expensive. Also, DNSC has safely stored elemental mercury for more than 50 years. This storage was made even safer by placing the flasks inside sealed 30-gal (114-l) drums, sealing the floors, and making other storage building improvements. A treatment and storage alternative would result in additional environmental impacts and costs, without significant benefits, during initial processing (stabilization), storage, and conversion (reclamation) back into elemental mercury at the end of the storage period. Therefore, this alternative is not considered for detailed evaluation in this MM EIS.

2.4.3 Treatment and Disposal

DNSC considered evaluating treatment and disposal into a qualified landfill as a viable alternative for management of the mercury stockpile. The *Scope of the Mercury Management Environmental Impact Statement* and the "Notice of Intent to Prepare a Draft Programmatic Environmental Impact Statement for the Long Term Management of the National Defense Stockpile of Excess Mercury" (DLA 2001a, 2001b) both discussed the intent to include the Treatment and Disposal Alternative.

DNSC's preliminary research into potential treatment technologies found that there did not appear to be commercially available technologies for large quantities of elemental mercury. Information on the existing technologies was also not generally available. DNSC placed an announcement in the *Commerce Business Daily* on May 24, 2001, requesting expressions of interest from vendors possessing the technology (DLA 2001c). Specifically, DNSC stated that it needed expressions of interest to determine whether there were any existing technologies for, and firms capable of and interested in supplying, processing services to render the elemental mercury more stable and/or less toxic for storage or disposal. Expressions of interest were received from the following five firms:

- Bjasta Atervinning and McCoy Environmental Technicians Incorporated proposed a process that combines mercury with selenium in a high-temperature furnace to form a mercury selenide.
- Bethlehem Apparatus Company Incorporated proposed a site but not a treatment process.
- Brookhaven National Laboratory provided information on a process known as Sulfur Polymer Stabilization/Solidification, by which mercury is combined with sulfur polymer cement and baked into a solid monolith.

- IT Corporation and Nuclear Fuel Services Incorporated proposed their DeHg™ process that combines mercury with a compatible metal to form an amalgam.
- PermaFix Environmental Services proposed a process that involves combining mercury with sulfur and other proprietary reagents to form a mercury sulfide.

The information provided by these vendors was based largely on bench-scale testing. In addition, it is clear that although studies to evaluate waste stability have been performed, the available information is often inconsistent. The U.S. Environmental Protection Agency (EPA) and DOE sponsored the development of much of the available information.

Current regulations do not provide adequate guidance for treating DNSC excess mercury and placing it in landfills. EPA regulates the treatment and disposal of mercury and its compounds that are no longer needed in commerce through waste management regulations under the Resource Conservation and Recovery Act. These regulations for mercury were developed to encourage the recovery of mercury for reuse. The treatment standard under 40 CFR 268 for high-concentration mercury wastes is roasting or retorting of mercury and subsequently condensing the volatized mercury for recovery. This treatment method is not feasible for disposing of mercury because the purpose of the specified treatment is to recover the mercury for further use. DNSC's inventory is in the form of greater than 99.5 percent pure elemental mercury, a form already suitable for most commercial uses.

On January 29, 2003, EPA published a Notice of Data Availability in the *Federal Register* (EPA 2003) making available two studies conducted on mercury waste treatment: *Technical Background Document: Mercury Wastes–Evaluation of Treatment of Mercury Surrogate Waste and Technical Background Document: Mercury Wastes–Evaluation of Treatment of Bulk Elemental Mercury*. The studies were intended to help EPA determine whether it could propose treatment and disposal alternatives to the current land disposal restrictions for mercury. The studies were performed to assess conditions that affect the stability of waste residues resulting from the treatment of high mercury (greater than 260 mg/kg total mercury) and elemental mercury wastes destined for disposal. Based on these studies, EPA concluded that it could not establish, at this time, new national treatment standards for disposal of high mercury and elemental mercury wastes.

Based on the immaturity of the bulk mercury treatment technologies and the lack of an EPA-approved path forward for treatment and disposal of elemental mercury, this alternative is not considered viable and is not evaluated in detail in this MM EIS.

2.4.4 Sales Related Options

In addition to selling the entire mercury inventory to a mercury mining company or selling the inventory at the maximum allowable market rate (Alternatives 3A and 3B), unrestricted sales of mercury was considered. An unrestricted sales option would allow DNSC to sell any portion of the mercury inventory at any point in time. This could result in sales at a rate greater than the maximum allowable market rate. This option is considered to be unreasonable because it could result in undue disruption of the world mercury market, which is prohibited under the Strategic and Critical Materials Stock Piling Act of 1939, as amended (50 U.S.C. 98 et seq.).

In addition to selling mercury directly from the existing storage locations (Alternative 3A and 3B), mercury could be sold after being moved to a consolidated storage location. Although this alternative is not expressly evaluated in this MM EIS, the Consolidated Storage and Sales Alternatives already cover most of the impacts of sales from a consolidation location. The transportation of mercury from the consolidation location to domestic or foreign buyers is not explicitly evaluated in this MM EIS, but its

effects are likely to be bounded by the transportation evaluated for the Sales Alternative. In this alternative, mercury is shipped from the existing storage locations to the ports in New York or San Francisco, and then overseas.

2.4.5 Transportation Methods Not Considered in Detail

Air transport is not considered a reasonable option because of the additional cost and handling required to move the mercury by truck or rail to and from the airports. In part because mercury is very heavy, air transport costs three times more than transport by truck and 35 times more than transport by rail (BTS 2002:Table 3-17).

The movement of mercury within the continental United States by barge is not a reasonable option due to the limited number of barge routes and the additional handling required to move the mercury by truck or rail to and from the barge route.

2.5 SUMMARY OF IMPACTS AND COSTS

This section summarizes the potential impacts of transporting and storing mercury for the various alternatives. Tables are provided that summarize and compare impacts on key environmental resources for each alternative and site. Key resource areas include air quality and noise, waste management, socioeconomics, human health and ecological risk under normal operating and accident conditions, transportation risk, water resources, land use, infrastructure, and environmental justice. Section 2.5.1 describes impacts to each resource associated with implementing the mercury management alternatives at each of the potentially affected sites. Other resources, including geology and soils, ecological resources, cultural resources, and visual resources, are not discussed here because these resources are essentially unaffected by the mercury management alternatives. These resources are largely unaffected because the alternatives do not involve building construction or land disturbance. The impacts of these resources are discussed in Chapter 4. Section 2.5.2 summarizes the costs of each alternative.

Impacts are typically described in terms of intensity and duration. A set of standard terms to describe impacts was developed for use in this MM EIS. These terms are described in Tables 2–1 and 2–2. Table 2–1 describes the terms used for all impacts except human health and ecological risk and transportation risk. Beneficial impacts are those that would improve current conditions, while adverse impacts would degrade current conditions. Intensities are categorized as minor, moderate, or major. Durations are classified as short term (less than or equal to 5 years) or long term.

Table 2–1. Impact Categories and Definitions

Impact Category		Definition
Beneficial Impacts	Major	An action that would greatly improve current conditions
	Moderate	An action that would moderately improve current conditions
	Minor	An action that would slightly improve current conditions
Negligible or No Impact		An action that would neither improve nor degrade current conditions
Adverse Impacts	Minor	An action that would slightly degrade current conditions
	Moderate	An action that would moderately degrade current conditions
	Major	An action that would greatly degrade current conditions

Note: Impacts may also be categorized as short-term (less than or equal to 5 years) or long term.

Table 2–2 provides similar information for human health and ecological risk and transportation risk. These terms are based on information presented in the *Human Health and Ecological Risk Assessment*

Report for the Mercury Management EIS (DLA 2004) and summarized in Section 4.1. Intensities are categorized as low, moderate, or high. Durations are classified as acute or chronic. The mercury management alternatives evaluated in this MM EIS are predicted to have minor impacts and low risks except as described below.

Table 2–2. Risk Categories and Definitions

Risk Category		Definition
Reduced Risk	High	An action that would greatly reduce risk
	Moderate	An action that would moderately reduce risk
	Low	An action that would slightly reduce risk
Negligible or No Increase in Risk		An action that would neither reduce nor increase risk
Increased Risk	Low	An action that would slightly increase risk
	Moderate	An action that would moderately increase risk
	High	An action that would greatly increase risk

Note: Risks may also be categorized as acute (less than or equal to 24 hours) or chronic.
Source: Based on the risk matrix presented in the *Human Health and Ecological Risk Assessment Report for the Mercury Management EIS* (DLA 2004).

