FINAL ENVIRONMENTAL ASSESSMENT

MERCURY TRANSFER PROJECT AT HAWTHORNE ARMY DEPOT

June 2012

Defense Logistics Agency
Strategic Materials
Fort Belvoir, Virginia

SUMMARY

The Defense Logistics Agency Strategic Materials (DLA Strategic Materials) is preparing this environmental assessment (EA) to address the potential environmental impacts of the proposed repackaging of the mercury stockpile stored at Hawthorne Army Depot (HWAD). DLA Strategic Materials is responsible for providing safe, secure, and environmentally sound stewardship for approximately 4,436 metric tons (about 4,890 tons) of mercury. This EA has been prepared in compliance with the National Environmental Policy Act of 1969 (NEPA, 42 U.S.C. 4321, et seq.) and Defense Logistics Agency (DLA) Regulations 1000.22.

DLA Strategic Materials proposes to transfer (repackage) the mercury stockpile stored at the Hawthorne Army Depot (HWAD) from existing 3-liter (3-L) steel flasks into new 1-metric ton (1-MT) containers. DLA Strategic Materials is proposing this action because 1) the existing mercury flasks are over 40 years old, 2) there is a small probability that one or more flasks may have failed during transport and leaked their contents into the drum or drums containing them, and 3) performing this action would satisfy the terms of its agreement with the state of Nevada, Division of Environmental Protection, Bureau of Air Pollution Control, which allowed the consolidation of the mercury stockpile at HWAD conditioned upon progress being made toward constructing and operating a mercury repackaging facility.

The alternative to the proposed action is to continue storing the mercury stockpile in the existing steel 3-L flasks, six flasks per steel drum, in the 14 warehouses at HWAD. Under the No-Action Alternative, the drums would continue to be inspected for rust and leaks. Rusty drums would be replaced, mercury leaks would be cleaned up by trained responders, and the mercury would be placed in a new container. Routine maintenance and inspections would be conducted on the warehouses and on the CO_2 fire suppression systems. Because DLA Strategic Materials would not be able to satisfy its agreement with the state of Nevada, the no-action alternative is not a viable alternative.

Transfer (repackaging) activities would be accomplished within fume hoods inside a modular building, the Mobile Mercury Transfer System (MMTS), to be installed adjacent to HWAD Building 110-66, one of the 14 warehouses where the DLA Strategic Materials mercury stockpile is stored. Ventilation and air filtration equipment in the MMTS would limit worker exposures to mercury vapors and prevent its release to the environment. Drums containing flasks of mercury would be delivered on pallets to the MMTS. After the 1-MT containers are filled with mercury, they would be put in long-term storage, either in Building 110-66 or another of the mercury storage warehouse. The proposed mercury transfer activities would be completed in approximately 15 years and would reduce the number of warehouses needed to store the mercury stockpile from fourteen to five. The remaining warehouses would be cleaned and readied for reuse by DLA Strategic Materials or HWAD.

The proposed project includes installation of a new underground electrical distribution line and data lines to serve the MMTS as well as installation of a separate personnel trailer that would contain the sanitary facilities for use by project personnel. A potable water line and a septic system would be installed to serve the personnel trailer (there would be no mercury in this building). Installation and testing of the new facility and installation of associated utilities would

employ about 20 people for a period of about three months. The operation would employ about five people for the approximately 15-year duration of mercury transfer.

The project would take place in an ammunition storage area of HWAD, located in an arid desert valley in west-central Nevada. HWAD is a federal government property for which the principal use is the storage, production, testing, and disposal of weapons and ordnance. There are no residences nearby; the nearest workers not involved in the proposed action are about 2.7 km (1.7 miles) away from the MMTS site. The potentially affected environment has been described for purposes of impact assessment; topics considered include physical setting, land use, geology and soils, air quality, hydrology, biological resources, cultural resources, aesthetics and noise, services and utilities, transportation and traffic, hazardous materials, and socioeconomics, including environmental justice.

Assessment of the environmental consequences of the proposed action and the no-action alternative considered potential impacts in 12 resource areas plus cumulative impacts: land use, air quality, hydrology, biological resources, cultural resources, aesthetics and noise, services and utilities, transportation and traffic, waste management, worker and public health and safety, socioeconomics, and environmental justice.

The potential impacts on land use, aesthetics and noise, and transportation and traffic are negligible.

There would be minor impacts on air quality from the generation of fugitive dust and criteria air pollutants from excavation for the installation of site utilities and from operation of motor vehicles during site development and project operations. It may be possible to avoid some fugitive dust emissions by measures such as not excavating on days when high winds are forecast or by employing other wind erosion control measures commonly used at HWAD. Some mercury would be emitted from the facility, but air concentrations would decline to near background within a short distance. The expected maximum annual emission of mercury from the MMTS would be extremely small (estimated at 165 grams annually).

The only identified impact on hydrology is a small increase in residential water consumption due to the increased local population (project workers and their families). Water discharged to the local sewage treatment system is evaporated and lost to the hydrologic system. Walker Lake, part of which is on HWAD property and which is the terminus for all surface water and groundwater flow in the valley, is declining in size and increasing in salinity as a result of water consumption, almost all of which is in other parts of its watershed. The small increase in water consumption would contribute to the ongoing impacts on Walker Lake, but the contribution would be very small.

The only identified impact on biological resources is a possible small loss of natural vegetation and its associated wildlife habitat. This impact would be very small because the site is disturbed and has little natural vegetation, and the small possibility of an impact could be reduced by conducting reconnaissance surveys along the routes of the planned electric and data lines to help ensure that any sensitive vegetation is avoided during construction of these lines. Walker Lake provides habitat for three fish species (including a federally listed threatened species, the Lahontan cutthroat trout) and is an important stopover for migratory birds. Loss of water volume

and increased salinity are reducing the lake's viability as habitat for these biota. Water use for project employees could contribute to this impact by slightly reducing inflows to the lake, but any impact would be very small compared with the other ongoing water losses affecting the lake.

The potential for impacts to cultural resources is low. There would be no alteration of buildings that could be historic and no identified archaeological sites on the route that would be disturbed for the new electrical distribution line. Walker Lake is of cultural significance to the Northern Paiute, the Native American people who have long occupied the area and have a reservation north of the lake. Continuing decline in the lake volume is adversely affecting this resource. Water use for project employees could contribute to this impact by slightly reducing inflows to the lake, but any impact would be very small compared with other water losses affecting the lake.

Existing services and utilities have sufficient capacity to meet the demands of the proposed action without adverse impacts. The addition of utility services at Building 110-66 could have a beneficial impact; the enhanced capacity could accommodate future uses that are not yet anticipated.

Only minor waste management impacts are expected. The proposed action would result in the generation of hazardous and nonhazardous wastes, but these wastes could be managed safely using existing capabilities and facilities that are considered to be protective of the environment and have sufficient capacity to accommodate the additional material. DLA will determine the ultimate disposal of the empty flasks per existing federal, state, and DOD requirements, in consultation with the State of Nevada.

Assessment of potential impacts to worker and public health and safety considered both the construction and operational phases of the proposed action, including impacts of potential accidents. No special concerns are identified for the construction phase, when the principal sources of concern are a low potential for construction accidents and the possibility of traffic accidents involving workers. During routine operations, the main potential threat to health and safety would be inhalation exposure to mercury vapor in air. Ventilation and filtration equipment in the MMTS would ensure that neither workers nor non-involved personnel are exposed to mercury vapor concentration levels that exceed protective thresholds for chronic exposure to mercury. Potential industrial accidents for the proposed mercury transfer project would be similar to the potential accidents in mercury storage and associated handling that were evaluated for the 2004 Mercury Management Environmental Impact Statement (EIS), but the impacts of any mercury releases within the MMTS would be less because spill containment, ventilation, and filtration systems in the new facility would minimize their effects. Additionally, the MMTS would be designed to meet stringent seismic specifications, precluding serious impacts from an earthquake event.

Socioeconomic impacts would be small but positive, due to a small increase in local employment that could be easily accommodated by existing housing and community services.

No environmental justice impacts are identified. Census data does not indicate the presence of either a minority or low-income population in the local area (the community of Hawthorne) that could be affected by the impacts of the proposed action. Additionally, the action would not

produce any environmental impacts that would be considered “high and adverse.” Accordingly, there is no potential for disproportionately high and adverse impacts to minority or low-income populations.

The project could contribute to cumulative impacts related to ongoing trends in the region, but any such contribution would be very small.

Overall, the assessment finds that the proposed action would have only minor adverse impacts and would have small positive impacts on socioeconomic conditions. The analysis in this assessment shows that the proposed action would produce no significant adverse impacts to the human environment within the context of the National Environmental Policy Act (NEPA).

CONTENTS

SUMMARY iii

LIST OF FIGURES ix

LIST OF ACRONYMS AND ABBREVIATIONS xi

1. PURPOSE AND NEED 1
   1.1 BACKGROUND 1
   1.2 PURPOSE AND NEED FOR ACTION 4

2. DESCRIPTION OF ALTERNATIVES 5
   2.1 PROPOSED ACTION 5
   2.2 NO-ACTION ALTERNATIVE 11

3. AFFECTED ENVIRONMENT 12
   3.1 LOCATION AND PHYSICAL SETTING 12
   3.2 LAND USE 14
   3.3 GEOLOGY AND SOILS 17
   3.4 AIR QUALITY 18
   3.5 HYDROLOGY 19
   3.6 BIOLOGICAL RESOURCES 21
   3.7 CULTURAL RESOURCES 23
   3.8 AESTHETICS AND NOISE 24
   3.9 SERVICES AND UTILITIES 25
   3.10 TRANSPORTATION AND TRAFFIC 26
   3.11 HAZARDOUS MATERIALS 26
   3.12 SOCIOECONOMICS 27

4. ENVIRONMENTAL CONSEQUENCES 29
   4.1 LAND USE 29
   4.2 AIR QUALITY 29
   4.3 HYDROLOGY 30
   4.4 BIOLOGICAL RESOURCES 31
   4.5 CULTURAL RESOURCES 31
   4.6 AESTHETICS AND NOISE 32
   4.7 SERVICES AND UTILITIES 32
   4.8 TRANSPORTATION AND TRAFFIC 32
   4.9 WASTE MANAGEMENT 33
      4.9.1 Proposed Action 33
      4.9.2 No-Action Alternative 34
   4.10 WORKER AND PUBLIC HEALTH AND SAFETY 34
      4.10.1 Proposed Alternative 34
      4.10.2 No-Action Alternative 36
   4.11 SOCIOECONOMICS 36

4.12 ENVIRONMENTAL JUSTICE 37
4.13 CUMULATIVE IMPACTS.....37

5. CONCLUSIONS 39

6. REFERENCES 40

APPENDIX A – LIST OF PREPARERS..... A-1

APPENDIX B – LIST OF PERSONS AND AGENCIES CONSULTED.....B-1

APPENDIX C – DLA STRATEGIC MATERIALS PROPOSAL AND NEVADA DIVISION OF ENVIRONMENTAL PROTECTION - BUREAU OF AIR POLLUTION CONTROL LETTER OF AGREEMENT C-1

LIST OF FIGURES

Fig. Page

1.1 Flasks in the bottom of a 30-gal drum showing polyethylene bag and cardboard divider....2
1.2 Mercury storage sites at Hawthorne Army Depot....3
1.3 Drums of mercury stored in a warehouse at Hawthorne Army Depot....4
2.1 Mobile Mercury Transfer System and portable dock at Building 110-66. 5
2.2 Inside view of the Mobile Mercury Transfer System. 6
2.3 Proposed route for the underground electrical distribution line....8
2.4 Proposed route for the data lines. 10
3.1 Hawthorne Army Depot. 12
3.2 Main entrance to Hawthorne Army Depot. 13
3.3 Mercury Storage Warehouses (Magazines) at HWAD. 14
3.4 Magazine area at HWAD. 15
3.5 Location map for Hawthorne Army Depot. 16

LIST OF ACRONYMS AND ABBREVIATIONS

ACGIH	American Conference of Governmental Industrial Hygienists
ATSDR	US Agency for Toxic Substances and Disease Registry
BLM	Bureau of Land Management
$^{\circ}$C	degrees Celsius
CFR	*Code of Federal Regulations*
cm	centimeter
CO_2	carbon dioxide
DLA	Defense Logistics Agency
DoD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
EA	environmental assessment
EIS	environmental impact statement
$^{\circ}$F	degrees Fahrenheit
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
ft	feet
ft^2	square feet
ft/min	feet per minute
ft^3/min	cubic feet per minute
gal	gallon
HEGA	high efficiency gas adsorption
HWAD	Hawthorne Army Depot
IDLH	immediately dangerous to life and health
in.	inch
kg	kilogram = 1 thousand grams
km	kilometer = 1 thousand meters
kW	kilowatt = 1 thousand watts
L	liter
L/year	liter per year
m	meter
m/min	meter per minute
m/sec	meter per second
m^2	square meter
m^3	cubic meter
m^3/min	cubic meter per minute
m^3/year	cubic meter per year
mg	milligram = 1 thousandth of a gram
mg/L	milligram per liter

min	minute
MMS	Mercury Monitoring System
MMTS	Mobile Mercury Transfer System
mph	mile(s) per hour
MT	metric ton = 1,000 kilograms
MW	megawatt = 1 million watts
µg	microgram = 1 millionth of a gram
$\mu g/m^2$	microgram per square meter
$\mu g/m^3$	microgram per cubic meter
ng	nanogram = 1 billionth of a gram
ng/m^3	nanogram per cubic meter
NEPA	National Environmental Policy Act
NIOSH	National Institute for Occupational Safety and Health
NOx	nitrogen oxides
ORNL	Oak Ridge National Laboratory
OSHA	Occupational Safety and Health Administration
PM-10	particulate matter with diameter less than 10 microns
PPE	personal protective equipment
PSD	prevention of significant deterioration
RCRA	Resource Conservation and Recovery Act
REL	recommended exposure limit
sec	second
SM	Strategic Materials
SO_2	sulfur dioxide
TDS	total dissolved solids
TLV	threshold limit value
tpy	tons (domestic, short) per year = 2,000 pounds per year
U.S.C.	*United States Code*
VOC	volatile organic compound
WADF	Western Area Demilitarization Facility
yd	yard
yd^3	cubic yard

1. PURPOSE AND NEED

The Defense Logistics Agency Strategic Materials (DLA Strategic Materials) is responsible for the safe, secure, and environmentally sound stewardship of the mercury stockpile. The DLA decision process documented in the Mercury Management Environmental Impact Statement (EIS) (DLA 2004a) resulted in a decision to consolidate the mercury stockpile at Hawthorne Army Depot (HWAD). Consistent with its responsibility for the stockpile, DLA Strategic Materials proposes to transfer the contents of the mercury stockpile into new, larger steel containers. As required under the National Environmental Policy Act (NEPA; 42 U.S.C. 4321, et seq.) and consistent with DLA Regulation 1000.22, DLA Strategic Materials has prepared this environmental assessment (EA) to assess the potential environmental impacts of the proposed action. The impacts of storing the mercury stockpile at HWAD are evaluated in the Mercury Management EIS, which is incorporated by reference in this document.