The term "impact," when used in this MM EIS, refers to adverse, long-term impacts, unless otherwise stated.

As shown in Table 2–3, the environmental and socioeconomic impacts of alternatives for mercury management are generally negligible to minor for all alternatives with few discriminating factors among the alternatives. The difference in the impacts among the alternatives is largely due to the number of sites affected and the duration of the impacts. The No Action Alternative would affect the four existing storage locations with largely long duration (40 years) negligible impacts. Because the No Action Alternative would not allow the DNSC depots to close, it is incompatible with DNSC's long-term closure strategy. The Consolidated Storage Alternative would affect the one consolidation location with largely long duration (40 years) impacts. In addition to negligible-to-minor impacts on the environment at the location where the mercury is consolidated, there would also be minor beneficial impacts at the existing storage locations after the mercury is removed. The Sales at the Maximum Allowable Market Rate Alternative would primarily affect the four existing storage locations with long duration (up to 26 years) negligible-to-minor impacts. Sales at the Maximum Allowable Market Rate would also result in negligible or no impacts at the mercury buyer's and user's locations. The Sales to Reduce Mercury Mining Alternative would largely affect the four existing storage locations with short duration (up to 3 months) negligible-to-minor impacts. Sales to Reduce Mercury Mining would also result in moderate beneficial long-term impacts from reduced mercury mining and refining. Under the Sales Alternative, minor beneficial impacts would also occur at the existing storage locations after the mercury is removed.

Table 2–3. Comparison of the Impacts of Mercury Management Alternatives

	Topics	Alternatives			
				Sales	
		No Action (1)[a]	Consolidated Storage (2A–2F)[b]	At Maximum Allowable Market Rate (3A)[c]	To Reduce Mercury Mining (3B)[d]
Environmental and Socioeconomic Impacts	Meteorology, Air Quality, and Noise	Negligible	Minor short term	Minor	Minor short term
	Waste Management	Negligible short term	Minor short term	Negligible short term	Negligible short term
	Socioeconomics	Negligible	Negligible	Negligible	Negligible short term
	Water Resources	Negligible	Negligible to minor	Negligible	Negligible short term
	Land Use	No	No	No	Negligible short term
	Infrastructure	Negligible	Negligible to minor	Negligible	Negligible short term
	Environmental Justice	No	No	No	No
Human Health Risks/Ecological Risks	Risks from Normal Operations	Negligible/ Negligible	Negligible/ Negligible	Negligible/ Negligible	Negligible short term/Negligible short-term
	Risks from Accidents	Low/ Negligible	Moderate/ Moderate	Moderate/ Moderate	Moderate/ Moderate
	Transportation Risk	No/No	Low/Moderate	Moderate/High	Moderate/High

[a] This column indicates the potential impacts that would result at the existing storage locations.

[b] This column indicates the potential impacts that would result at the consolidation locations and along the transportation routes. This alternative would also result in minor beneficial impacts and low reduced risk at existing storage locations after the mercury is removed. This is DNSC's preferred alternative.

[c] This column indicates the potential impacts that would result at the existing storage locations and along the transportation routes. Minor beneficial impacts and low reduced risk would also occur at existing storage locations after the mercury is removed. This alternative would also result in negligible or no additional impacts and risks at the mercury buyer's and user's locations.

[d] This column indicates the potential impacts that would result at the existing storage locations and along the transportation routes. Minor beneficial impacts and low reduced risk would also occur at existing storage locations after the mercury is removed. This alternative would also result in moderate beneficial impacts and moderate reduced risk from reduced mercury mining and refining.

As shown in Table 2–3, the human health and ecological risks of alternatives for mercury management are within the normal ranges to be expected for these types of activities. The human health risks would be negligible for all mercury management alternatives during normal operations. Human health risks from facility accidents would range from low for the No Action Alternative to moderate for the Consolidated Storage and Sales Alternatives. Human health risks from transportation accidents would range from no additional risk for the No Action Alternative to moderate risk for both Sales Alternatives.

The ecological risks would be negligible for all mercury management alternatives during normal operations. Ecological risks from facility accidents would range from negligible for the No Action Alternative to moderate for the Consolidated Storage and Sales Alternatives. Ecological risks from transportation accidents would range from no additional risk for the No Action Alternative to high ecological risk for both Sales Alternatives. The high ecological risk for both Sales Alternatives is a result of the longer transportation distances for the truck transport segments associated with shipping the mercury to overseas buyers. See Section 4.4.6 for more information.

The Consolidate Storage and Sale Alternatives would result in low reduced human health risk at the existing storage locations after the mercury is removed. The Sales to Reduce Mercury Mining Alternative is estimated to result in moderate reduced human health and ecological risk from reduced mercury mining and refining.

The estimated cost for 40 years of storage under the No Action Alternative is approximately $26 million. The estimated cost for 40 years of storage under the Consolidated Storage Alternative is $29 million. The Sales at Maximum Allowable Market Rate Alternative ranges from costs of $6.1 million to revenues of $12 million. The market price of mercury at the time of sale (low of $58 per flask to high of $195 per flask) accounts for the variation in estimated revenue. This alternative includes the cost of storage for up to 26 years before all the mercury is sold. The estimated revenue from the Sales to Reduce Mercury Mining Alternative ranges between $7.5 and $25 million. The market price of mercury at the time of sale accounts for the variation in estimated revenue. This alternative does not include storage costs because all the mercury is sold in less than 1 year.

2.5.1 Summary of Impacts by Resource

This section summarizes and compares potential impacts on each resource from the mercury management alternatives. Detailed descriptions of the environmental impacts are presented in Chapter 4.

2.5.1.1 Air Quality and Noise

Under the No Action Alternative, excess mercury would continue to be stored at the existing storage locations, and there would be no construction activities except routine maintenance of the warehouses. Impacts on air quality would be negligible and result from use of vehicles and a forklift by the employees making periodic inspections of the storage areas. Noise impacts would also be negligible, resulting from the use of vehicles.

Under the Consolidated Storage Alternatives, impacts on air quality from shipping activities at the existing storage sites would be minor. They would result from a temporary increase in truck or rail trips. These trips would be a small fraction of the vehicle activity in the vicinity of these sites. Noise impacts from the temporary increase in shipping activity would also be minor and result in less than 1 dBA in the day-night average sound levels along the shipping routes in the vicinity of the sites.

Minor impacts on air quality and noise near the consolidation site would result from shipping. Air quality and noise impacts would result from the delivery of 268 truck shipments or 134 railcars of mercury over a period of several months to the New Haven Depot (Alternative 2A); 126 truck shipments or 63 railcars to the Somerville Depot (Alternative 2B); 267 truck shipments or 134 railcars to the Warren Depot (Alternative 2C); and 308 truck shipments or 156 railcars to the Hawthorne Army Depot (Alternative 2D), the PEZ Lake Development (Alternative 2E), or the Utah Industrial Depot (Alternative 2F). The Consolidated Storage Alternative would result in an increase of less than 1 percent of the vehicle activity and emissions on nearby roads and a small fraction of the existing railroad activity and emissions. Noise

impacts from the temporary increase in shipping activity at any of the candidate sites would also be minor and result in less than 1 dBA in the day-night average sound levels along the shipping routes to any of these sites.

If igloos rather than warehouses were used for consolidated storage at the Hawthorne Army Depot, there still would be negligible or no additional impacts on air quality and noise.

Impacts on air quality and noise are expected to be minor under the Sales Alternative. Impacts on air quality from shipping the mercury from each of the existing storage locations would be minor and result from a temporary increase in truck or rail trips and increases in activity at a commercial port. These trips would be a small fraction of the vehicle activity in the vicinity of these locations. Noise impacts from the temporary increase in shipping activity would also be minor and result in less than 1 dBA in the day-night average sound levels along the shipping routes in the vicinity of the existing storage and buyer's sites. No increase in noise levels at a commercial port would be expected.