1.1 BACKGROUND

The mercury stockpile consists of approximately 4,436 metric tons (about 4,890 tons) of mercury. The mercury is stored in 21,450 drums stored on drip pans on 4,300 pallets. The mercury is in 128,672 3-liter (3-L) steel flasks, each containing 2.5 L of mercury. The flasks are packaged in 113-L [30-gallon (30-gal)] drums, and each drum contains six flasks. A cushioning pad is placed in the bottom of each drum. The six flasks are enclosed in a polyethylene bag, and beneath the mercury flasks at the bottom of each bag is a cushioning pad. The flasks are separated by cardboard dividers, as shown in Fig. 1.1.

Fig. 1.1. Flasks in the bottom of a 30-gal drum showing polyethylene bag and cardboard divider. Source: *Drum Characterization for the DNSC Mercury Stockpile, Oak Ridge National Laboratory,* prepared for Defense Logistics Agency – Defense National Stockpile Center, ORNL/TM-2009/002, April 2009.

In 2008 and 2009, Oak Ridge National Laboratory (ORNL) examined and performed destructive and nondestructive tests on example flasks and drums from the mercury stockpile (Terry 2008; Carroll et al. 2009; Hermes et. al 2009; Hylton et al. 2009; Mattus et al. 2009; Pawel and Longmire 2009; Terry et al. 2009; Varma and Aaron 2009).

Four main conclusions were reached based on these studies.

- Because of possible contamination on the outside of the flasks, gloves should always be worn when handling flasks.
- The external appearance of some of the flasks is poor, but this does not correlate with the actual poor condition or internal corrosion of the containers.
- Welds are of lower quality compared with the state of the art today, but the flasks tested were able to withstand hydrostatic pressures substantially higher than commercial flasks manufactured today.
- The flasks are suitable for containing the mercury for 40 or more additional years.

During a shipping campaign between September 2010 and March 2011, the entire mercury stockpile was moved from depots in the East to Hawthorne Army Depot (HWAD). The mercury stockpile is presently being stored in 14 buildings at HWAD (Figs. 1.2 and 1.3).

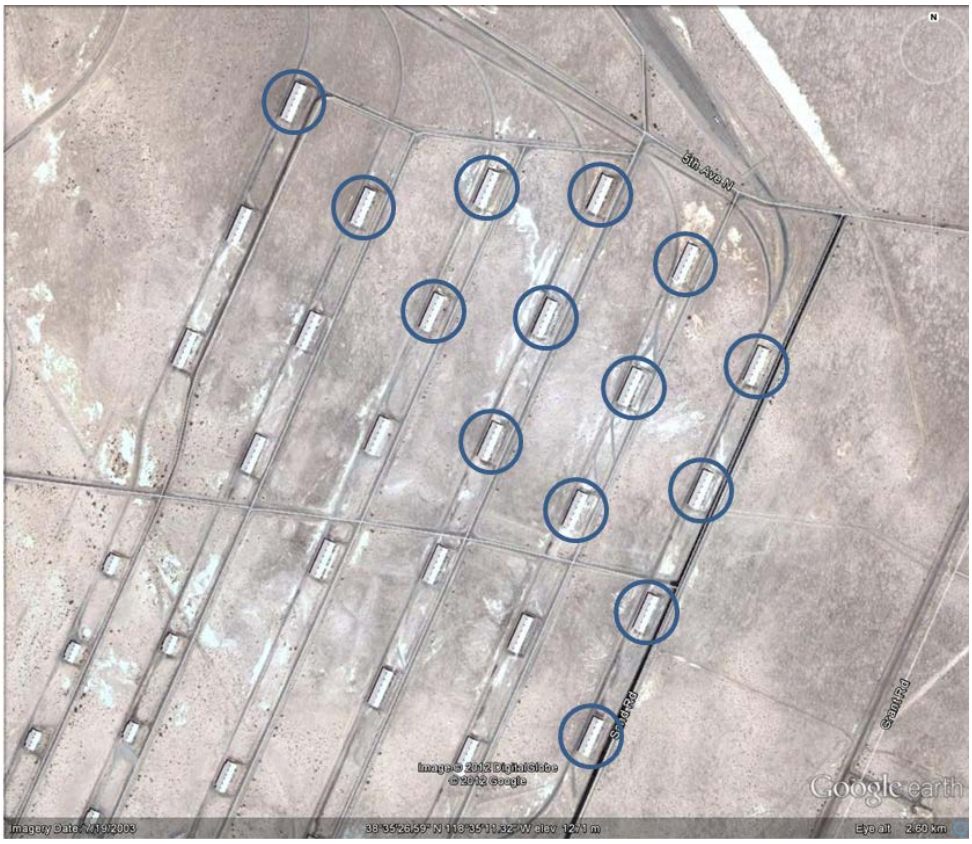

Fig. 1.2. Mercury storage sites at Hawthorne Army Depot. Source: Google earth, "Mercury Storage Buildings," 38°35'26.59"N and 118°35'11.32" W, July 19, 2003, accessed February 29, 2012, modified by Oak Ridge National Laboratory.

Fig. 1.3. Drums of mercury stored in a warehouse at Hawthorne Army Depot.
Source: "Data Confirmation for the Mercury Stored in the 110 Group Warehouses," Oak Ridge National Laboratory, prepared for Defense Logistics Agency – Strategic Materials, September 2011, MSSP-33.

1.2 PURPOSE AND NEED FOR ACTION

DLA Strategic Materials proposes to transfer the mercury stockpile into new, larger steel containers — from 3-L steel containers into 1-metric ton (MT) steel containers. DLA Strategic Materials needs to perform this action because 1) the existing mercury flasks are over 40 years old, 2) some flasks may have failed during transport and spilled their contents into the drums containing them, and 3) performing this action would satisfy the terms of its agreement with the state of Nevada, Division of Environmental Protection, Bureau of Air Pollution Control, which allowed the consolidation of the mercury stockpile at HWAD conditioned upon progress being made toward constructing and operating a mercury repackaging facility (State of Nevada 2010; DLA 2010; complete referenced documents are provided in Appendix C).

2. DESCRIPTION OF ALTERNATIVES

2.1 PROPOSED ACTION

The proposed action is to transfer the mercury stockpile from 3-L steel flasks into 1-MT containers. All operations, from opening the drums containing the flasks of mercury through filling the 1-MT containers, would be performed within a single modular building, the Mobile Mercury Transfer System (MMTS). The mercury transfers would be performed within fume hoods to limit the potential for exposing the workers to mercury vapors.

The warehouse chosen (Building 110-66) at which to position the modular building would be partially emptied by transporting 212 pallets of mercury by flatbed truck to a partially filled warehouse (Building 110-98) and storing the pallets there. Portions of Building 110-66 would be set aside for logistical support for the operations that occur in the MMTS, including storage of new 1-MT containers pending being filled in the MMTS, filled 1-MT containers on drip pans pending transfer to other warehouses for long-term storage, recyclable materials pending disposition, and hazardous and nonhazardous wastes pending disposition.

The mercury warehouses in the 110 Area are oriented roughly north to south (Fig. 2.1). A loading dock, a rail spur, and a rail line are on the west side of the warehouses. The modular building would be located at the south end of Building 110-66, with its two roll-up doors aligning with the two southern-most doors of the warehouse. Pallets of drums would enter the MMTS at its southern end, and filled 1-MT containers would exit the MMTS at its northern end. The movement of mercury would be from right to left (Fig. 2.2).

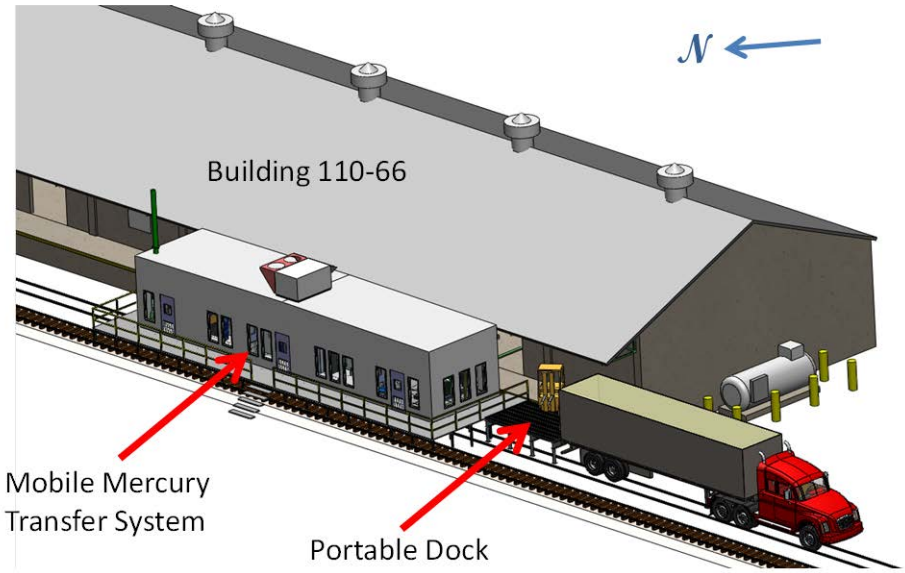

Fig. 2.1. Mobile Mercury Transfer System and portable dock at Building 110-66.

Source: Oak Ridge National Laboratory, drawing ORNL-234-MMTS-0000.

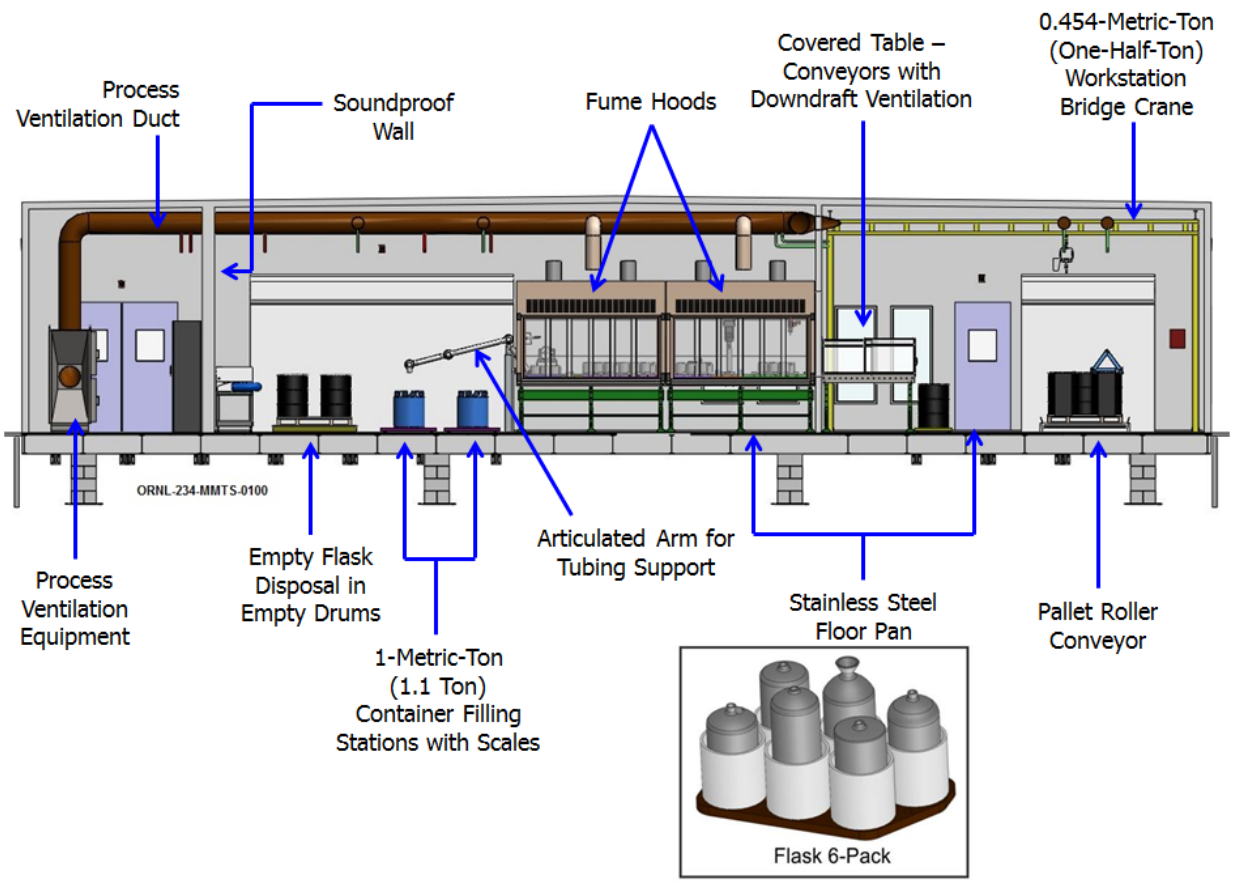

Fig. 2.2. Inside view of the Mobile Mercury Transfer System. Source: Oak Ridge National Laboratory, drawing ORNL-234-MMTS-0100.

Within the MMTS, drums would be emptied one at a time. Vapors would be evacuated from the drum using hoses (snorkels) connected to the process ventilation system, and the drum would be transported by a bridge crane to the end of the covered table, a ball conveyor with downdraft ventilation (Fig. 2.2). Using the bridge crane and a lifting fixture, the flasks would be removed one at a time from the drum and placed in a special tray on the ball conveyor. The tray, called a Flask 6-Pack, can readily accommodate six flasks of different sizes (external dimensions), as shown in the Fig. 2.2 insert.

The tray of flasks is moved by hand along the ball conveyor and placed in the first of two fume hoods (Fig. 2.2). To enhance the movement of the tray, both fume hoods are equipped with ball conveyors. In the first fume hood, the plugs are loosened using an impact wrench and removed. Equipment is available to drill a hole in any flask (expected to be less than one per hundred) with a plug that cannot be loosened and removed.

The tray of flasks is moved from the first fume hood into the second hood, where the mercury is syphoned from each flask using a peristaltic pump. The mercury flows through tubing into a 1-MT container. As shown in Fig. 2.2, either of the blue cylinders to the left of the second fume hood is a 1-MT container. Each emptied flask is inverted over a vibratory table (flask shaker tray). Six flasks at a time are vibrated to remove residual mercury. At the end of this process,

each flask is bagged and placed in a 113-L (30-gal) drum for appropriate disposal. The filled 1-MT container is moved to a warehouse for long-term storage. Four filled 1-MT containers are stored on a steel drip pan that was previously used to store drums that contained the 3-L flasks.

The process ventilation equipment is shown on the left side of Fig. 2.2. The ventilation equipment takes in outside air through appropriately sized vents in the MMTS doors. The ventilation equipment is designed for a flow rate of 52.4 m^3/min (1,850 ft^3/min). The air passes through a roughing filter to remove particulates and two parallel-mounted high-efficiency gas adsorption (HEGA) filters containing sulfur-impregnated activated carbon to remove mercury vapors before being released to the environment. Although the filter is designed to be highly effective in removal of mercury, the HEGA filters do not remove 100% of the mercury vapors; a small amount of mercury would be released to the environment. To ensure proper functioning of the ventilation system, the mercury vapor concentration in the air stream is measured before entering and after exiting the HEGA filters.

The ventilation equipment is designed to minimize exposure of the workers to mercury vapor and allow the workers to perform their duties without the need for respirators. The ventilation equipment is sized to maintain a minimum airflow of 30.5 m/min (100 ft/min) at the working faces of the fume hoods and covered table. Additional duct-mounted snorkels and portable snorkel units are available to provide mercury vapor reduction where needed.

The temperature within the MMTS is maintained in the range 21–24°C (70–75°F) by an appropriately sized heat pump system. In addition to worker comfort, mercury vapor emissions are stabilized; mercury vapor emissions increase with temperature.

During all operations in the MMTS, mercury vapor concentrations at 16 locations are monitored by the Mercury Monitoring System (MMS). The MMS is set to trigger an alarm if the mercury concentration at any of the measuring locations reaches or exceeds 25 $\mu g/m^3$ (25,000 ng/m^3), the DLA Strategic Materials action level, which is one-fourth the permissible exposure limit required by the Occupational Safety and Health Administration (OSHA). In addition, at least one portable mercury vapor analyzer will be available in the MMTS.

To contain mercury if a spill occurs, the floors of the two mercury-handling areas are covered with stainless steel floor pans with a 2.5-cm (1-in.) lip, providing sufficient capacity to hold over two times the maximum potential spill, which is the entire 29 L in a 1-MT container. Spills within the MMTS would be cleaned up by the operations crew. If a spill were to occur outside the MMTS, the emergency responders of the HWAD Fire Department would conduct the cleanup action. The area adjacent to the loading dock of Building 110-66 must be prepared for securely positioning the MMTS. Additional upgrades must be performed to prepare this isolated site for daily worker presence.

Compacted pads will be constructed and rail lines will be removed if necessary. A personnel trailer will be installed to provide sanitary facilities and other conveniences for project personnel in a facility separate from the MMTS. There will be no mercury in the personnel trailer. A potable water line will be installed from a nearby fire hydrant to the personnel trailer. A septic tank and drain field will be installed to serve the personnel trailer. Fiber-optic lines (data lines) will be installed to serve the personnel trailer and the MMTS.

Insufficient electrical capacity for the MMTS and the personnel trailer exists at Building 110-66. Electrical power will be brought to the site from the nearest electrical vault with sufficient capacity. The distribution line will be run under the ground. The proposed route for the underground electrical distribution line is shown in Fig. 2.3. The distance along this route is 3,150 m (10,334 ft). A transformer will be installed at the site to provide electrical power to the MMTS and the personnel trailer. A backup 50-kW diesel-powered generator will be available to provide electrical power to the components of the MMTS if electrical power from the HWAD distribution system is not available.

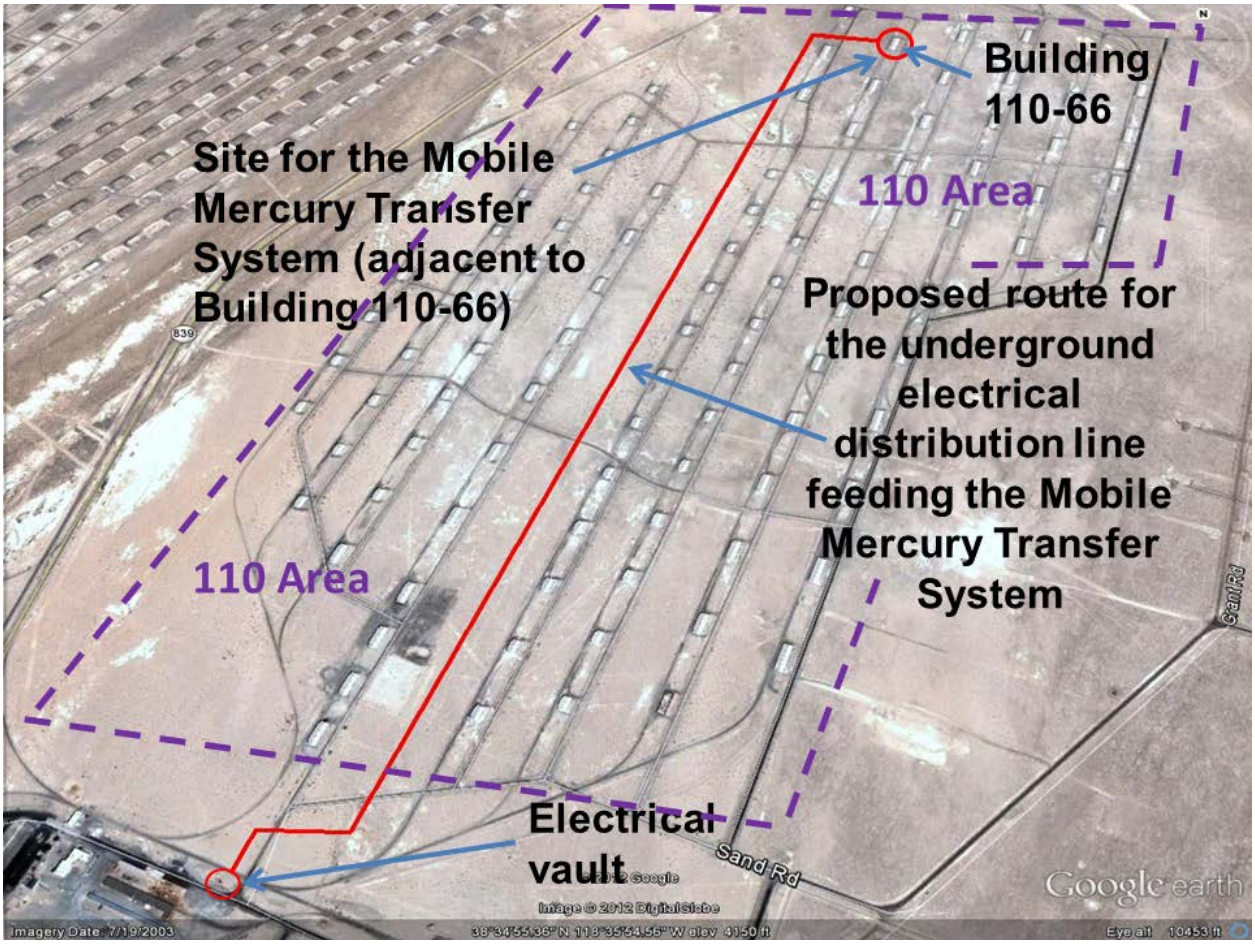

Fig. 2.3. Proposed route for the underground electrical distribution line. Source: Google earth, "Proposed Distribution Line Route for the Mobile Mercury Transfer System Site at Hawthorne Army Depot," 38°35'55.36" N and 118°35'54.56" W, July 19, 2003, accessed March 12, 2012.

No computer or telephone lines exist at Building 110-66. Data lines will be brought to the MMTS and the personnel trailer from a building near the Rail Characterization Yard. The proposed route is shown in Fig. 2.4. The distance along this route is 595 m (1,952 ft). The most likely installation method would be to place utility poles in the ground, between which the data lines would be strung. The data lines could also be run underground, but that option is less desirable because it is more costly and is not required.

Work at the depot will be performed one warehouse at a time subject to DLA Strategic Materials and HWAD operating procedures and stringent health and safety rules. After the mercury from 110-66 has been transferred into 1-MT containers, pallets of mercury would be brought to 110-66 from the other 13 warehouses. Transport would be done on a flatbed truck, with up to14 pallets per flatbed load. The pallets would be loaded at the originating warehouse and unloaded at 110-66 using a portable dock, as shown in Fig. 2.1. After the available space for filled 1-MT containers in 110-66 is full, staged 1-MT containers would be transported to a warehouse from which drums of mercury have been removed. Floors in the warehouses have a posted bearing capacity rating of 19,500 kg/m^2 (4000 lb/ft^2), which is more than adequate to handle the calculated load of about 3000 kg/m^2 (600 lb/ft^2) from the 1-MT containers. A flatbed truck could be used for transportation. A portable dock would be used for loading at 110-66 and for unloading at the receiving warehouse.

Upon completion of the proposed action, the entire mercury stockpile would be stored on drip pans in five of the 14 buildings where mercury is currently stored. The buildings are already equipped with spill containment features, including membrane flooring and berms. The remaining former mercury storage warehouses would be checked for mercury, remediated if needed, and readied for reuse by DLA Strategic Materials or HWAD.

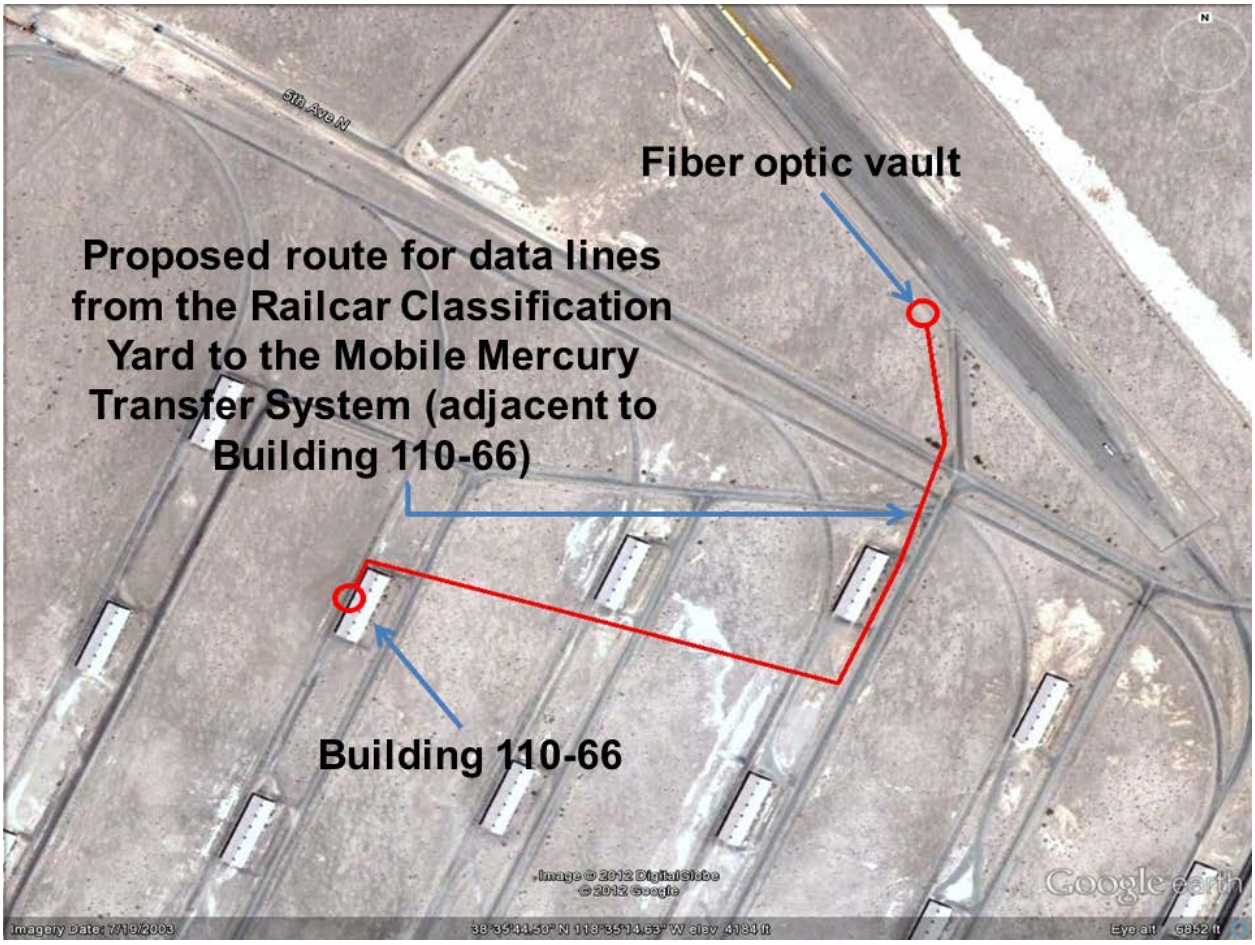

Fig. 2.4. Proposed route for the data lines. Source: Google earth, "Proposed Route for Data Lines Serving the Mobile Mercury Transfer System Site at Hawthorne Army Depot," 38°34'44.50" N and 118°35'14.63" W, July 19, 2003, accessed March 12, 2012.

All workers would be trained as to the potential hazards associated with the proposed action. Additionally, each worker would be issued and required to wear personal protective equipment appropriate to the hazards that may be encountered during the proposed action. Although respirators would not be required during normal MMTS operation, workers would be provided with respirators and appropriate training to enable them to respond to hazards that may require use of respiratory protection. Potential hazards to workers associated with the proposed action include the following:

- a forklift fire inside one of the mercury storage warehouses
- a dropped pallet of mercury drums resulting in personnel injury without a spill of the contents
- a dropped mercury drum, resulting in a broken flask and a spill of mercury without personnel injury
- penetration of a mercury drum by a forklift tine
- a mercury flask dropped during removal from a drum with and without release of mercury
- an empty 1-MT container dropped resulting in personnel injury
- a filled 1-MT container dropped resulting in personnel injury without release of mercury
- a forklift driving off the edge of a loading dock, with or without a mercury load
- a mercury contamination incident with and without accompanying personnel injury
- a leaky flask observed in a drum
- a leaky flask observed while lifting from a drum onto the conveyer table
- a leaky flask observed in the flask tray on the roller conveyer table
- a leaky flask observed in the flask tray under the fume hood
- loose mercury observed outside the fume hood
- a leak at a mercury transfer fitting
- loss of electrical power during daytime operations
- loss of electrical power at night
- heat stress and cold stress (associated with the lack of heating, ventilation, and air-conditioning in the warehouses and the use of personal protective equipment)

Required training would minimize the potential risks to workers. That training will include the following general categories:

- Occupational Safety and Health Administration (OSHA) safety training
- OSHA certification of all forklift operators
- Nevada Chemical Accident Prevention Program
- Site-wide general worker procedures

- Site-wide mercury worker procedures
- MMTS procedures
- Respirator training as dictated by hazardous materials operations requirements, including medical approval for the wearing of a respirator
- Material balance accountability

DLA Strategic Materials expects to complete the proposed action within approximately 15 years after the mercury transfer operations start. All work would be conducted in compliance with applicable federal, state, and local regulations and requirements. Worker health and safety, as well as accident prevention and avoidance, are being addressed in more detail under a separate state-mandated process, the Nevada Chemical Accident Prevention Program.

At the conclusion of the proposed mercury transfer project, the air filter media in the MMTS would be removed and managed as waste. The MMTS and personnel trailer could remain in place, be relocated, or be demolished and discarded. The nature and extent of decontamination and decommissioning actions for the MMTS would depend on the planned future use or disposition of the facility.