There would be no impacts on air quality or noise at other locations such as ports and the global commons[3] from shipping mercury under the Sales Alternative. There would be potentially beneficial impacts from the reduction of mining operations under the alternative for the sale of mercury to reduce mining, such as reduction in air pollutant emissions and noise.

There would be negligible beneficial impacts from reduced vehicle activity at the sites from which mercury is removed under the Consolidated Storage and Sales Alternatives. A summary of impacts for air quality and noise is provided in Table 2–4.

[3] Global commons – any territory (land, water, and air space) that is outside the territorial jurisdiction of any nation; includes Antarctica and the oceans outside the territorial limits of any nation.

Table 2–4. Summary of Impacts—Air Quality and Noise

Location	No Action Alternative (Alternative 1)	Consolidated Storage Alternative[a] (Alternatives 2A–2F)	Sales Alternatives	
			Sales at Maximum Allowable Market Rate[b] (Alternative 3A)	Sales to Reduce Mercury Mining[b] (Alternative 3B)
New Haven Depot	Negligible impacts from employee vehicles and forklift.	**Impacts at Consolidation Location:** Minor short-term increase in pollutant concentrations from vehicles. Minor air quality impact even at Hawthorne, where gasoline-powered generators would be used to supply electricity. Minor short-term traffic or other noise impact. **Impacts at Other Existing Mercury Storage Locations:** Minor short-term air quality impact from shipping, over a period of months. Negligible short-term traffic or other noise impact from shipping. Minor beneficial impact from reduced activity on site.	Minor impact from shipping, over a period of years. Negligible beneficial impact from reduced activity on site.	Minor impact from shipping, over a period of months. Negligible beneficial impact from reduced activity on site.
Somerville Depot	Negligible impacts from employee vehicles and forklift.		Minor impact from shipping, over a period of years. Negligible beneficial impact from reduced activity on site.	Minor impact from shipping, over a period of months. Negligible beneficial impact from reduced activity on site.
Warren Depot	Negligible impacts from employee vehicles and forklift.		Minor impact from shipping, over a period of years. Negligible beneficial impact from reduced activity on site.	Minor impact from shipping, over a period of months. Negligible beneficial impact from reduced activity on site.
Y–12	Negligible impacts from employee vehicles and forklift.		Minor impact from shipping, over a period of years. Negligible beneficial impact from reduced activity on site.	Minor impact from shipping, over a period of months. Negligible beneficial impact from reduced activity on site.
Hawthorne Army Depot	Not applicable.		Not applicable.	Not applicable.
PEZ Lake Development	Not applicable.		Not applicable.	Not applicable.
Utah Industrial Depot	Not applicable.		Not applicable.	Not applicable.
Ports	Not applicable.	Not applicable.	Minor impact from shipping and handling.	Minor impact from shipping and handling.
Ocean	Not applicable.	Not applicable.	No impact.	No impact.
User locations	Not applicable.	Not applicable.	No impact.	No impact.
Mercury mine	Not applicable.	Not applicable.	Not applicable.	Moderate beneficial impact from reduction in mercury emissions.

[a] This column summarizes the impacts from the six sites considered in the Consolidated Storage Alternative. "Impacts at Consolidation Location" describes the impacts that would occur at the consolidated storage sites. "Impacts at Other Existing Mercury Storage Locations" describes the impacts that would occur at the existing mercury storage locations that are not the subject of consolidated storage.

[b] Impacts of storage at the buyer's site would be site specific and cannot be assessed further.

2.5.1.2 Waste Management

Under the No Action Alternative, waste generation would continue at current levels except during the last year of the 40-year period. At that time, activities to replace leaking flasks could generate some quantities of hazardous solid waste, nonhazardous solid waste, and used flasks. This increase in waste would have no impact on long-term waste management at these sites.

Minor impacts on waste management activities at the storage sites would result from the Consolidated Storage Alternative. Wastes generated during storage would include small quantities of hazardous and nonhazardous wastes, which would have a minor impact on waste management activities. During the last year of the 40-year period, the inspection and flask replacement operation would result in up to 9,560 lb (4,336 kg) of hazardous solid waste, 17.7 yd^3 (13.5 m^3) of nonhazardous solid waste, and 956 old flasks. This one-time event is expected to have no impact on long-term waste management at the consolidation site.

If igloos rather than warehouses were used for consolidated storage at the Hawthorne Army Depot, there would be negligible or no additional impacts on waste management.

Under the Sales Alternative, no impacts are expected on waste management from the transportation of mercury to the buyer's site. There would be negligible or no impacts on waste management during storage over a period of years under the Sales at Maximum Allowable Market Rate Alternative and over a period of months under the Sale of Mercury to Reduce Mining Alternative. Minor beneficial impacts from reduced waste generation would result at sites from which mercury is removed.

There would be no impacts on other locations such as ports and the global commons from shipping mercury under the Sales Alternative. There would be moderate beneficial impacts from the alternative for the sale of mercury to reduce mining, including reduction in mining wastes. A summary of impacts for waste management is provided in Table 2–5.

Table 2–5. Summary of Impacts—Waste Management

Location	No Action Alternative (Alternative 1)	Consolidated Storage Alternative[a] (Alternatives 2A–2F)	Sales Alternatives	
			Sales at Maximum Allowable Market Rate[b] (Alternative 3A)	Sales to Reduce Mercury Mining[b] (Alternative 3B)
New Haven Depot	1,200 lb hazardous solid waste, 2.2 yd^3 nonhazardous solid waste, and 120 flasks from inspection and reflasking. No impact on long-term waste management.	**Impacts at Consolidation Location:** 9,560 lb hazardous solid waste, 17.7 yd^3 nonhazardous solid waste, and 956 flasks from inspection and reflasking. No impact on long-term waste management. **Impacts at Other Existing** Mercury **Storage Locations:** Minor beneficial impact from reduced waste generation.	Negligible impact on waste management activities during storage, over a period of years. Minor beneficial impact from reduced waste generation.	Negligible impact on waste management activities during storage, over a period of months. Minor beneficial impact from reduced waste generation.
Somerville Depot	5,640 lb hazardous solid waste, 10.4 yd^3 nonhazardous solid waste, and 564 flasks from inspection and reflasking. No impact on long-term waste management.		Negligible impact on waste management activities during storage, over a period of years. Minor beneficial impact from reduced waste generation.	Negligible impact on waste management activities during storage, over a period of months. Minor beneficial impact from reduced waste generation.
Warren Depot	1,220 lb hazardous solid waste, 2.3 yd^3 nonhazardous solid waste, and 121 flasks from inspection and reflasking. No impact on long-term waste management.		Negligible impact on waste management activities during storage, over a period of years. Minor beneficial impact from reduced waste generation.	Negligible impact on waste management activities during storage, over a period of months. Minor beneficial impact from reduced waste generation.
Y–12	1,500 lb hazardous solid waste, 2.8 yd^3 nonhazardous solid waste, and 151 flasks from inspection and reflasking. No impact on long-term waste management.		Negligible impact on waste management activities during storage, over a period of years. Minor beneficial impact from reduced waste generation.	Negligible impact on waste management activities during storage, over a period of months. Minor beneficial impact from reduced waste generation.
Hawthorne Army Depot	Not applicable.		Not applicable.	Not applicable.
PEZ Lake Development	Not applicable.		Not applicable.	Not applicable.
Utah Industrial Depot	Not applicable.		Not applicable.	Not applicable.
Ports	Not applicable.	Not applicable.	No impact.	No impact.
Ocean	Not applicable.	Not applicable.	No impact.	No impact.
User locations	Not applicable.	Not applicable.	No impact.	No impact.
Mercury mine	Not applicable.	Not applicable.	Not applicable.	Moderate beneficial impact from reduction in wastes.

[a] This column summarizes the impacts from the six sites considered in the Consolidated Storage Alternative. "Impacts at Consolidation Location" describes the impacts that would occur at the consolidated storage sites. "Impacts at Other Existing Mercury Storage Locations" describes the impacts that would occur at the existing mercury storage locations that are not the subject of consolidated storage.

[b] Impacts of storage at the buyer's site are site specific and cannot be assessed further.

Note: The metric conversion chart in this MM EIS should be used to convert standard units to metric units.

2.5.1.3 Socioeconomics

Under the No Action Alternative, there would be no change in the employment level associated with mercury storage at any of the storage sites. As a result, impacts on socioeconomic conditions near the sites would be negligible.

Negligible impacts on socioeconomics would result in the region of the consolidation sites. Consolidation of mercury at the New Haven Depot would increase the level of effort needed to inspect the mercury from 0.24 to 1.9 full-time equivalents (FTEs). The level of effort would increase from 1.12 to 1.9 FTEs at the Somerville Depot; from 0.24 to 1.9 FTEs at the Warren Depot; and from 0 to 1.9 FTEs at the Hawthorne Army Depot, the PEZ Lake Development, and the Utah Industrial Depot. These increases in activity would likely be performed by existing depot employees. Even if new employees were hired for these functions, it would result in negligible or no increases in employment or socioeconomic impacts in the region of the sites considered in the Consolidated Storage Alternative**.** There would be negligible impacts from reduced employment at the sites from which mercury is removed.

If igloos rather than warehouses were used for consolidated storage at the Hawthorne Army Depot, there would be negligible or no additional impacts on socioeconomics.

The regional socioeconomic impact would be negligible under the Sales Alternative. Under the alternative for the sale of mercury at the maximum allowable market rate, employment levels would remain constant during the sales operation. After the 13- to 26-year sales period, there would be a reduction of up to 1.12 FTEs at each storage location. Under the alternative for the sale of mercury to reduce mining, there would be a similar reduction in employment after the one-time sale of mercury is complete.

There would be no impacts on other locations such as ports from shipping mercury under the Sales Alternative. There would be moderate impacts due to reduced mine employment under the Sale of Mercury to Reduce Mining Alternative. A summary of impacts for socioeconomics is provided in Table 2–6.

Table 2–6. Summary of Impacts—Socioeconomics

Location	No Action Alternative (Alternative 1)	Consolidated Storage Alternative[a] (Alternatives 2A–2F)	Sales Alternatives	
			Sales at Maximum Allowable Market Rate[b] (Alternative 3A)	Sales to Reduce Mercury Mining[b] (Alternative 3B)
New Haven Depot	0.24 FTE required. No increase in employment. Negligible impact on region.	**Impacts at Consolidation Location:** Increase to 1.9 FTEs. Negligible impact on region. **Impacts at Other Existing Mercury Storage Locations:** Decrease in employment of as much as 1.12 FTEs at each site. Negligible impact of reduced employment.	Decrease in employment of as much as 0.24 FTE. Negligible impact from reduced employment.	Decrease in employment of as much as 0.24 FTE. Negligible impact from reduced employment.
Somerville Depot	1.12 FTEs required. No increase in employment. Negligible impact on region.		Decrease in employment of as much as 1.12 FTEs at each site. Negligible impact from reduced employment.	Decrease in employment of as much as 1.12 FTEs at each site. Negligible impact from reduced employment.
Warren Depot	0.24 FTE required. No increase in employment. Negligible impact on region.		Decrease in employment of as much as 0.24 FTE. Negligible impact from reduced employment.	Decrease in employment of as much as 0.24 FTE. Negligible impact from reduced employment.
Y–12	0.046 FTE required. No increase in employment. Negligible impact on region.		Decrease in employment of as much as 0.046 FTE. Negligible impact from reduced employment.	Decrease in employment of as much as 0.046 FTE. Negligible impact from reduced employment.
Hawthorne Army Depot	Not applicable.		Not applicable.	Not applicable.
PEZ Lake Development	Not applicable.		Not applicable.	Not applicable.
Utah Industrial Depot	Not applicable.		Not applicable.	Not applicable.
Ports	Not applicable.	Not applicable.	No impact.	No impact.
Ocean	Not applicable.	Not applicable.	No impact.	No impact.
User locations	Not applicable.	Not applicable.	No impact.	No impact.
Mercury mine	Not applicable.	Not applicable.	Not applicable.	Moderate impact of reduced mine employment.

[a] This column summarizes the impacts from the six sites considered in the Consolidated Storage Alternative. "Impacts at Consolidation Location" describes the impacts that would occur at the consolidated storage sites. "Impacts at Other Existing Mercury Storage Locations" describes the impacts that would occur at the existing mercury storage locations that are not the subject of consolidated storage.

[b] Impacts of storage at the buyer's site are site specific and cannot be assessed further.

2.5.1.4 Human Health and Ecological Risk from Normal Operations

Under the No Action Alternative, the mercury storage area would be inspected periodically and the risk for workers and ecological resources would be negligible. The risk for the public at the fence line would be negligible.

Under the Consolidated Storage Alternative, the mercury storage area would be inspected regularly and the risk for workers and ecological resources would be negligible. The risk for the public at the fence line would be negligible at all the consolidated sites.

If igloos rather than warehouses were used for consolidated storage at the Hawthorne Army Depot, handling of mercury would be more difficult due to the tighter configuration of storage space within the igloos. There would likely be some increase in exposure to workers due to increased time needed to make periodic inspections of a larger number of storage structures. Some increase in exposure could also occur due to the increased time required for inspection and reflasking during the last year of the 40-year storage period.

The risk for the public at the fence line under the Sales Alternative would be negligible at all the storage sites. For normal operating conditions, the mercury storage area is inspected regularly and the risk for ecological resources is negligible.

There would be negligible risks at other locations such as ports and the global commons from shipping mercury under the Sales Alternative. There would be reduced risk from the alternative for the sale of mercury to reduce mining. This would include reduction in exposure of workers, the public, plants, and animals to mercury near mines. A summary of impacts for human health and ecological risk from normal operations is provided in Table 2–7.

Table 2–7. Summary of Impacts—Human Health and Ecological Risk from Normal Operations

Location	No Action Alternative (Alternative 1)	Consolidated Storage Alternative[a] (Alternatives 2A–2F)	Sales Alternatives	
			Sales at Maximum Allowable Market Rate[b] (Alternative 3A)	Sales to Reduce Mercury Mining[b] (Alternative 3B)
New Haven Depot	Negligible risk.	**Impacts at Consolidation Location:** Negligible risk. **Impacts at Other Existing Mercury Storage Locations:** Negligible risk. Negligible reduced risk from reduced storage.	Negligible risk. Negligible reduced risk from reduced storage.	Negligible risk. Negligible reduced risk from reduced storage.
Somerville Depot	Negligible risk.		Negligible risk. Negligible reduced risk from reduced storage.	Negligible risk. Negligible reduced risk from reduced storage.
Warren Depot	Negligible risk.		Negligible risk. Negligible reduced risk from reduced storage.	Negligible risk. Negligible reduced risk from reduced storage.
Y–12	Negligible risk.		Negligible risk. Negligible reduced risk from reduced storage.	Negligible risk. Negligible reduced risk from reduced storage.
Hawthorne Army Depot	Not applicable.		Not applicable.	Not applicable.
PEZ Lake Development	Not applicable.		Not applicable.	Not applicable.
Utah Industrial Depot	Not applicable.		Not applicable.	Not applicable.
Ports	Not applicable.	Not applicable.	Negligible risk.	Negligible risk.
Ocean	Not applicable.	Not applicable.	Negligible risk.	Negligible risk.
User location	Not applicable.	Not applicable.	Negligible risk.	Negligible risk.
Mercury mine	Not applicable.	Not applicable.	Not applicable.	Moderate reduced risk from reduced exposure to mercury of mineworkers, public, plants, and animals near mine or refinery.

[a] This column summarizes the impacts from the six sites considered in the Consolidated Storage Alternative. "Impacts at Consolidation Location" describes the impacts that would occur at the consolidated storage sites. "Impacts at Other Existing Mercury Storage Locations" describes the impacts that would occur at the existing mercury storage locations that are not the subject of consolidated storage.

[b] Impacts of storage at the buyer's site are site specific and cannot be assessed further.

2.5.1.5 Human Health and Ecological Risk from Facility Accidents

Under the No Action Alternative, for onsite facility accidents that do not result in fire, risks would be negligible except for a spill due to an earthquake. In that case, human health risk would be low for a worker in the immediate vicinity of the spill. For a forklift fuel fire, risk estimates for human health and ecological receptors would be negligible.

Risks from facility accidents from the Consolidated Storage Alternative would be negligible to moderate. For onsite accidents that do not result in fire, risks would be negligible except for a spill due to an earthquake. In that case, human health risk would be moderate for an involved worker in the immediate vicinity of the spill and low for an onsite worker and the public. For a forklift fuel fire, human health risk would be moderate for an involved worker, low for the maximum exposed member of the public, and negligible to moderate for ecological receptors.