2.2 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, the mercury stockpile would continue to be stored in the existing steel 3-L flasks, six flasks per steel drum, in the 14 warehouses at HWAD. The drums would continue to be inspected for rust and leaks. Rusty drums would be replaced. If mercury leaks occurred, they would be cleaned up by trained responders, and the mercury would be placed in a new container. Routine maintenance and inspections would be conducted on the warehouses and on the CO_2 fire suppression systems. Because DLA Strategic Materials would not be able to satisfy its agreement with the state of Nevada, Division of Environmental Protection, Bureau of Air Pollution Control (State of Nevada 2010; DLA 2010; complete referenced documents are provided in Appendix C), the no-action alternative is not a viable alternative.

3. AFFECTED ENVIRONMENT

3.1 LOCATION AND PHYSICAL SETTING

The project location is in the 110 Area of the HWAD in Mineral County, Nevada. An aerial view of HWAD is presented in Fig. 3.1, and a street-level view of the main entrance to HWAD is presented in Fig. 3.2. HWAD is in west-central Nevada, about 40 km (25 miles) from the Nevada–California border, 149 km (93 miles) southeast of Reno, Nevada, and 394 km (245 miles) northwest of Las Vegas, Nevada. Approximate highway distances to Reno and Las Vegas are 209 and 512 km (130 and 311 miles), respectively.

Fig. 3.1. Hawthorne Army Depot. Source: The Nevada Division of Environmental Protection, Hawthorne Army Depot Webpage, Installation Restoration Program, http://ndep.nv.gov/hwad/haap02.htm, accessed February 15, 2012.

HWAD is located in the Great Basin section of the Basin and Range geomorphic province. The Great Basin is characterized by discontinuous sub-parallel mountain ranges that are separated by valleys up to several tens of miles long and up to several miles wide.

The 110 Area of HWAD (Figs. 2.3 and 3.3) is on the valley floor of Walker Lake Valley, a wide valley that ranges in elevation from roughly 1,220 to 1,460 m (4,000 to 4,800 ft). The valley is bordered on the east and northeast by the Gillis Range [elevation of nearly 2,410 m (7,900 ft)], on the southeast by the Garfield Hills [elevations over 2,320 m (7,600 ft)], and on the west by the Wassuk Range [elevations over 3,350 m (11,000 ft)]. The valley is named for Walker Lake, a large natural lake that is the main physiographic feature of the valley; the south shore of Walker Lake and part of the lake itself are encompassed within the boundaries of HWAD. The valley bottom can be perceived as essentially flat, but it is in fact formed in part by gently sloping surfaces (bajadas) formed by the coalescence of numerous alluvial fans emanating from the mountain fronts. The mercury storage buildings in the 110 Area are at elevations of between

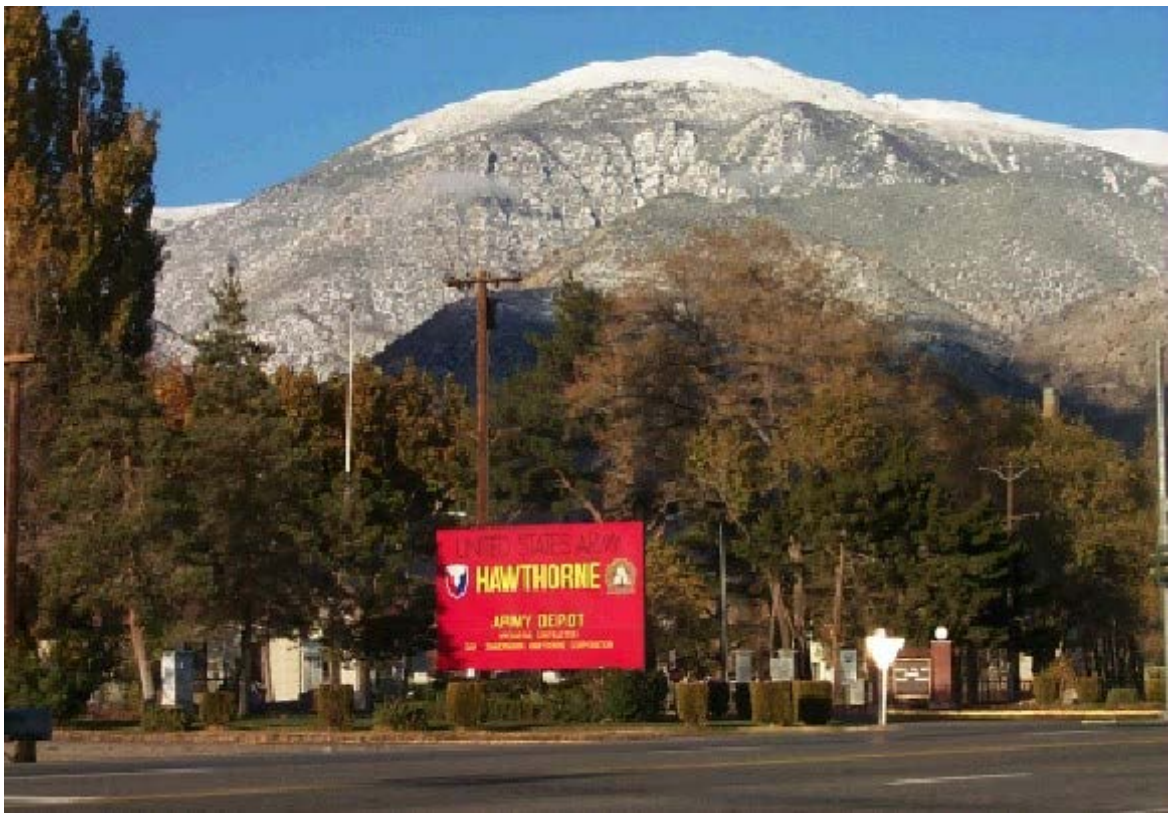

Fig. 3.2. Main entrance to Hawthorne Army Depot. Source: The Nevada Division of Environmental Protection, Hawthorne Army Depot Webpage, Installation Restoration Program, http://ndep.nv.gov/hwad/haap02.htm, accessed February 15, 2012.

1,270 and 1,278 m (4,166 and 4,193 ft), roughly 5 km (3 miles) south of the Gillis Range mountain front and 8 km (5 miles) east of Walker Lake.

The climate is arid, with relatively hot summers and mild winters. The average annual temperature at Hawthorne is 13°C (56°F); December and January are the coolest months, with average temperatures of 2°C (36°F), and July is the warmest month, with an average temperature of 25°C (78°F) (NOAA 2002). The lowest temperature recorded was -23°C (-10°F); the highest was 43°C (110°F). Normal annual precipitation is about (4.5 in.) (NOAA 2002), and average annual snowfall is 6.4 cm (2.5 in.). Based on data from Reno, the region averages 13.5 days per year with thunderstorm activity (DOE 2011).

The average annual wind speed is 2.7 m/sec (6 mph). The region typically experiences several episodes of high winds each year. The maximum wind speed at Reno (the nearest location for which these data are readily available), based on the highest 1-minute average value, is 30 m/sec (67 mph) (DOE 2011).

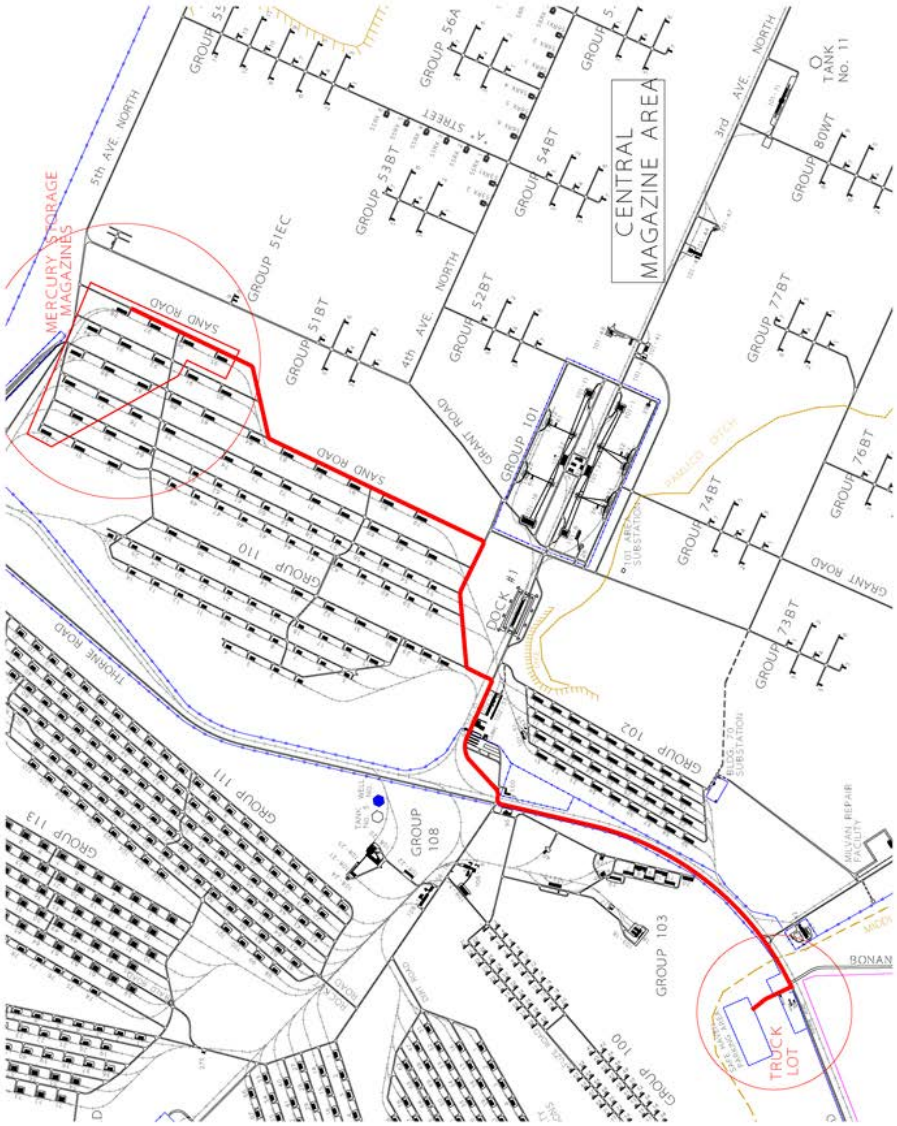

Fig. 3.3. Mercury Storage Warehouses (Magazines) at HWAD. Source: Serving Our Country, Contractor/Operator Hawthorne Army Depot, excerpt from drawing entitled Hawthorne Army Depot Mercury Storage Project Site Plan (no drawing number and no date).

3.2 LAND USE

HWAD has an area of 59,585 hectares (147,238 acres). It borders and surrounds the town of Hawthorne, Nevada, on three sides (Figs. 3.4 and 3.5). The town of Hawthorne has an area of about 388 hectares (960 acres).

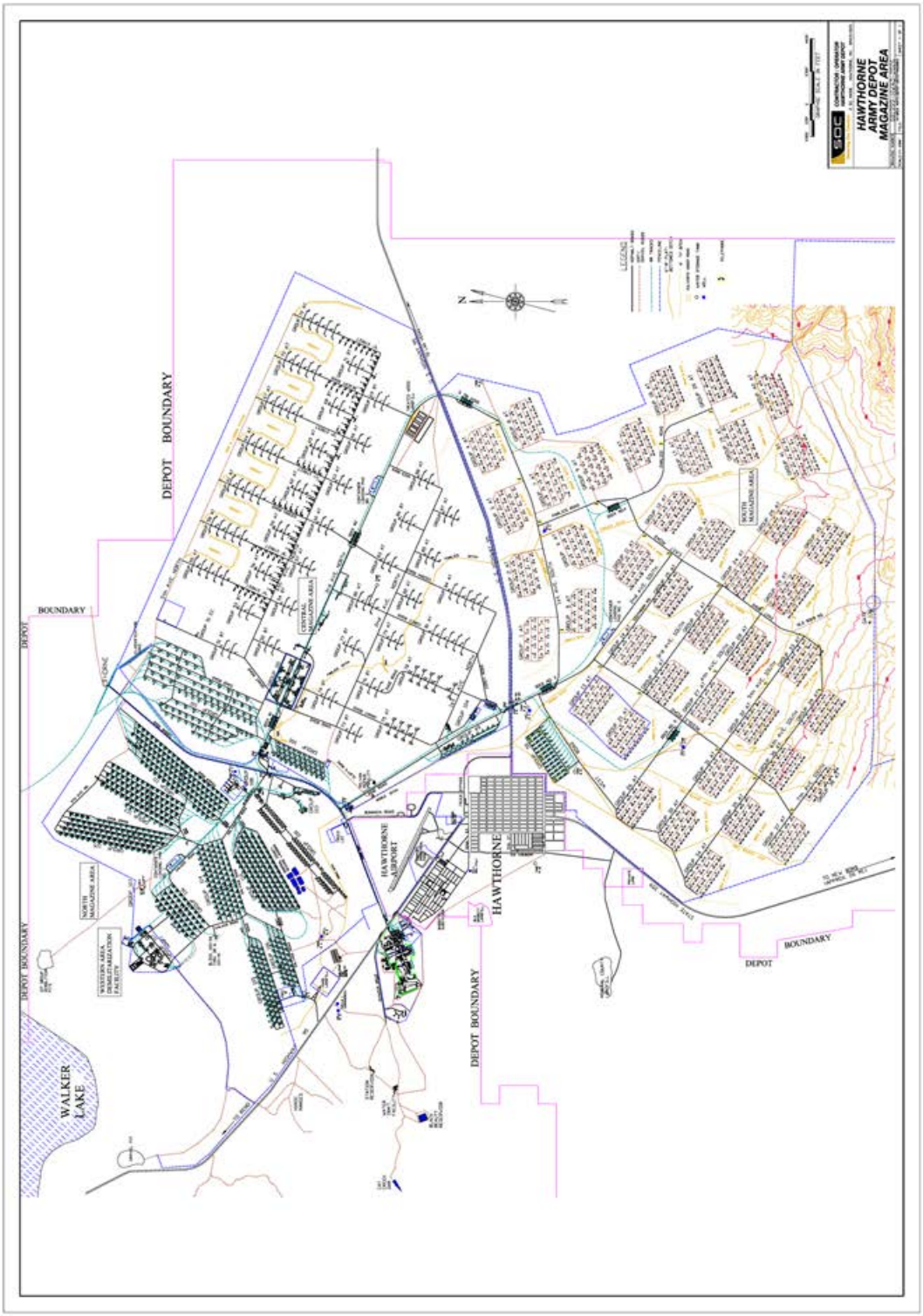

Fig. 3.4. Magazine area at HWAD. Source: Serving Our Country, Contractor/Operator Hawthorne Army Depot, Hawthorne Army Depot Magazine Area, drawing number 081999-HWAD-2026 (no date).