If igloos rather than warehouses were used for consolidated storage at the Hawthorne Army Depot, handling of mercury would be more difficult due to the tighter configuration of storage space within the igloos. There would likely be some increased time needed to make periodic inspections of a larger number of storage structures. Some increase in exposure could also occur due to an increased time needed for inspection and reflasking during the last year of the 40-year storage period. The increased handling of mercury is expected to result in a negligible increase in accident risk. However, there would be a reduction in accident risk from natural hazards because of the more robust construction of the igloos.

Risks from facility accidents from the Sales Alternative would be negligible to moderate. For onsite accidents that do not result in fire, risks would be negligible except for a spill due to an earthquake. In that case, human health risk would be low for an involved worker in the immediate vicinity of the spill. For a forklift fuel fire, human health risk would be moderate for an involved worker, low for the maximum exposed member of the public, and negligible to moderate for ecological receptors.

There would be no additional risks of facility accidents at user locations. There would be a potential for reduced risk from the alternative for the sale of mercury to reduce mining, including a reduction in risk from mining and refining accidents. A summary of impacts for human health and ecological risk from facility accidents is provided in Table 2–8.

Table 2–8. Summary of Impacts—Human Health and Ecological Risk from Facility Accidents

Location	No Action Alternative (Alternative 1)	Consolidated Storage Alternative[a] (Alternatives 2A–2F)	Sales Alternatives	
			Sales at Maximum Allowable Market Rate[b] (Alternative 3A)	Sales to Reduce Mercury Mining[b] (Alternative 3B)
New Haven Depot	Negligible except low risk for earthquake spill for involved worker.	**Impacts at Consolidation Location:** Negligible except moderate risk for forklift fuel fire and earthquake spill for involved worker. Low risk for maximum exposed member of the public for forklift fuel fire and earthquake spill. Negligible-to-moderate risk for some ecological receptors. Reduced risk from natural hazards if stored in igloos at Hawthorne. **Impacts at Other Existing Mercury Storage Locations:** Negligible except moderate risk for forklift fuel fire and earthquake spill for involved worker. Low risk for maximum exposed member of the public for forklift fuel fire and earthquake spill. Negligible-to-moderate risk for some ecological receptors. Reduced risk from reduced storage.	Negligible except moderate risk for forklift fuel fire for involved workers, low for maximum exposed member of the public, and negligible to moderate for some ecological receptors. Reduced risk from reduced storage.	Negligible except moderate risk for forklift fuel fire for involved worker, low for maximum exposed member of the public, and negligible to moderate for some ecological receptors. Reduced risk from reduced storage.
Somerville Depot	Negligible except low risk for earthquake spill for involved worker.		Negligible except moderate risk for forklift fuel fire for involved workers, low for maximum exposed member of the public, and negligible to moderate for some ecological receptors. Reduced risk from reduced storage.	Negligible except moderate risk for forklift fuel fire for involved worker, low for maximum exposed member of the public, and negligible to moderate for some ecological receptors. Reduced risk from reduced storage.
Warren Depot	Negligible except low risk for earthquake spill for involved worker.		Negligible except moderate risk for forklift fuel fire for involved workers, low for maximum exposed member of the public, and negligible to moderate for some ecological receptors. Reduced risk from reduced storage.	Negligible except moderate risk for forklift fuel fire for involved worker, low for maximum exposed member of the public, and negligible to moderate for some ecological receptors. Reduced risk from reduced storage.
Y–12	Negligible except low risk for earthquake spill for involved worker.		Negligible except moderate risk for forklift fuel fire for involved workers, low for maximum exposed member of the public, and negligible to moderate for some ecological receptors. Reduced risk from reduced storage.	Negligible except moderate risk for forklift fuel fire for involved worker, low for maximum exposed member of the public, and negligible to moderate for some ecological receptors. Reduced risk from reduced storage.
Hawthorne Army Depot	Not applicable.		Not applicable.	Not applicable.
PEZ Lake Development	Not applicable.		Not applicable.	Not applicable.
Utah Industrial Depot	Not applicable.		Not applicable.	Not applicable.
Ports	Not applicable.	Not applicable.	Not applicable.	Not applicable.
Ocean	Not applicable.	Not applicable.	Not applicable.	Not applicable.
User location	Not applicable.	Not applicable.	No risk.	No risk.
Mercury mine	Not applicable.	Not applicable.	Not applicable.	Low reduced risk of mining accident and reduced risk of mercury refinery accident. Low increased risk of mercury storage accident.

[a] This column summarizes the impacts from the six sites considered in the Consolidated Storage Alternative. "Impacts at Consolidation Location" describes the impacts that would occur at the consolidated storage sites. "Impacts at Other Existing Mercury Storage Locations" describes the impacts that would occur at the existing mercury storage locations that are not the subject of consolidated storage.

[b] Impacts of storage at the buyer's site are site specific and cannot be assessed further.

2.5.1.6 Transportation Risk

Under the No Action Alternative, there would be no transportation of mercury, and therefore no transportation risks.

Transportation risks from the Consolidated Storage Alternative would be negligible to moderate. The estimated frequency of both truck and rail accidents with a mechanically induced fatality would be low. A mechanically induced fatality is a fatal injury caused by the force of the accident regardless of the cargo being transported. The risk from a transportation spill without fire would be negligible for human and ecological receptors. The risk from transportation accidents with fire would range from negligible to moderate for human health and from negligible to moderate for ecological receptors.

If igloos rather than warehouses were used for consolidated storage at the Hawthorne Army Depot, some additional onsite transportation would be needed to move the mercury. The increased handling of mercury is expected to result in a negligible increase in accident risk.

Transportation risks for the Sales Alternative would be negligible to high. Estimated frequency of both truck and rail accident with a mechanically induced fatality would be low. The risk from a transportation spill without a fire would be negligible for human and ecological receptors. The risk from transportation accidents with fire would range from negligible to moderate for human health and from negligible to high for ecological receptors. The risk would be higher for ecological receptors for the Sales Alternative than for the Consolidated Storage Alternative because the frequency of truck fires is predicted to be higher due to the increased number of miles traveled.

Risks would be negligible to moderate at other locations such as ports and the global commons from shipping mercury under the Sales Alternative. Risks would be moderate for involved workers from a vehicle to ship transfer fire and negligible to moderate for some ecological receptors. A summary of transportation risk is provided in Table 2–9.

Table 2–9. Summary of Impacts—Transportation Risk

Location	No Action Alternative (Alternative 1)	Consolidated Storage Alternative (Alternatives 2A–2F)	Sales Alternatives	
			Sales at Maximum Allowable Market Rate (Alternative 3A)	Sales to Reduce Mercury Mining (Alternative 3B)
New Haven Depot	No risk.	**Transportation Routes between Storage and Consolidation Sites:** Negligible-to-low human health risk for various accident scenarios. Negligible-to-moderate ecological risk for various accident scenarios.	Negligible-to-moderate human health risk for various accident scenarios. Negligible-to-high ecological risk for various accident scenarios.[a]	Negligible-to-moderate human health risk for various accident scenarios. Negligible-to-high ecological risk for various accident scenarios.[a]
Somerville Depot	No risk.			
Warren Depot	No risk.			
Y–12	No risk.			
Hawthorne Army Depot	Not applicable.		Not applicable.	Not applicable.
PEZ Lake Development	Not applicable.		Not applicable.	Not applicable.
Utah Industrial Depot	Not applicable.		Not applicable.	Not applicable.
Ports	Not applicable.	Not applicable.	Negligible except moderate risk for vehicle to ship transfer fire for involved workers and negligible to moderate for some ecological receptors.	Negligible except moderate risk for vehicle to ship transfer fire for involved worker and negligible to moderate for some ecological receptors.
Ocean	Not applicable.	Not applicable.	Negligible risk.	Negligible risk.
User location	Not applicable.	Not applicable.	No risk.	No risk.
Mercury mine	Not applicable.	Not applicable.	Not applicable.	Negligible-to-moderate human health risk for various accident scenarios. Negligible-to-high ecological risk for various accident scenarios.[a]

[a] The 'high risk' is ecological risk from the truck transport segments associated with shipping mercury to overseas buyers. See Chapter 4 for more information.

2.5.1.7 Water Resources

Under the No Action Alternative, water use and wastewater discharge would not change. There are currently adequate controls in place to prevent mercury from reaching surface water or groundwater under normal storage conditions. Impacts on surface water and groundwater would be negligible.

No impacts are expected from the transportation of mercury to the consolidation site. Impacts on surface water and groundwater would be negligible to minor. Water use by employees performing mercury management activities would be about 10,800 gal/yr (40,900 l/yr). Water use would be largely by employees performing inspection and maintenance duties. The additional water use would result in negligible-to-minor change in overall water supply availability at these sites. Similarly, there would be minor increase expected in sanitary wastewater discharge to the sewer system. No impacts of spills on water resources are expected because adequate measures are in place to manage any leaks of mercury from the flasks. There would be minor beneficial impacts at the sites from which the mercury would be removed due to the reduction in water use.

If igloos rather than warehouses were used for consolidated storage at the Hawthorne Army Depot, there would be negligible or no additional impacts on water resources.

Impacts on surface water and groundwater would be negligible under the Sales Alternative. Negligible or no impacts are expected on water resources from the transportation of mercury to the buyer's site. As the mercury is removed under Alternative 3A, there would be some reduction in water use. Total water use over the storage period would be 17,600 gal (66,500 l) at the New Haven Depot over the 13 years, 165,150 gal (625,200 l) over 26 years at the Somerville Depot, 19,140 gal (72,400 l) over 14 years at the Warren Depot, and about 3,915 gal (14,820 l) over 15 years at Y–12. Reduction in water use would be expected to occur earlier under Alternative 3B.

There would be no impacts on surface water or groundwater at other locations such as ports and the global commons from shipping mercury under the Sales Alternative. There would be moderate beneficial impacts from the reduction of mining operations, including reduction in contamination of surface water and groundwater. A summary of impacts for water resources is provided in Table 2–10. Impacts from facility and transportation accidents are discussed in Sections 2.5.1.5 and 2.5.1.6, respectively.

Table 2–10. Summary of Impacts—Water Resources

Location	No Action Alternative (Alternative 1)	Consolidated Storage Alternative[a] (Alternatives 2A–2F)	Sales Alternatives	
			Sales at Maximum Allowable Market Rate[b] (Alternative 3A)	Sales to Reduce Mercury Mining[b] (Alternative 3B)
New Haven Depot	Potable water use 1,352 gal/yr. Sanitary wastewater generation 1,300 gal/yr. Negligible impact on groundwater or surface water.	**Impacts at Consolidation Location:** Potable water use increase to 10,800 gal/yr. Sanitary wastewater generation increase to 10,400 gal/yr increase. Negligible-to-minor impact on groundwater or surface water. **Impacts at Other Existing Mercury Storage Locations:** Minor beneficial impact from reduced water use and wastewater discharge.	Negligible impact on groundwater or surface water during sales period. Potential beneficial impact from reduced water use and wastewater discharge.	Negligible impact on groundwater or surface water during sales period. Potential beneficial impact from reduced water use and wastewater discharge.
Somerville Depot	Potable water use 6,352 gal/yr. Sanitary wastewater generation 6,108 gal/yr. Negligible impact on groundwater or surface water.		Negligible impact on groundwater or surface water during sales period. Potential beneficial impact from reduced water use and wastewater discharge.	Negligible impact on groundwater or surface water during sales period. Potential beneficial impact from reduced water use and wastewater discharge.
Warren Depot	Potable water use 1,367 gal/yr. Sanitary wastewater generation 1,314 gal/yr. Negligible impact on groundwater or surface water.		Negligible impact on groundwater or surface water during sales period. Potential beneficial impact from reduced water use and wastewater discharge.	Negligible impact on groundwater or surface water during sales period. Potential beneficial impact from reduced water use and wastewater discharge.
Y–12	Potable water use 261 gal/yr. Sanitary wastewater generation 251 gal/yr. Negligible impact on groundwater or surface water.		Negligible impact on groundwater or surface water during sales period. Potential beneficial impact from reduced water use and wastewater discharge.	Negligible impact on groundwater or surface water during sales period. Potential beneficial impact from reduced water use and wastewater discharge.
Hawthorne Army Depot	Not applicable.		Not applicable.	Not applicable.
PEZ Lake Development	Not applicable.		Not applicable.	Not applicable.
Utah Industrial Depot	Not applicable.		Not applicable.	Not applicable.
Ports	Not applicable.	Not applicable.	No impact.	No impact.
Ocean	Not applicable.	Not applicable.	No impact.	No impact.
User location	Not applicable.	Not applicable.	No impact.	No impact.
Mercury mine	Not applicable.	Not applicable.	Not applicable.	Moderate beneficial impact of reduced environmental contamination from reduced mining and refining.

[a] This column summarizes the impacts from the six sites considered under the Consolidated Storage Alternative. "Impacts at Consolidation Location" describes the impacts that would occur at the consolidated storage sites. "Impacts at Other Existing Mercury Storage Locations" describes the impacts that would occur at the existing mercury storage locations that are not the subject of consolidated storage.

[b] Impacts of storage at the buyer's site are site specific and cannot be assessed further.

Note: The metric conversion chart in this MM EIS should be used to convert standard units to metric units.

2.5.1.8 Land Use

Under the No Action Alternative, no additional land would be disturbed and no additional warehouse space would be used.

Under the Consolidated Storage Alternative, there would be no additional land disturbed at any of the consolidated storage sites. The mercury storage space requirements would change as described in Table 2–11. Warehouse space would become available for other uses at the sites from which mercury is removed.

If igloos rather than warehouses were used for consolidated storage at the Hawthorne Army Depot, there would be negligible or no additional impacts on land use.

Under the Sales Alternative, warehouse space would become available for other uses at the existing storage sites: 43,200 ft^2 (4,013 m^2) at the New Haven Depot, 80,000 ft^2 (7,432 m^2) at the Somerville Depot, 40,000 ft^2 (3,716 m^2) at the Warren Depot, and 4,400 ft^2 (409 m^2) at Y–12. Under the alternative for the sale of mercury to reduce mining, this space would be expected to become available earlier than under the alternative for the sale of mercury at the maximum allowable market rate.

There would be no impacts on other locations such as ports and the global commons from shipping mercury under the Sales Alternative. There could be minor impacts at a mercury mine from land needed to store the mercury. A summary of impacts for land use is provided in Table 2–11.

Table 2–11. Summary of Impacts—Land Use

Location	No Action Alternative (Alternative 1)	Consolidated Storage Alternative[a] (Alternatives 2A–2F)	Sales Alternatives	
			Sales at Maximum Allowable Market Rate[b] (Alternative 3A)	Sales to Reduce Mercury Mining[b] (Alternative 3B)
New Haven Depot	No impact. 43,200 ft^2 floor space required.	**Impacts at Consolidation Location:** No impact on acreage disturbed. 200,000 ft^2 floor space required.	No impact on acreage disturbed. Potential beneficial impact because warehouse space is freed for other uses.	No impact on acreage disturbed. Potential beneficial impact because warehouse space is freed for other uses.
Somerville Depot	No impact. 80,000 ft^2 floor space required.	**Impacts at Other Existing Mercury Storage Locations:** No impact on acreage disturbed. Minor beneficial impact because warehouse space is freed for other uses.	No impact on acreage disturbed. Potential beneficial impact because warehouse space is freed for other uses.	No impact on acreage disturbed. Potential beneficial impact because warehouse space is freed for other uses.
Warren Depot	No impact. 40,000 ft^2 floor space required.		No impact on acreage disturbed. Potential beneficial impact because warehouse space is freed for other uses.	No impact on acreage disturbed. Potential beneficial impact because warehouse space is freed for other uses.
Y–12	No impact. 4,400 ft^2 floor space required.		No impact on acreage disturbed. Potential beneficial impact because warehouse space is freed for other uses.	No impact on acreage disturbed. Potential beneficial impact because warehouse space is freed for other uses.
Hawthorne Army Depot	Not applicable.		Not applicable.	Not applicable.
PEZ Lake Development	Not applicable.		Not applicable.	Not applicable.
Utah Industrial Depot	Not applicable.		Not applicable.	Not applicable.
Ports	Not applicable.	Not applicable.	No impact.	No impact.
Ocean	Not applicable.	Not applicable.	No impact.	No impact.
User location	Not applicable.	Not applicable.	No impact.	No impact.
Mercury mine	Not applicable.	Not applicable.	Not applicable.	Potential minor impacts. Adequate storage space required at buyer's site.