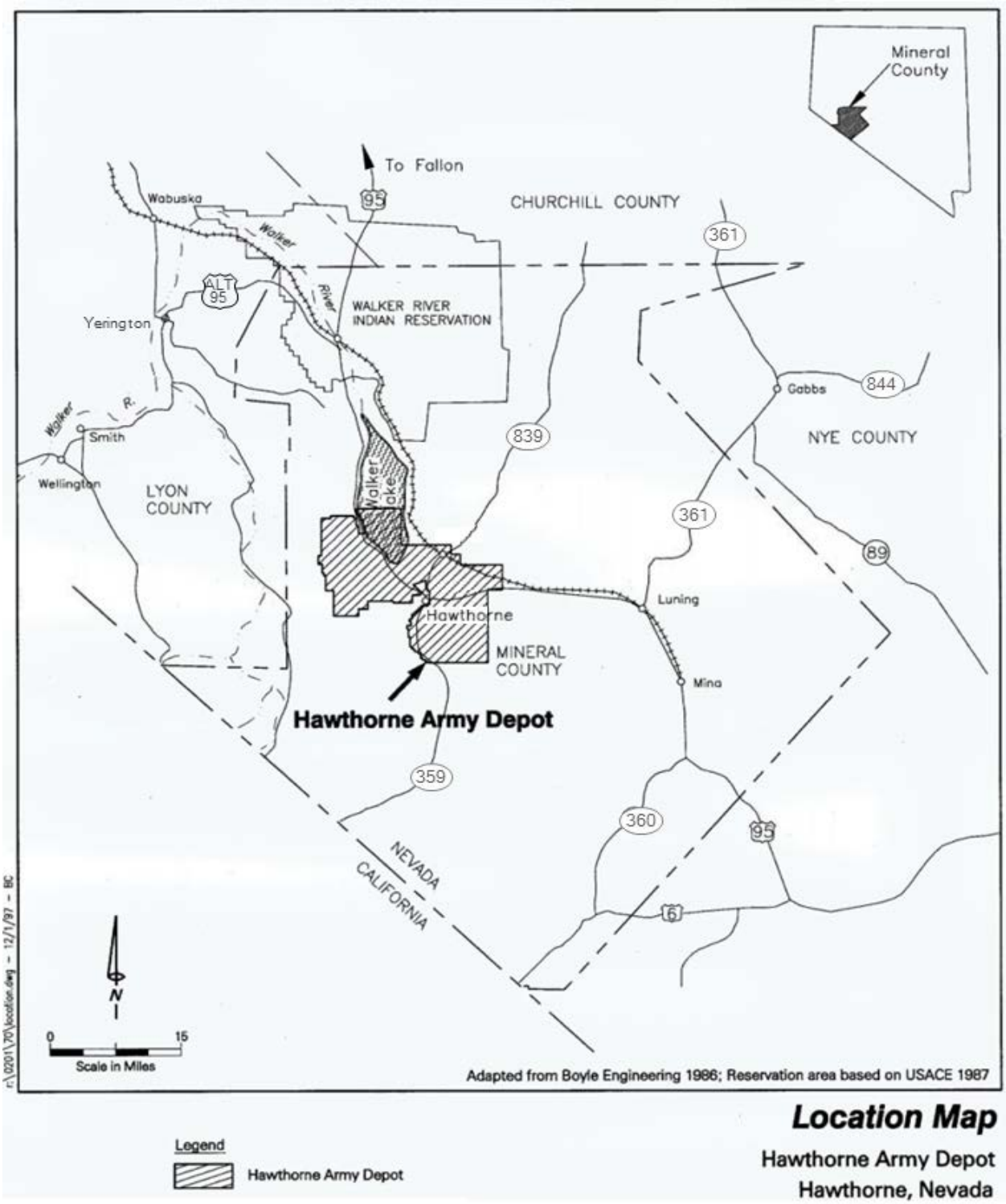

Fig. 3.5. Location map for Hawthorne Army Depot. Source: The Nevada Division of Environmental Protection, Hawthorne Army Depot Webpage, IRP Contamination Assessment, accessed February 17, 2010, http://ndep.nv.gov/hwad/locamap.jpg, modified by Oak Ridge National Laboratory.

The installation is owned by the US government and operated for the US Army by a contractor. It is part of a complex of property withdrawn from the public domain that has been used since 1930 for storage, production, testing, and disposal of various types of weapons and ordnance. Its current mission is to receive, issue, store, renovate, inspect, demilitarize, and dispose of conventional ammunition. Storage of war-reserve ammunition is a major function.

Land uses include ordnance storage, ordnance demilitarization, testing, former ordnance production areas, landfills, and training. There are three ammunition storage and production areas (designated North, Central, and South) on the facility property. Production activities occur in the Western Area Demilitarization Facility, located on the northwestern portion of the depot, and other onsite locations. The HWAD Industrial Area, located in the west-central portion of the depot a short distance northwest of the town of Hawthorne, includes housing, command headquarters, offices, an engineering shop, and a golf course. There are 2,508 buildings on HWAD, including over 2,000 storage magazines ("igloos").

The project site is in the 110 Area, which is in the north ammunition storage area in the northern portion of HWAD. Fourteen warehouse buildings in the 110 Area are currently used to store the mercury stockpile. Each warehouse is about 61 × 15 m (200 × 50 ft), which is 915 m^2 (10,000 ft^2). The MMTS would be installed adjacent to Building 110-66, which is approximately 6 km (4 miles) north of the town of Hawthorne.

The nearest location where personnel not involved in the proposed action are normally present is Dock 1, a shipping and receiving facility in the 102 Area, about 2.7 km (1.7 miles) from Building 110-66.

3.3 GEOLOGY AND SOILS

Walker Lake Valley is underlain by an extensive thickness of unconsolidated sedimentary material. The total thickness of sediment is unknown; depth to bedrock exceeds 305 m (1,000 ft) (URS 2009). Walker Lake is a remnant of Lake Lahontan, which filled many valleys in the northwestern Nevada during the Pleistocene, reaching its highest water level above 1,300 m (4,270 ft) elevation about 14,000 years ago (Sharpe 2010). Sediments in Walker Lake Valley were derived from erosion of the surrounding mountains and were deposited in alluvial fans, floodplains, river channels, and the beds of Lake Lahontan and earlier pluvial lakes (URS 2009).

Surface soils at HWAD typically consist of silty sands, gravelly silt-sand mixtures, clay, and silt intermixed with sand and gravel. Soils in the 110 Area are silty sands and silt-sand mixtures (URS 2009). There are no prime farmland soils on HWAD (DOE 2011).

Walker Lake Valley is in an active seismic zone, denoted as the Walker Lane fault zone. The east face of the Wassuk Range is the fault scarp of an active normal fault (DOE 2011). One of the largest recorded earthquakes in Nevada history was the magnitude 7.2 Cedar Mountain earthquake in 1932, estimated to have been centered about 48 km (30 miles) east of the project site, south of the town of Gabbs. Strong shocks were reported at places including Fallon, Mina, Luning, and Tonopah; chimneys and walls were cracked or toppled, and there were extensive ground ruptures in valleys south of Gabbs (USGS 2009; Bell et al. 1999). Other earthquakes exceeding magnitude 7 have occurred within 160 km (100 miles) of HWAD within the last

50 years. No structural damage to HWAD facilities has been observed as a result of past seismic activity in the region (URS 2009).

An active volcanic area, the Mono-Inyo Craters chain, is located approximately 97 km (60 miles) south of HWAD. Eruptions have occurred at a frequency of once every 250 to 750 years over the past 5,000 years, most recently about 250 years ago. At HWAD, the main impact of an eruption would be the deposition of volcanic ash; it is estimated that Mineral County could receive more than 5 cm (2 in.) of ash (DOE 2011).

3.4 AIR QUALITY

Mineral County is designated as in attainment or unclassifiable for all criteria air pollutants regulated under the National Ambient Air Quality Standards (Nevada Division of Environmental Protection Bureau of Air Quality Planning 2011). There are no monitoring stations for criteria air pollutants in Mineral County. The nearest monitoring locations are in Lyon, Washoe, Clark, Douglas, and Churchill Counties (DOE 2011).

Windblown dust is an air quality concern throughout the Great Basin region wherever lake beds, such as the former bed of Walker Lake, are exposed to wind erosion due to water-level decline (DOE 2011).

Mercury in air is a concern in the state of Nevada because of mercury emissions from the state's precious metal mining industry. Mercury in air is a concern for human health because of the toxicity of inhaled mercury. Additionally, deposition of mercury on land and water is an important potential route of exposure because of subsequent uptake by fish and other organisms. Nationally, the rate of atmospheric deposition of mercury ranges from 0.3–30 $\mu g/m^2$ annually (Seiler et al. 2004).

The nearest mercury monitoring site to HWAD is in Reno (DOE 2011). The average concentration of mercury in air in the Reno-Sparks area during February 2007 through January 2009 was 2 ng/m^3; the maximum value measured was 10 ng/m^3 (Lyman and Gustin 2009). This average is somewhat higher than the mean background concentration in the Northern Hemisphere, which is 1.5 ± 0.2 ng/m^3 (Lyman and Gustin 2009). The US Agency for Toxic Substances and Disease Registry (ATSDR) has identified 0.2 $\mu g/m^3$ (200 ng/m^3) as the "Minimal Risk Level" for chronic exposure to mercury in air (ATSDR 2012a). ATSDR Minimal Risk Levels indicate levels of exposure that, based on current information, would not cause adverse health effects in people most sensitive to such effects (ATSDR 2012b).

US Environmental Protection Agency regulations limit mercury emissions from mercury cell chlor-alkali plants, Portland cement plants, and electric power plants. Nevada established a state Mercury Air Emissions Control Program by statute in 2006. Under this program, permits are required for the operation of thermal units associated with the mining of gold and silver.

HWAD holds an air quality permit issued by the Nevada Division of Environmental Protection under Title V of the Clean Air Act (BAPC 2011). Regulated air emissions result from installation activities such as operation of boilers, propane combustion, vehicle refueling, open burning, and disposal of munitions by detonation in earthen trenches (URS 2009).

Total facility-wide emissions of criteria air pollutants at HWAD are 74.0 t/year [81.6 domestic short tons/year (tpy)] of particulate matter, 70.9 t/year (78.1 tpy) of particulate matter less than 10 microns in diameter (PM-10), 220.2 t/year (242.7 tpy) of oxides of nitrogen (NOx), 75.7t/year (83.5 tpy) of sulfur dioxide (SO_2), 21.4 t/year (23.6 tpy) of carbon monoxide, and 23.6 t/year (26.0 tpy) of volatile organic compounds (VOCs). To control emissions, the permit places limits on the installation's use of diesel fuel in boilers, quantities of gasoline dispensed, amount of open burning, and operation of certain facilities with air emissions.

Mercury is one of the hazardous air pollutants regulated under the permit; emissions of hazardous air pollutants are limited to no more than 9.1 t/year (10 tpy) for any one hazardous air pollutant and 22.7 t/year (25 tpy) for all such pollutants combined (BAPC 2011).

The nearest Class I Prevention of Significant Deterioration (PSD) areas are Yosemite National Park and Hoover National Wilderness Area, about 80 km (50 miles) distant. No PSD permits are required for emission sources at HWAD (DOE 2011).

3.5 HYDROLOGY

Surface hydrology. HWAD is located in an internally drained basin. Walker Lake, located approximately 8 km (5 miles) west of the project site, is the terminus for all surface runoff and groundwater flow in the basin.

The size and elevation of Walker Lake have been declining. The main cause of the decline is the diversion and consumptive use of water from streams in the watershed of the lake. Most stream flow in the watershed originates as snowmelt in the Sierra Nevada mountains to the west. Streams in the Sierra Nevada began being diverted for agricultural irrigation in the late 1800s; currently, most stream flow in the watershed is consumed by agriculture (USGS 2010). Since 1882, the lake level has dropped about (160 ft) (USGS 2010). During 2009 and the first nine months of 2010, the lake water elevation was between about 1,196 and 1,198 m (3,924 and 3,930 ft). At this level, the lake has a surface area of 122–126 km^2 (30,000–31,000 acres) (Lopes and Smith 2007).

As the water volume of Walker Lake has decreased, the quantity of dissolved solids it contains has not been reduced, so the salinity of the water has increased as a result of the loss of water volume (plus minor contributions from dissolved solids contained in the water that enters the lake). The US Geological Survey estimates that the lake had a total dissolved solids (TDS) concentration of about 2,500 mg/L in 1882; by 2010 the TDS concentration had increased to about 18,000 mg/L (USGS 2010), which is roughly half the TDS concentration in seawater.

Thomas (1995) estimated total annual inflow to the lake from all sources as 128 billion L (104,000 acre-ft), of which 94 billion L (76,000 acre-ft) came from the Walker River. He estimated that 169 billion L (137,000 acre-ft) was evaporated from the lake annually, meaning that an additional 41 billion L (33,000 acre-ft) of inflow would be needed annually to maintain the lake at its 1994 size and salinity. As the lake continues to shrink, the water volume lost to evaporation also decreases; at a lake area of 126 km^2 (31,000 acres), evaporation exceeds inflow by about 31 billion L (25,000 acre-ft).

There are no perennial streams in Walker Lake Valley; surface runoff occurs in the valley only after major rainfall events or unusual snowmelt, and the water seldom reaches Walker Lake. Intense local thunderstorms in the surrounding mountains can produce flash floods and debris flows that transport eroded sedimentary material from the mountains and deposit it in the alluvial fans that flank the valley (URS 2009).

Floodplains. Because HWAD is federal government property, the Federal Emergency Management Agency (FEMA) does not publish Flood Insurance Rate Maps (FIRMs) for it, but parts of HWAD appear on preliminary FIRMs published for adjacent nonfederal areas. These maps identify some portions of HWAD as floodplain areas associated with ephemeral streams (FEMA 2011). Flash flooding from precipitation in the surrounding mountains is the main potential hazard. Dikes have been constructed along the principal drainages through HWAD in order to reduce risks from flash flooding (URS 2009).

Groundwater hydrology. Groundwater occurs in the valley fill of Walker Lake Valley under both confined and unconfined conditions. At HWAD, depth to groundwater varies from about 1.5 m (5 ft) below ground surface near Walker Lake to about 61 m (200 ft) near the southern boundary of HWAD (URS 2009).

The principal directions of natural groundwater movement in the basin are (1) from recharge areas at the base of the surrounding mountains that form the edge of the basin toward the center of the valley and (2) northwest toward Walker Lake, which is a groundwater discharge area.

The safe annual yield from the valley fill aquifer in the HWAD area has been estimated at 5.67 billion L (4,600 acre-ft). In 1966, groundwater pumping by HWAD and the town of Hawthorne totaled approximately 3.45 billion L (2,800 acre-ft) (URS 2009).

The chemical quality of the groundwater in basins like the Walker Lake Valley is typically highest near the mountains at the basin perimeter, where recharge occurs, and declines along the direction of flow. TDS concentrations in two water supply wells located on an alluvial fan in the western part of the valley were approximately 500 and 400 mg/L. Wells closer to Walker Lake are reported to have higher dissolved solids concentrations (URS 2009).

There are no designated sole-source aquifers in Nevada (DOE 2011).

Water supply. HWAD obtains the majority of its potable water supply from streams in the Wassuk Range (part of the Walker River watershed) west of Walker Lake Valley. These surface water sources supply water of excellent quality and meet 99 percent of the installation's water needs during the months of November through May (URS 2009). During drier months, up to 40 percent of the installation's water comes from groundwater (URS 2009). HWAD has several groundwater wells that cannot be used for potable water supply because of naturally high levels of dissolved substances that exceed drinking water criteria. Substances whose concentrations exceed health-based criteria in one or more wells include fluoride, nitrates, and arsenic. Some wells that cannot be used for potable water supply may be used to supply water for purposes such as fire suppression and dust control (URS 2009). HWAD used a total of 311 million L (252 acre-ft) of water in 2002 (DOE 2011).