[a] This column summarizes the impacts from the six sites considered under the Consolidated Storage Alternative. "Impacts at Consolidation Location" describes the impacts that would occur at the consolidated storage sites. "Impacts at Other Existing Mercury Storage Locations" describes the impacts that would occur at the existing mercury storage locations that are not the subject of consolidated storage.

[b] Impacts of storage at the buyer's site are site specific and cannot be assessed further.

Note: The metric conversion chart in this MM EIS should be used to convert standard units to metric units.

2.5.1.9 Infrastructure

Under the No Action Alternative, no additional infrastructure capacity would be needed, including roads, railroads, electricity, fuel, water, and site safety services.

Negligible impacts under the Consolidated Storage Alternative are expected at the consolidation sites. Infrastructure requirements would not change except for a minor increase in water, electric, and fuel use. Electric use would increase to support the increased storage area, and there would be a minor increase in fuel use during the last year of the 40-year storage period for inspection and reflasking. There would be no increase in electric use at Hawthorne Army Depot (Alternative 2D) because the warehouses and igloos are not lighted. At the Hawthorne Army Depot (Alternative 2D) there would be a minor increase in fuel use associated with generators used to provide lighting for periodic inspections. Other infrastructure requirements at these sites would not change. There would be a negligible-to-minor increase in traffic along roads leading to the consolidation site. There would be a minor beneficial impact from reduced fuel, water, and electric use at the sites from which mercury is removed.

If igloos rather than warehouses were used for consolidated storage at the Hawthorne Army Depot, there would be negligible or no additional impacts on infrastructure.

Under the Sales Alternative, negligible impacts are expected on infrastructure from the transportation of mercury to the buyer's site. As the mercury is removed under the alternative for the sale of mercury at the maximum allowable market rate, there would be some reduction in water, electric, and fuel use. Reduction in electric use would be expected to occur earlier under the alternative for the sale of mercury to reduce mining. There would be a negligible increase in traffic along roads and rails leading from the existing storage sites.

There would be no impacts on infrastructure at other locations such as ports and the global commons from shipping mercury under the Sales Alternative. There would be potentially beneficial impacts under the alternative for the sale of mercury to a mining company, including reduction in utility use. A summary of impacts for infrastructure is provided in Table 2–12.

Table 2–12. Summary of Impacts—Infrastructure

Location	No Action Alternative (Alternative 1)	Consolidated Storage Alternative[a] (Alternatives 2A–2F)	Sales Alternatives	
			Sales at Maximum Allowable Market Rate[b] (Alternative 3A)	Sales to Reduce Mercury Mining[b] (Alternative 3B)
New Haven Depot	*Continued Storage*: Electric use 5.1 MWh/yr related to mercury storage. No change in infrastructure requirements. *Inspection and Reflasking—Gasoline/Propane Use:* Minor increase from inspection and reflasking during the last year of storage. Adequate capacity available. Negligible impact.	**Impacts at Consolidation Location:** *Electric Use:* Increase to 26 MWh/yr (varies by site) except at Hawthorne where gasoline powered generators would be used to supply electricity. *Gasoline/Propane Use:* Minor increase from inspection and reflasking. Adequate capacity available. Negligible impact. *Traffic*: Negligible-to-minor short-term increase. **Impacts at Other Existing Mercury Storage Locations**: Initially no changes in infrastructure requirements. Minor beneficial impact from reduction in infrastructure requirements as mercury is removed. *Gasoline/Propane Use:* Minor increase for loading trucks or railcars. Adequate capacity is available.	*Storage*: Initially no change in infrastructure requirements. Minor beneficial impact from reduction in infrastructure requirements as mercury is removed. Reduction would occur over an extended period. *Gasoline/Propane Use*: Minor increase for loading trucks or railcars. Adequate capacity is available. *Traffic*: Negligible increase.	*Storage*: Initially no change in infrastructure requirements. Minor beneficial impact from reduction in infrastructure requirements as mercury is removed. Reduction would occur over a number of months. *Gasoline/Propane Use*: Minor increase for loading trucks or railcars. Adequate capacity is available. *Traffic*: Negligible increase.
Somerville Depot	*Continued Storage*: Electric use 10.2 MWh/yr related to mercury storage. No change in infrastructure requirements. *Inspection and Reflasking—Gasoline/Propane Use:* Minor increase from inspection and reflasking during the last year of storage. Adequate capacity available. Negligible impact.		*Storage*: Initially no change in infrastructure requirements. Minor beneficial impact from reduction in infrastructure requirements as mercury is removed. Reduction would occur over an extended period. *Gasoline/Propane Use*: Minor increase for loading trucks or railcars. Adequate capacity is available. *Traffic*: Negligible increase.	*Storage*: Initially no change in infrastructure requirements. Minor beneficial impact from reduction in infrastructure requirements as mercury is removed. Reduction would occur over a number of months. *Gasoline/Propane Use*: Minor increase for loading trucks or railcars. Adequate capacity is available. *Traffic*: Negligible increase.
Warren Depot	*Continued Storage*: Electric use 5.1 MWh/yr related to mercury storage. No change in infrastructure requirements. *Inspection and Reflasking—Gasoline/Propane Use:* Minor increase from inspection and reflasking during the last year of storage. Adequate capacity available. Negligible impact.		*Storage*: Initially no change in infrastructure requirements. Minor beneficial impact from reduction in infrastructure requirements as mercury is removed. Reduction would occur over an extended period. *Gasoline/Propane Use*: Minor increase for loading trucks or railcars. Adequate capacity is available. *Traffic*: Negligible increase.	*Storage*: Initially no change in infrastructure requirements. Minor beneficial impact from reduction in infrastructure requirements as mercury is removed. Reduction would occur over a number of months. *Gasoline/Propane Use*: Minor increase for loading trucks or railcars. Adequate capacity is available. *Traffic*: Negligible increase.

Table 2–12. Summary of Impacts—Infrastructure (Continued)

Location	No Action Alternative (Alternative 1)	Consolidated Storage Alternative[a] (Alternatives 2A–2F)	Sales Alternatives	
			Sales at Maximum Allowable Market Rate[b] (Alternative 3A)	Sales to Reduce Mercury Mining[b] (Alternative 3B)
Y–12	*Continued Storage*: Electric use 0.2 MWh/yr related to mercury storage. No change in infrastructure requirements. *Inspection and Reflasking— Gasoline/ Propane Use:* Minor increase from inspection and reflasking during the last year of storage. Adequate capacity available. Negligible impact.		*Storage*: Initially no change in infrastructure requirements. Minor beneficial impact from reduction in infrastructure requirements as mercury is removed. Reduction would occur over an extended period. *Gasoline/Propane Use*: Minor increase for loading trucks or railcars. Adequate capacity is available. *Traffic*: Negligible increase.	*Storage*: Initially no change in infrastructure requirements. Minor beneficial impact from reduction in infrastructure requirements as mercury is removed. Reduction would occur over a number of months. *Gasoline/Propane Use*: Minor increase for loading trucks or railcars. Adequate capacity is available. *Traffic*: Negligible increase.
Hawthorne Army Depot	Not applicable.		Not applicable.	Not applicable.
PEZ Lake Development	Not applicable.		Not applicable.	Not applicable.
Utah Industrial Depot	Not applicable.		Not applicable.	Not applicable.
Ports	Not applicable.	Not applicable.	Negligible increase in fuel use for material handling. No other impact on infrastructure.	Negligible increase in fuel use for material handling. No other impact on infrastructure.
Ocean	Not applicable.	Not applicable.	No impact.	No impact.
User location	Not applicable.	Not applicable.	No impact.	No impact.
Mercury mine	Not applicable.	Not applicable.	Not applicable.	Overall beneficial impact. Beneficial impact of reduced utility use from reduced mining and refining.