The town of Hawthorne obtains approximately 95 percent of its potable water supply from groundwater, with 5 percent coming from surface sources. The town has five wells, two of which provide most of the town's water. Groundwater is pumped into a reservoir and tank that can store up to 14.2 million L (3.75 million gal). HWAD is the backup supplier of potable water for the town (URS 2009).

3.6 BIOLOGICAL RESOURCES

Plants. The predominant vegetation type in Walker Lake Valley is the shadscale association (or shadscale vegetation zone) and its variants. This vegetation type is present on lake bed, alluvial plains, alluvial fans, and bajadas from the shore of Walker Lake up to an elevation of about 1,370 m (4,500 ft). Characteristic plants in this association are the desert shrubs shadscale (*Atriplex confertifolia*), budsage (*Artemisia spinescens*), and greasewood (*Sarcobatus baileyi*). In western Nevada, the soils on which this association is found are characteristically alkaline to a great depth (Billings 1949).

No federally listed threatened or endangered plant species have been identified at HWAD. One state-protected plant species, the sand cholla (*Opuntia pulchella*), is present on the site (URS 2009). This is a cactus, the collection and harvest of which is regulated under a state law that restricts the removal or possession for commercial purposes of cacti, yucca, or Christmas trees (Nevada Natural Heritage Program 2001; Nevada Natural Heritage Program 2008). The Nevada Natural Heritage Program lists the state conservation status of this species as S2S3, indicating uncertainty on its placement between the ranks S2, "imperiled due to rarity and/or other demonstrable factors," and S3, "rare and local throughout its range, or with very restricted range, or otherwise vulnerable to extinction." It is not, however, subject to any other state protection, it is not of concern to the Nevada Native Plant Society, and from a global perspective, its conservation rank is G4, "apparently secure, though frequently quite rare in parts of its range, especially at its periphery" (Nevada Natural Heritage Program 2001). In Nevada, the sand cholla is found on sandy soils in the desert, including dunes, dry-lake borders, river bottoms, washes, valleys, and plains, at elevations between 1,205 and 1,920 m (3,950 and 6,300 ft) (Nevada Natural Heritage Program 2001).

Terrestrial wildlife. HWAD has not been surveyed for its mammals. The most abundant terrestrial mammals reported from the lowland portion of HWAD are the black-tailed jackrabbit (*Lepus californicus*) and the white-tailed antelope ground squirrel (*Ammospermophillus leucurus)*. Mule deer also move between upland areas and the Walker Lake Valley (CH2M Hill 2007).

Feral horses are resident on HWAD, principally on the former lakebed of Walker Lake located south of the lake, where 126 horses were counted in January 2011 (Axtell 2012). HWAD is not part of any of the designated herd management areas in which the Bureau of Land Management (BLM) manages feral horses under the Wild Free-Roaming Horses and Burros Act of 1971 (Axtell 2012), but BLM can coordinate with HWAD to manage horses on depot land when HWAD determines that the feral horse population requires management (URS 2009). In 2010, plans were made to gather 104 horses from HWAD lands, but the gather was cancelled after BLM and HWAD were notified of public objections (BLM 2010a; Axtell 2012). Fencing was

installed to prevent horses from wandering onto US Route 95, where several horses had been killed in vehicle accidents (BLM 2010b; Axtell 2012).

Fifteen species of bats have been reported at HWAD, including 11 species that the Revised Nevada Bat Conservation Plan (Bradley et al. 2006) identifies as conservation species (URS 2009). The rafters and eaves of the installation's concrete warehouses provide habitat for bats, including state-protected species. Bats are the only mammal species found at the installation that are currently on Nevada state lists of protected species (CH2M Hill 2007). Conservation practices to protect bats at HWAD include preserving buildings known to be occupied by bats, preserving riparian habitat and pinyon-juniper forest habitat, prohibiting off-highway vehicles, and reducing or avoiding activities (such as recreational activity and pesticide spraying) that could disturb bats or their habitat (CH2M Hill 2007; URS 2009).

No mammals found at HWAD are currently federally listed as threatened or endangered (CH2M Hill 2007).

Approximately 185 bird species have been reported at HWAD. Walker Lake is a significant attractor for migratory birds, notably including the common loon (*Gavia immer*), the American white pelican (*Pelecanus erythrorhynchos*), grebes, sea gulls, terns, ducks, and other water birds. Few bird species are reported from the desert habitat of Walker Lake Valley; most of the birds reported at HWAD are associated with Walker Lake or with the mountainous parts of the installation (URS 2009; CH2M Hill 2007; DOE 2011). There are no federally listed threatened or endangered species at HWAD; however, the bald eagle (*Haliaeetus leucocephalus*) has been reported on the installation and is protected under the Bald and Golden Eagle Protection Act. The western burrowing owl *(Athene cunicularia)* is a state-protected species that could utilize habitat in Walker Lake Valley but has not been reported on HWAD. Additionally, several state-protected water birds are reported from Walker Lake. Pigeons *(Columba livia)* and common ravens *(Comus corax)* are abundant on parts of HWAD and cause damage to buildings. Their populations are controlled by removal of nests; also, a USFWS permit authorizes destruction of a limited number of nuisance ravens (CH2M Hill 2007).

A 1999 survey found 16 reptile species and two amphibian species on HWAD. None are subject to federal or state protection in Nevada. Reptiles reported were western whiptail (*Cnemidophorus tigris*), zebratailed lizard (*Callisaurus draconoides*), long-nosed leopard lizard (*Gambelia wislizenii*), Great Basin collared lizard (*Crotaphytus bicintores*), desert spiny lizard (*Sceloporus magister*), desert horned lizard (*Phrynosoma platyrhinos*), western fence lizard (*Sceloporus occidentalis*), sideblotched lizard (*Uta stansburiana*), night snake (*Hypsiglena torquata*), common kingsnake (*Lampropeltis getula*), western rattlesnake (*Crotalus viridis*), coachwhip (*Masticophis flagellum*), striped whipsnake (*Masticophis taeniatus*), speckled rattlesnake (*Crotalus mitchellii*), gopher snake (*Pituophis melanoleucus*), and long-nosed snake (*Rhinocheilus lecontei*). The two amphibians were western toad (*Bufo boreas*) and Great Basin spadefoot (*Scaphiopus intermontanus*). Some of these species are found only near water, but several are adapted to the desert habitat of Walker Lake Valley (CH2M Hill 2007; URS 2009). Lizards sometimes enter HWAD buildings (CH2M Hill 2007).

Most land in and near the 110 Area has been disturbed by past and ongoing HWAD activities. Past disturbance can be assumed to have diminished wildlife habitat value and promoted the spread of weedy flora, including nonnative plants (DOE 2011).

Aquatic biota. Walker Lake, part of which is on the HWAD property, provides habitat for three native fish species: Lahontan cutthroat trout (*Oncorhynchus clarki henshawi*), Lahontan tui chub (*Gila bicolor*), and Tahoe sucker (*Catostumus tahoensis*) and several aquatic invertebrates. Increasing salinity is, however, reducing the lake's viability as habitat for these aquatic biota and the migratory birds that utilize it as a stopover area.

The Lahontan cutthroat trout is federally listed as a threatened species. However, it no longer reproduces naturally in the Walker Lake watershed because the streams in which it formerly reproduced no longer have enough flow to support spawning (URS 2009). Since 1948, it has been maintained in Walker Lake solely by hatchery propagation and artificial stocking (Seiler et al. 2004). The Lahontan cutthroat trout is adapted to tolerate the high salinity levels encountered in terminal basins such as Walker Lake, but increasing salinity in the lake is considered a threat to its continuing survival (USGS 2010). Although the Lahontan cutthroat trout is a listed species, it is also a sport fish in Nevada and regulated fishing for consumption is allowed (URS 2009).

3.7 CULTURAL RESOURCES

Material culture. Archaeological evidence indicates that people have been using the Walker River watershed for the past 11,000 years. Campsites, gathering areas, hunting blinds, and hot springs identified on HWAD are evidence of Native American activities prior to the historic period. The historic period in the region began in the late 19th century, in connection with emigration to California and subsequent mining booms (DOE 2011).

Archaeological surveys on the HWAD installation have identified 116 prehistoric archaeological sites, of which 15 are deemed eligible for inclusion in the National Register of Historic Places, 91 are ineligible for inclusion, and 10 have unknown eligibility. There are 13 historic archaeological sites, of which three are deemed eligible for the National Register. As of 2009, 1,790 buildings and structures had been determined to be potentially eligible for the National Register (URS 2009), including World War II-era warehouses, such as those used for mercury storage (DOE 2011). No properties at HWAD have been nominated for National Register listing (URS 2009).

Thirty-four building types in the HWAD Personnel Area and 19 buildings or building types in the Industrial Area are considered to be important and have been documented according to Historic American Buildings Survey/Historic American Engineering Record procedures (URS 2009). The Advisory Council on Historic Preservation identified ammunition storage facilities from World War II and the Cold War, including certain facilities at HWAD, as historically significant properties for which documentation could be an appropriate means of fulfilling federal agency responsibilities under Section 106 of the National Historic Preservation Act (Nau 2006).

No traditional cultural properties or sacred sites have been formally identified at HWAD, but there have been no systematic inventories of these types of cultural resources (URS 2009).

Native American concerns. The Walker River Paiute Tribe, a federally recognized tribe associated with the Northern Paiute Tribe, occupies the Walker River Indian Reservation in Mineral County at the northern end of Walker Lake (DOE 2011). The Northern Paiute and their ancestors are believed to have lived in the region for the last 1,000 to 5,000 years (SWCA 2002).

Before European-Americans arrived in the region, Northern Paiutes led a semi-nomadic life, moving seasonally to utilize different ecological resources. Subsistence strategies included hunting, plant-gathering, and fishing. Plant foods included pine nuts and other seeds, roots and berries. Tule, willow, and sagebrush were used to make clothing, fishing nets, baskets, bird decoys, roofing, and small rafts. Fishing was very important for the Northern Paiutes, who fished rivers and lakes using a variety of techniques (SWCA 2002).

Very few specific places are mentioned in Northern Paiute oral tradition. Walker Lake (known as *Agai Pah*) is one location named in Northern Paiute creation accounts. Northern Paiute informants who have been interviewed by researchers identify Walker Lake as a feature of cultural significance for their people, and the Inter-Tribal Council of Nevada has specifically identified Walker Lake as a sacred place. In general, deep lakes and other bodies of water hold special significance for the Northern Paiute (SWCA 2002).

The Walker Lake Reservation was first established in the 19th century, when it included all of Walker Lake and had a total area of about 1,300 km^2 (320,000 ac). Its boundaries have changed substantially over time. A large reduction occurred in 1906, when Walker Lake and other lands were removed from the reservation area, reducing it to approximately 347 km^2 (85,760 acres) (SWCA 2002). In subsequent transactions, other lands were added to the reservation, bringing it up to its present area of 1,312 km^2 (324,323 acres) (Nevada Division of Water Resources 2011).

The reservation's main community is Schurz, located on the Walker River. The reservation has a population of approximately 1,200 (DOE 2011). Most of the land is held in trust by the United States (DOE 2011).

3.8 AESTHETICS AND NOISE

The visual environment of HWAD consists of low-profile military and industrial buildings in a setting of open range that is dominated by distant views of the Wassuk Range to the west and the Gillis Range to the east and north. The tallest structures at the depot are two 85-m (280-ft) water storage tanks located in the Central Magazine Area (DOE 2011).

No sound level measurements have been made to evaluate the ambient noise environment near HWAD. Noise sources at HWAD include heating, ventilating, and air-conditioning equipment; forklifts and other material-handling equipment; and vehicles. Also, some impulsive noise is generated from test firing and demolition of military munitions, weapons, and small arms. An environmental noise study concluded that noise levels emanating from onsite activities are compatible with the nearby residential areas and other noise-sensitive land uses in the town of Hawthorne. Other than HWAD, noise sources in the area include highway traffic and airport

operations at Hawthorne Municipal Airport. Neither the state of Nevada nor Mineral County has promulgated community noise standards (DOE 2011).

3.9 SERVICES AND UTILITIES

Electric power. Electrical service for HWAD and the town of Hawthorne is provided by NV Energy. HWAD is served by three 2,500-kW substations and one 5,000-kW substation (DOE 2011), for a total capacity of 12.5 MW. Reported annual electricity consumption in 2002 was 7,386 MW-hours (DOE 2011), which was well below the name plate capacity (less than 7 percent). Not all areas of the installation are served by electric distribution lines (DOE 2011). The 110 Area currently has 110-V electrical service in several buildings.

Fuels and steam. HWAD operates several oil-fired boilers to produce steam that is piped to other installation buildings for heat and some process uses. Some HWAD facilities use propane for space heating and hot water. HWAD and customers in the town of Hawthorne obtain propane from commercial suppliers (Amerigas and Valley Gas). Propane and fuel oil are stored in several tanks on the HWAD property (DOE 2011; URS 2009).

Water. HWAD operates a water supply and distribution system for the installation, using water sources discussed in Section 3.5.

Wastewater. HWAD manages sanitary wastewater and process wastewater by several methods.

Sanitary wastewater collected from the industrial and housing areas of HWAD formerly was treated in an onsite sewage treatment facility, from which treated effluent was discharged to an array of 20 onsite evaporation/percolation ponds (URS 2009). The onsite facility has been closed, and HWAD sanitary wastewater is now directed to a municipal wastewater treatment plant on the HWAD site that is operated by the town of Hawthorne. At the town treatment facility, wastewater is treated in a group of three oxidation-evaporation lagoons. These lagoons formerly allowed percolation to groundwater, but percolation no longer occurs due to an upgrade in the mid-1990s that added double liners and aeration systems (URS 2009).

Process wastewater from the Western Area Demilitarization Facility (WADF) Area is treated in a process wastewater system operated by HWAD, the effluent from which is reused or evaporated. Sanitary effluent from the WADF area is discharged to lined evaporation ponds without treatment (URS 2009; Nevada Division of Environmental Protection Bureau of Corrective Actions, undated).

Other areas on HWAD have septic systems that receive wastewater from bathrooms and some floor drains (URS 2009).

Solid waste. HWAD manages metallic and wood scrap material by selling it for reclamation through local auction sales and through the DLA Disposition Services (formerly known as the Defense Reutilization and Marketing Service). For waste that cannot be recycled or reused, there are two state-permitted landfills on the installation property. One landfill is used for disposal of operations-related waste and debris, including office and lunchroom waste, horticultural waste, and metal inert mock munitions. A second landfill is used for asbestos materials and chemically

treated wood. Both onsite landfills are unlined. Domestic waste from the installation's housing area is disposed at the Hawthorne town landfill (URS 2009). Hazardous waste is shipped to offsite licensed commercial facilities for management (DOE 2011).

Public safety. HWAD contractors provide security, fire protection and emergency response services on the installation property. Law enforcement is the responsibility of Mineral County, which had a force of 16 sworn police officers as of 2002 (DLA 2004a).

3.10 TRANSPORTATION AND TRAFFIC

Roads that provide access to HWAD include US Route 95 and State Routes 359 and 839. US Route 95, which crosses the center of the depot, is the main highway in the region. It connects HWAD and Hawthorne with Carson City and Reno to the north and the Las Vegas area to the south. State Route 359 traverses the Sierra Nevada mountains to the south of Hawthorne. State Route 839 is a secondary route to the north. The highest traffic counts in the local area are on US Route 95 just north of C Street in Hawthorne, where average annual daily traffic count was 5,000 vehicles per day as of 2008 (DOE 2011).

Rail access is available on an extensive network of onsite track connected to a railroad line that is owned by the US Army and connects to the Union Pacific main line via the Walker River Indian Reservation. The line experiences occasional activity, with a total of 474 incoming or outgoing railcars annually as of the early 2000s (DOE 2011).

Aviation facilities exist at the Hawthorne Industrial Airport, a general aviation airport owned by Mineral County and located on the northwest side of Hawthorne (DOE 2011).

3.11 HAZARDOUS MATERIALS

Past site operations and management practices at HWAD left unexploded ordnance and ordnance debris on some parts of the site, including Walker Lake, and introduced environmental contamination on the land and in groundwater. Wash water and industrial wastewater that was discharged to catch basins and percolation ponds contained explosives, acids, caustics, solvents, petroleum, oil, and lubricant residues, and paint slops (URS 2009). Contamination of groundwater has been identified in several areas of HWAD. Contaminants include nitrogen-based explosive compounds, volatile organic compounds, and petroleum products (Seiler et al. 2004; DOE 2011). Activities are currently ongoing to clear HWAD of ordnance and ordnance debris and to remediate contamination in HWAD soils and groundwater (URS 2009; DOE 2011). As Walker Lake recedes, unexploded ordnance and debris are exposed on the shoreline and are removed.

There are no contaminated sites or remediation activities in the immediate vicinity of the proposed site for the MMTS facility. There is one remediation site in the general vicinity of the proposed electric distribution connection. A leak in underground piping at a fuel tank site (HWAD building 336) released an estimated 18,900 to 26,500 L (5,000 to 7,000 gal) of gasoline into the subsurface. The site, which is about 90 m (300 m) west of the electrical vault where the distribution line would be connected, was excavated to a depth of 6 m (20 ft). The underground

storage tanks were taken out of service and the underground piping was removed along with about 460 m^3 (600 yd^3) of soil. After groundwater monitoring wells installed at the site found free product (i.e., gasoline) at the water table, the affected wells were bailed monthly for several years to remove gasoline. About 660 L (175 gal) were removed in this fashion, and free product was not observed after the mid-2000s (URS 2009).

The discovery (in 1998) of elevated concentrations of mercury in the blood of loons from Walker Lake led to concern about mercury contamination in the Walker River watershed that drains to the lake. Subsequent investigations have found elevated levels of mercury in water, sediment, invertebrates, and fish from some sites in the watershed. Sites with the highest concentrations of mercury are in streams that drain areas where gold was mined or milled in the late 19th century and in the reservoirs formed by damming those streams. Gold mining and milling were significant sources of mercury contamination because mercury is found in association with gold ore deposits and because large quantities of mercury were used in gold milling (Seiler et al. 2004).

3.12 SOCIOECONOMICS

HWAD is closely associated with the town of Hawthorne. Hawthorne, which is not incorporated as a municipality, is the county seat and administrative center of Mineral County, Nevada.

HWAD is the largest single employer in Mineral County, employing approximately 560 people. Many HWAD employees live in the town of Hawthorne or in government-provided housing. Based on regional commuting patterns, nearly all HWAD employees are assumed to reside in Mineral County or in the more populous counties of Lyon and Churchill to the north (DOE 2011).

The population of Hawthorne was 3,269 as of the 2010 US Census, when Mineral County had a total population of 4,772. Both Hawthorne and the county lost population between 2000 and 2010. The population of Hawthorne decreased by about 1 percent, and Mineral County experienced a 6 percent decrease. Of the 1,864 housing units counted in Hawthorne in the 2010 census, 1,539 (82.6%) were occupied, 80 (4.3%) were for rent, 22 (1.2%) were for sale, and 223 units (12.0%) were vacant for some other reason.

Community services. The Mineral County School District operates two public elementary schools, in Schurz (on the Walker Lake Indian Reservation) and Hawthorne, and a high school in Hawthorne (Mineral County School District 2008). The county-owned Mt. Grant General Hospital in Hawthorne is a critical-access public hospital with 11 acute-care beds and 24 long-term care beds (Mt. Grant General Hospital 2012).

Environmental justice. The 2010 US census found that minorities made up 21.3% of the population in Hawthorne. The black or African American population was 5.0% of the total, 3.2% were American Indians and Alaska natives, 1.5% were Asian, 0.2% were Native Hawaiian and other Pacific Islanders, 2.7% were “some other race,” and 3.8% were of two or more races. The Hispanic or Latino population was 9.7%, including persons of all races.

In Mineral County as a whole, minorities made up 31.5% of the population in 2010. The black or African American population was 4.1% of the total, 15.5% were American Indians and Alaska natives, 1.1% were Asian, 0.1% were Native Hawaiian and other Pacific Islanders, 2.1% were "some other race," and 4.4% were of two or more races. The Hispanic or Latino population was 9.1%, including persons of any race.

In the state of Nevada, minorities made up 45.9% of the population in 2010. The black or African American population was 8.1% of the total, 1.2% were American Indians and Alaska natives, 7.2% were Asian, 0.6% were Native Hawaiian and other Pacific Islanders, 12.0% were "some other race," and 4.7% were of two or more races. The Hispanic or Latino population was 26.5%, including persons of any race.

During 2006–2010, 11.6% of the population of Hawthorne, 19.1% of the population of Mineral County, and 11.9% of the population of the state of Nevada was below the poverty level, according to the US Census Bureau's American Community Survey.

4. ENVIRONMENTAL CONSEQUENCES

This section describes the impacts that could result from implementing the proposed action or the no-action alternative, as described in Section 2, in the context of the affected environment described in Section 3.

4.1 LAND USE

Land use impacts under either alternative would be inconsequential. Under the proposed action, all activities would be conducted in areas previously disturbed and historically used for industrial and military purposes. Activities would be compatible with other ongoing land uses at HWAD. There would be no impact on land uses outside HWAD boundaries.

Under the no-action alternative, there would be no change in land use conditions.

4.2 AIR QUALITY

For the proposed action, some potential for impacts on air quality exists in both the construction phase and the operating phase, but impacts would be negligible.

In the construction phase, trenching or other excavation to install electric and data lines to Building 110-66 would disturb site soils, resulting in increased fugitive dust emissions. The total area of disturbance would be very small [less than 0.06 hectare (0.15 acre)] and very short in duration, so the impact would be minimal. Fugitive dust generation could be further reduced by not scheduling the work on days when particularly high wind speeds are forecast and by employing other wind erosion control measures commonly used at HWAD (CH2M Hill 2007). Minor amounts of criteria pollutants such as carbon monoxide would be emitted by equipment used in excavation and in delivery and installation of the MMTS. The emissions of criteria pollutants would be of short duration and would not have the potential to affect compliance with ambient air quality standards.

During normal facility operation, there would be minimal air pollutant emissions from the MMTS.

Mercury vapor in the facility air would be controlled by the filtration system described in Section 2.1. There is no full-scale prototype for this system upon which its performance can be confirmed. Accordingly, mercury vapor emissions from the MMTS are estimated using conservative assumptions designed to provide a high-end upper-bound estimate of potential emissions. The activated carbon sorbent in the filtration system has a claimed mercury-capture effectiveness of greater than 99.9%. However, the fraction of mercury captured is conservatively assumed to be much lower in this installation because of the low initial concentration of mercury vapor and the expectation that the low air temperature will slow the chemical reactions that trap mercury. Assuming that air inside the ventilation system has a mercury vapor concentration of 15 $\mu g/m^3$ during the workday (the average concentration is expected to be less) and that the filtration system removes 60% of the mercury (higher filtration efficiency is anticipated), air

emerging from the MMTS would have a mercury vapor concentration of 6 µg/m^3 (6,000 ng/m^3). Mixing with the surrounding air should reduce concentrations to near background levels within a short distance from the MMTS.

Conservatively assuming that emissions occur at the 6 µg/m^3 mercury vapor concentration level for 24 hours a day and 365 days a year, maximum daily emissions of mercury would total about 450 mg (0.45 g) and total annual emissions would be about 165 g (about 3/8 lb). For comparison, this estimated daily emission of mercury is less than the amount contained in an oral thermometer of the type that used to be found in almost every American home (EPA 2012). These are very small quantities. They are a negligible fraction of both the 9.1-t/yr (10-tpy) limit on emission of a hazardous air pollutant that is set by the HWAD air permit (Section 3.4) and the values of 454 g (1 lb) per day and 1000 lbs per year that Nevada state regulations [NAC 445B.288.4(a)] designate as thresholds below which a source of hazardous air pollutant emissions may be deemed an "insignificant activity" that does not require an Air Quality Operating Permit.

Throughout both construction and operation, fugitive dust would be released by the use of motor vehicles on unpaved areas for employee access to the facility and for mercury movement by flat-bed trucks to and from MMTS and the other storage buildings. Employee transportation would also produce minor emissions of criteria air pollutants. The increase in vehicle activity would be small relative to current levels of motor vehicle activity at HWAD, so the increases in fugitive dust and criteria air pollutants would also be relatively small.

DLA Strategic Materials would obtain all necessary air emissions approvals for MMTS operations from the Nevada Division of Environmental Protection. Project-related emissions would have no effect on HWAD compliance with the air quality permit described in Section 3.4.

The no-action alternative would not result in any changes in current air quality conditions.

4.3 HYDROLOGY

There would be minimal impacts on hydrologic conditions under either alternative.

The proposed action would not use any water nor generate any wastewater. Construction of the MMTS would not affect the flow of floodwaters nor change the condition of any floodplains. Addition of the MMTS adjacent to HWAD Building 110-66 would slightly increase the area of impervious surface on the installation property. Any resulting increase in local stormwater runoff would have negligible effects due to the extremely low rainfall. No impact on groundwater recharge would be expected at this location, which is in a portion of the basin where essentially no natural recharge occurs. Because surface runoff from the site area is unlikely ever to reach surface water, the soil disturbance for installation of electric and communications lines would not lead to siltation of any surface water. The project would not use any storage tanks or piping that could leak to the environment, and there would be no discharge of fluids or other materials that could introduce contaminants to surface water. Containment systems incorporated in the MMTS design would prevent any spillage in that facility from being released to the environment. No fluids are expected to be handled or transferred outside the facility, but any accidental spills that did occur outdoors could be cleaned up before contaminant migration occurred.

HWAD and the town of Hawthorne would experience a small increase in water consumption due to water use by project workers and the family members of those workers who reside in Hawthorne. During facility operations, some of the water consumed by project workers would be retained in the local hydrologic system because their wastewater would be discharged to the onsite septic system. Seepage from the septic system would eventually reach groundwater, which flows to Walker Lake. However, because wastewater discharged to the town of Hawthorne's municipal wastewater treatment facility is evaporated, water consumed at home by workers and their families would be lost from the Walker River hydrologic system (including Walker Lake). Thus, water use at home by workers and their family members would contribute to the continuing depletion of Walker Lake. The effect on the hydrologic system would be extremely small in comparison with the losses occurring as a result of agriculture and other activities in other parts of the Walker River watershed.

The no-action alternative would not result in any changes in current hydrologic conditions and trends.

4.4 BIOLOGICAL RESOURCES

Under the proposed action, excavation to install the electric and data lines could result in some loss of natural vegetation, including the sand cholla cactus, and associated wildlife habitat. The potential for such impacts is low because of the previously disturbed condition of the affected sites, which likely has already eliminated natural plant communities. Potential impacts could be further reduced, however, by surveying the routes of the lines prior to the initiation of work to identify vegetation that should be protected. Individual plants thus identified can be protected by transplantation or by minor rerouting of a line.

Because the proposed action would not include alterations to any existing building, it should not adversely affect any bat habitat that may be present in HWAD buildings.

There would be almost no potential for project-related vehicles to collide with feral horses due to the distance and the presence of security fencing between the project site and the lakeshore area where these animals are found.

To the extent that the proposed action contributed to reductions in flow to Walker Lake, it could contribute to continuing impacts to waterfowl and fish that rely on the lake. However, as discussed in Section 4.3, any flow reduction resulting from the proposed action would be very small in comparison with other water losses affecting the lake.

The no-action alternative would not result in any changes in the condition of biological resources.

4.5 CULTURAL RESOURCES

Under the proposed action, excavation to install the electric and data lines could disturb archaeological sites if any were present. The potential for such impacts is low because of the previously disturbed condition of the sites, which likely has already resulted in the destruction of

any sensitive archaeological resources. There are no identified archaeological sites along the route of the proposed new electric distribution line.

The proposed action would not alter any existing building, so it would not adversely affect the historic attributes of existing HWAD buildings.

Walker Lake has cultural significance to the Northern Paiute, and to the extent that the proposed action contributed to reductions in flow to Walker Lake, it could contribute to adverse effects on this resource. However, as discussed in Section 4.3, any flow reduction resulting from the proposed action would be very small in comparison with other water losses affecting the lake.

The no-action alternative would not result in any changes in the condition of cultural resources.

4.6 AESTHETICS AND NOISE

Neither alternative would produce noticeable changes in the aesthetic or noise environment.

The low-profile MMTS facility that would be added to the HWAD site under the proposed action would be similar in visual character to other low-profile industrial buildings in the existing visual environment. If the MMTS facility requires new nighttime lighting, this would introduce lighting into an area of HWAD that is currently unlighted, but the visual impact would be limited to the immediate vicinity of the building. Noise sources added by project construction and operation (including excavation equipment, vehicles, and fans) would be similar to sources currently present at HWAD and would not perceptibly change sound levels at any HWAD boundary.

The no-action alternative would not result in any changes in the existing aesthetic and noise environment.

4.7 SERVICES AND UTILITIES

Utility systems at HWAD and in the town of Hawthorne have sufficient capacity to meet the additional demands associated with the proposed action. The extension of electric and data lines to Building 110-66 could have a beneficial impact, by enhancing the site's capacity to accommodate future uses that are not yet anticipated. Security, emergency response, and law enforcement services at HWAD and in the local community also should be able to handle the small increase in responsibilities associated with the proposed action.

The no-action alternative would not result in any changes in conditions affecting local services and utilities.

4.8 TRANSPORTATION AND TRAFFIC

Impacts on transportation and traffic would be negligible under either alternative. Local transportation systems would be able to accommodate the transportation activities associated

with the proposed action without adverse impacts on the systems or on traffic conditions. The no-action alternative would not result in any changes in conditions affecting transportation and traffic.

4.9 WASTE MANAGEMENT

4.9.1 Proposed Action

Wastes from the proposed action could be managed safely, resulting in only minor impacts.