[a] This column summarizes the impacts from the six sites considered in the Consolidated Storage Alternatives. "Impacts at Consolidation Location" describes the impacts that would occur at the consolidated storage sites. "Impacts at Other Existing Mercury Storage Locations" describes the impacts that would occur at the existing mercury storage locations that are not the subject of consolidated storage.

[b] Impacts of storage at the buyer's site are site specific and cannot be assessed further.

Note: The metric conversion chart in this MM EIS should be used to convert standard units to metric unit.

2.5.1.10 Environmental Justice

Under the No Action Alternative, there would be no disproportionately high and adverse effects on minority and low-income populations.

Under normal operations, the Consolidated Storage Alternative would pose no disproportionately high and adverse human health risks to minority and low-income populations. Ecological risks due to accidental releases of mercury may pose a risk to populations who depend on subsistence fishing and hunting. Such an event could result in releases to the atmosphere that would eventually be deposited on water, soil, or plants and bioaccumulate in the food chain.

If igloos rather than warehouses were used for consolidated storage at the Hawthorne Army Depot, handling of mercury would be more difficult due to the tighter configuration of storage space within the igloos. The increased handling of mercury is expected to result in a negligible increase in accident risk. However, there would be a reduction in accident risk from natural hazards because of the more robust construction of the igloos.

Under the Sales Alternative, there would be no disproportionately high and adverse risks on minority and low-income populations at the storage sites. Ecological risks due to accident releases of mercury at a port may pose a potential risk to nearby populations who depend on subsistence fishing and hunting. Such an event could result in releases to the atmosphere that would eventually be deposited on water, soil, or plants and bioaccumulate in the food chain. There would be potentially beneficial impacts from the alternative for the sale of mercury to reduce mining, including reduction in exposure of workers, the public, plants, and animals to mercury near mines. These reductions in risk could only provide beneficial impacts to minority and low-income populations near the mercury mines and refineries.

A summary of impacts for environmental justice is provided in Table 2–13. Because the changes in employment would be very small, less than 2 FTEs for all alternatives, there would be no disproportionately high and adverse effects on minority and low-income populations.

Table 2–13. Summary of Impacts—Environmental Justice

Location	No Action Alternative (Alternative 1)	Consolidated Storage Alternative[a] (Alternatives 2A–2F)	Sales Alternatives	
			Sales at Maximum Allowable Market Rate[b] (Alternative 3A)	Sales to Reduce Mercury Mining[b] (Alternative 3B)
New Haven Depot	*Normal Operations and Facility Accidents*: No disproportionately high and adverse effects on minority and low-income populations.	**Impacts at Consolidation Location and Other Existing Storage Locations:** *Normal Operations and Facility Accidents*: No disproportionately high and adverse effects on minority and low-income populations. Accidents may pose a potential risk to individuals dependent on subsistence fishing and hunting in the vicinity of the Hawthorne Army Depot, PEZ Lake Development, and Utah Industrial Depot.	*Normal Operations and Facility Accidents*: No disproportionately high and adverse effects on minority and low-income populations.	*Normal Operations and Facility Accidents*: No disproportionately high and adverse effects on minority and low-income populations.
Somerville Depot	*Normal Operations and Facility Accidents*: No disproportionately high and adverse effects on minority and low-income populations.		*Normal Operations and Facility Accidents*: No disproportionately high and adverse effects on minority and low-income populations.	*Normal Operations and Facility Accidents*: No disproportionately high and adverse effects on minority and low-income populations.
Warren Depot	*Normal Operations and Facility Accidents*: No disproportionately high and adverse effects on minority and low-income populations.		*Normal Operations and Facility Accidents*: No disproportionately high and adverse effects on minority and low-income populations.	*Normal Operations and Facility Accidents*: No disproportionately high and adverse effects on minority and low-income populations.
Y–12	*Normal Operations and Facility Accidents*: No disproportionately high and adverse effects on minority and low-income populations.		*Normal Operations and Facility Accidents*: No disproportionately high and adverse effects on minority and low-income populations.	*Normal Operations and Facility Accidents*: No disproportionately high and adverse effects on minority and low-income populations.
Hawthorne Army Depot	Not applicable.		Not applicable.	Not applicable.
PEZ Lake Development	Not applicable.		Not applicable.	Not applicable.
Utah Industrial Depot	Not applicable.		Not applicable.	Not applicable.
Ports	Not applicable.	Not applicable.	Transportation accident with fire poses potential risk to individuals dependent on subsistence fishing and hunting near ports.	Transportation accident with fire poses potential risk to individuals dependent on subsistence fishing and hunting near ports.

Table 2–13. Summary of Impacts—Environmental Justice (Continued)

Location	No Action Alternative (Alternative 1)	Consolidated Storage Alternative[a] (Alternatives 2A–2F)	Sales Alternatives	
			Sales at Maximum Allowable Market Rate[b] (Alternative 3A)	Sales to Reduce Mercury Mining[b] (Alternative 3B)
Ocean	Not applicable.	Not applicable.	No impact.	No impact.
User location	Not applicable.	Not applicable.	No impact.	No impact.
Mercury mine	Not applicable.	Not applicable.	Not applicable.	Potential beneficial impacts from reduce risk from reduced mining and refining. Transportation accident with fire poses potential risk to individuals dependent on subsistence fishing and hunting near mines.

[a] "Impacts at Consolidation Location" describes the impacts that would occur at the consolidated storage sites. "Impacts at Other Existing Mercury Storage Locations" describes the impacts that would occur at the existing mercury storage locations that are not the subject of consolidated storage.

[b] Impacts of storage at the buyer's site are site specific and cannot be assessed further.

2.5.2 Summary of Costs

This section provides a summary of the cost of implementing the mercury management alternatives. The cost analysis is presented in Appendix D. Included are the costs of overpacking of Y−12 mercury flasks, transportation, rent, utilities, and reflasking, as appropriate. A table is provided that summarizes the total costs for each alternative (Table 2–14). For the two Sales Alternatives, maximum and minimum flask prices of $195 and $58 were assumed, based on the current market value for mercury and the low price paid in previous DNSC sales between 1992 and 1994, respectively.

The estimated total cost of the No Action Alternative is approximately $26 million. The estimated cost of the Consolidated Storage Alternative is approximately $29 million.

The costs of the two Sales Alternatives would be less than the No Action Alternative and all of the Consolidated Storage Alternatives. The estimated total costs of the sales at the maximum allowable market rate (Alternative 3A) would be between a cost of $6.1 million to revenues of $12 million, while sales to reduce mercury mining (Alternative 3B) would result in revenue of between $7.5 and $25 million.

Table 2–14. Costs of the Mercury Management Alternatives ($)

	Total	New Haven Depot	Somerville Depot	Warren Depot	Y–12	Hawthorne Army Depot	PEZ Lake Development	Utah Industrial Depot
Alternative 1: No Action—Continued Storage at Current Locations								
	25,546,942	3,134,171	16,251,010	3,328,837	2,832,924			
Alternative 2A: Consolidated Storage at the New Haven Depot								
Truck	29,122,008	29,122,008						
Rail	29,158,172	29,158,172						
Alternative 2B: Consolidated Storage at the Somerville Depot								
Truck	29,192,717		29,192,717					
Rail	29,241,669		29,241,669					
Alternative 2C: Consolidated Storage at the Warren Depot								
Truck	29,072,167			29,072,167				
Rail	29,110,120			29,110,120				
Alternative 2D: Consolidated Storage at the Hawthorne Army Depot								
Truck	29,325,903					29,325,903		
Rail	29,155,921					29,155,921		
Alternative 2E: Consolidated Storage at the PEZ Lake Development								
Truck	29,349,056						29,349,056	
Rail	29,352,895						29,352,895	
Alternative 2F: Consolidated Storage at the Utah Industrial Depot								
Truck	29,525,189							29,525,189
Rail	29,292,266							29,292,266
Alternative 3A: Sale of Mercury at the Maximum Allowable Market Rate[a]								
	(11,674,243) to 6,135,757	1,013,979	10,528,571	1,077,208	1,056,000			
Alternative 3B: Sale of Mercury to Reduce Mercury Mining[a]								
	(25,089,090) to (7,462,396)							

[a] For the two Sales Alternatives, maximum and minimum flask prices of $195 and $58 were assumed, giving a range of total cost/net profit.

Note: Values in parenthesis () are revenues.

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