Waste types. The two principal types of waste requiring management under the proposed action would be the mercury flasks that are emptied during MMTS operations and the drums in which the flasks were stored. Project activities would generate roughly 8,500 empty mercury flasks and 1,430 empty drums annually for 15 years. The empty flasks could still contain very small amounts of residual mercury (1 mL or less per flask. All wastes can be managed safely using existing capabilities and facilities that are considered to be protective of the environment and have sufficient capacity to accommodate the additional material. DLA will determine the ultimate disposal of the empty flasks and drums per existing federal, state, and DOD requirements, in consultation with the state of Nevada.

Some waste generated by MMTS operations would be subject to regulation as hazardous waste under RCRA. This includes inner packaging from drums, flask plugs, wipes, and chips from flask drilling operations.

Other project wastes would include wood pallets and metal bands used in materials handling in the warehouses, drip pans from under the drums (however, many drip pans would be reused for storage of 1-MT mercury containers), personal protective equipment (PPE), and incidental wastes such as items discarded by employees.

At the conclusion of the proposed mercury transfer project, the air filter media from the MMTS would be managed as waste. Ventilation ducts, fans, and other components of the MMTS hoods and ventilation system could require disposal, depending on the planned future use or disposition of the facility.

Management methods and impacts. All wastes generated by the proposed action would be managed using existing capabilities and facilities that are considered to be protective of the environment and that have sufficient capacity to accommodate the additional material.

Hazardous wastes, emptied mercury flasks, and used PPE would be segregated and packaged in empty drums and transported to a commercially available licensed hazardous waste facility in Beatty, Nevada, for landfill disposal. Annual waste volumes are estimated to be 41.2 m^3 (1,454 ft^3) of drummed hazardous waste and 103.4 m^3 (3,652 ft^3) of drummed mercury flasks and PPE; an annual total of 1,021 113-L (30-gal) drums. The equivalent of nine truckloads [each truckload would contain up to 24 pallets with five 113-L (30-gal) drums per pallet] of waste would be shipped each year. The US Ecology, Inc., facility near Beatty, Nevada, which is about 320 km (200 miles) from HWAD, has appropriate licenses and capabilities for safe disposal of these

wastes and reports adequate capacity to receive all materials that would require disposal over the life of the project, as well as any wastes from decommissioning the MMTS.

Wood pallets, metal bands, and drip pans not needed for waste packaging would be sold or recycled using existing HWAD capabilities and procedures. As noted above, drums not needed for waste packaging would be available for reuse on the depot, particularly for waste disposal. Other wastes incidental to the project could be disposed in HWAD's onsite operations landfill, which could easily accommodate the additional waste volume.

4.9.2 No-Action Alternative

The no-action alternative would not generate any new wastes requiring management, and it would not change any existing waste management systems.

4.10 WORKER AND PUBLIC HEALTH AND SAFETY

4.10.1 Proposed Alternative

In this section, potential impacts to worker and public health and safety are evaluated for the construction phase of the proposed action and for routine operational activities. Additionally, impacts of potential accidents are considered.

Construction. In the construction phase of the proposed action, construction accidents and traffic accidents would be the principal potential sources of adverse impact to worker and public health and safety. The potential for construction accidents would be relatively low due to the use of a prefabricated structure to house the MMTS.

No known contaminated sites could be encountered during construction activities; additionally, construction activities would not affect any ongoing remediation efforts. The only known contamination site near the areas affected by construction is the site of the gasoline leak described in Section 3.11. As described in Section 3.11, the site has been remediated to a depth of 6 m (20 ft), so there is no residual contamination present within the shallow depths [less than 2 m (6 ft)] that would be excavated for the proposed project.

Routine operation. The main potential threat to health and safety from routine operations, not accidents, would be inhalation of mercury vapor in the air. Ventilation and filtration equipment in the MMTS, as described in Section 2.1, would limit worker exposures inside the facility to de minimis levels. At the MMTS loading dock and other locations where workers would be present intermittently, workers could be exposed to a mercury vapor concentration of up to 6 $\mu g/m^3$ (the concentration in air emitted from the MMTS, as described in Section 4.2). There should be no health effects to workers receiving intermittent exposures to this concentration of mercury vapor, which is well below the 25 $\mu g/m^3$ concentration that the American Conference of Governmental Industrial Hygienists (ACGIH) has established as the recommended threshold limit value (TLV) for continuous exposure over an entire 8-hour workday and 40-hour workweek (the most stringent criterion applicable to workplace exposure to mercury in air). The ACGIH TLV is less than the recommended exposure limit (REL), 50 $\mu g/m^3$, set by the National Institute for Occupational Safety and Health (NIOSH) for continuous exposure over a 10-hour workday and a

40-hour workweek. Because the nearest routine work location for noninvolved personnel is about 2.7 km (1.7 miles) from the MMTS, exposures to noninvolved personnel outside the MMTS and its immediate vicinity would be well below the ATSDR's minimal risk level for chronic exposure to mercury of 0.2 $\mu g/m^3$ (200 ng/m^3), as described in Section 3.4.

If mercury were spilled inside the MMTS, the stainless steel floor pans would prevent the liquid mercury from escaping into the surrounding environment, but vapors could be released into air inside the MMTS. The real-time Mercury Monitoring System (MMS) would trigger a facility-evacuation alarm if a spill or any other failure caused air concentrations in the MMTS to reach the ACGIH-recommended TLV of 25 $\mu g/m^3$.

Because the exposure of the workers would be maintained below the ACGIH TLV, no adverse health effects would be expected for MMTS workers due to exposures within the facility. Workers who enter the facility when air concentrations exceed this level would be equipped with appropriate PPE, which would prevent exposures that might lead to adverse health effects.

Potential accidents. Potential industrial accidents for the proposed mercury transfer project would be similar to the potential accidents in mercury storage and associated handling that were evaluated in the *Mercury Management Environmental Impact Statement* (DLA 2004a) and the associated risk assessment report (DLA 2004b). The impacts of any mercury releases within the MMTS would, however, be lower than assessed in those documents because the spill containment, ventilation, and filtration systems in place in the new facility would minimize their effects. Detailed analysis of potential hazards and planning for hazard prevention and response are being conducted as part of the Chemical Accident Prevention Program (CAPP) required by the state of Nevada in order to obtain Nevada CAPP permits (Bradley et al. 2012; Giuliano et al. 2012; Noakes et al. 2012).

Accidents involving dropped pallets, drums, 3-L flasks, or 1-MT containers could cause injuries to personnel typical of a similar industrial accident not involving hazardous materials. As discussed in Section 2.1, workers would be trained in the potential hazards associated with the proposed action and would be provided with appropriate PPE. Procedures would be developed to minimize the potential hazards of industrial-type accidents associated with transporting or handling mercury within the 110 Area and the MMTS.

The DLA 2004 documents considered the probabilities and consequences of several potential accident scenarios and found negligible consequences and risks for all but two of the scenarios:

- a forklift fire combined with spillage of mercury and
- a spill resulting from an earthquake.

The forklift fire was assessed (DLA 2004b) as having the greatest consequences of any of the events analyzed; it could result in an involved facility worker being exposed to mercury vapor concentrations substantially higher than the 1,000-$\mu g/m^3$ benchmark level established by NIOSH as immediately dangerous to life (IDLH). The risk assessment report noted that the worker would be able to evacuate the area in much less time than the 30 minutes of exposure on which the IDLH threshold is based, reducing the potential for health effects (DLA 2004b). Exposures to non-involved personnel located more than 120 m (130 yd) away from the incident were judged

to be negligible (DLA 2004a). The forklift fire is the most severe potential accident for the proposed mercury transfer project. Because of the high physical integrity of the 1-MT containers and the 113-L (30-gal) drums containing the 3-L mercury flasks, spills such as those modeled in the 2004 analyses would be very unlikely, indicating a very low probability for the consequences described in the risk assessment report.

For the earthquake, the 2004 analysis conservatively assumed that an earthquake could result in building damage that would cause some mercury flasks to spill, briefly exposing a facility worker to a mercury concentration somewhat above the 1,000-$\mu g/m^3$ IDLH benchmark. Consequences to persons outside the facility and its immediate vicinity would depend on weather conditions but were judged to be low. The accident analyzed in the 2004 DLA documents would apply to transfer activities in the existing warehouses in the 110 Area, but design of the MMTS to meet stringent seismic specifications would preclude a similar accident in the new facility.

No potential has been identified for more severe accidents to occur as a result of extreme natural events potentially associated with the site. The MMTS would be designed to withstand wind speeds encountered in the region. Windblown dust episodes or volcanic ash deposition from an eruption in the Mono-Inyo Craters chain could disrupt the MMTS ventilation system, but suspension of facility operation during such events would be a prudent measure to minimize effects on the ventilation equipment. These types of events would not be expected to cause any releases of mercury.

The risk assessment report (DLA 2004b) considered the potential effect of wildfires on mercury storage but dismissed it as a concern, noting that vegetative fuel sources are limited in the vicinity of the HWAD warehouses, fire suppression capabilities are available onsite, and the warehouses have concrete floors, concrete walls, and fire-resistant transite roofing. The MMTS and the personnel trailer used for the proposed mercury transfer project would not have the fire resistance characteristics of the warehouses, but wildfire risk would be minimized for the mercury transfer project by the lack of vegetative fuel and the HWAD fire suppression capabilities.

4.10.2 No-Action Alternative

Under the no-action alternative, there would be no change in existing conditions related to worker and public health and safety.

4.11 SOCIOECONOMICS

Changes in local employment are the primary means by which the proposed action could affect socioeconomic conditions. The proposed action would produce small positive socioeconomic impacts in the Hawthorne area.

During construction, the proposed action would increase local employment by roughly 20 people for a period of no more than 3 months. Due to the temporary nature of this employment, the additional workers would not relocate to the area, so they would not increase the local population. Their presence would, however, provide a short-term benefit to local businesses by increasing spending in the community.

During operation, the proposed action would add about five workers to the local full-time workforce. Housing and community services could easily accommodate the additional workers, whose presence would increase revenues for local businesses.

Under the no-action alternative, there would be no change in local socioeconomic conditions.

4.12 ENVIRONMENTAL JUSTICE

Census data presented in Section 3.12 does not indicate the presence of either a minority population or a low-income population, as defined by the Council on Environmental Quality guidance for Executive Order 12898, in the town of Hawthorne, which is the area most likely to be affected by impacts of the proposed action. The percentage of minorities in the population of Hawthorne is less than that in Mineral County as a whole or in the entire state of Nevada. Similarly, the percentage of the population of Hawthorne with incomes below the poverty level is less than that reported in either Mineral County as a whole or in the entire state of Nevada.

Additionally, the foregoing discussions of environmental consequences of the proposed action and the no-action alternative did not identify any environmental impacts that would be considered "high and adverse."

Accordingly, there is no potential for either alternative to result in disproportionately high and adverse impacts to minority or low-income populations.

4.13 CUMULATIVE IMPACTS

Cumulative impacts are impacts on the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Cumulative impacts from past and ongoing activities at HWAD are generally reflected in the baseline conditions described in Section 3, Affected Environment. Regarding reasonable foreseeable future actions, no publicly announced future actions or changes in HWAD mission were identified that could contribute to cumulative impacts. Two ongoing trends in the region were identified and evaluated as potential contributors to cumulative impacts from the proposed action:

- decreasing size and increasing salinity of Walker Lake and
- invasive plants, including cheatgrass (*Bromus tectorum*), also known as downy brome, and halogeton (*Halogeton glomeratus*), also known as barilla and saltlover, entering desert shrub habitat, resulting in increased wildfire risk and reducing the availability of suitable forage for wildlife.

As discussed in Section 4.3, the proposed action would be a small contributor to the ongoing depletion of inflows to Walker Lake. Reductions in water availability from the proposed action would, however, be very small in comparison with other causes of the depletion of the lake.

Because disturbance of natural vegetation is one condition that increases a plant community's vulnerability to invasions, there is some possibility that the land disturbance resulting from installation of the electrical and data lines for the proposed project could contribute to the spread of invasive species. Impacts are unlikely, however, because the areas that would be disturbed by these activities were previously disturbed and may already have lost their ecological integrity. Implementation of the vegetation management protocols currently employed at HWAD CH2M Hill 2007) should reduce the potential for the project to inadvertently introduce or encourage invasive plants.

5. CONCLUSIONS

The potential environmental impacts of the proposed action have been assessed and compared with the impacts from the no-action alternative. The proposed action would have only minor adverse impacts and would have small positive impacts on socioeconomic conditions.

Control systems and management practices already incorporated in the plans for the proposed action would ensure avoidance of potential adverse impacts in the areas of air quality, waste management, and health and safety. Additionally, the assessment identifies some specific measures that could further reduce the minor impacts expected from the action.

- Some fugitive dust emissions could be avoided by measures such as not scheduling excavation on days when particularly high wind speeds are forecast.
- The small potential for adverse impacts on biological resources could be further reduced by conducting reconnaissance surveys along the routes of the planned electrical and data lines to help ensure that sensitive vegetation would be avoided during construction of these lines.
- Implementation of appropriate vegetation management measures in excavated areas should help ensure that the project does not contribute to the region-wide cumulative trend of invasive plants entering desert shrub habitat, resulting in increased wildfire risk and reduced wildlife forage.

The analysis in this assessment shows that the proposed action would produce no significant adverse impacts to the human environment within the context of the National Environmental Policy Act (NEPA).

The no-action alternative does not meet DLA Strategic Materials' purpose and need for action as described in Section 1.2.

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APPENDIX A – LIST OF PREPARERS

OAK RIDGE NATIONAL LABORATORY

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M.S., water resources management, University of Wisconsin-Madison
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Experience: 33 years

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Ph.D., physics, Vanderbilt University
M.S., astronomy, University of South Florida
B.S., astronomy, University of South Florida
Experience: 33 years

DEFENSE LOGISTICS AGENCY STRATEGIC MATERIALS

Harder, Charles
Experience: DoD employee – 30 years
Mercury Program Manager – 5 years
Commodity Logistics Specialist – 15 years

APPENDIX B – LIST OF PERSONS AND AGENCIES CONSULTED

Biological Resources – Terrestrial Wildlife

John Axtell, wild horse specialist, Carson City District (Carson City, NV), Bureau of Land Management, U.S. Department of the Interior, 775-885-6146

Services and Utilities

Tom Fitzgerald, Manager, Engineering and Planning, SOC NV LLC, Hawthorne Army Depot, 775-945-7436

APPENDIX C – DLA STRATEGIC MATERIALS PROPOSAL AND NEVADA DIVISION OF ENVIRONMENTAL PROTECTION - BUREAU OF AIR POLLUTION CONTROL LETTER OF AGREEMENT

Defense Logistics Agency (DLA)/DLA Strategic Materials[1]
Proposal for Initiation of Mercury Metal Inventory for Consolidation at the Hawthorne Army Depot (HWAD) in Hawthorne, Nevada
July 19, 2010

Repackaging Proposal and Milestones,

Proposal

Defense Logistics Agency (DLA) through its field activity, DLA Strategic Materials, proposes to Nevada Division of Environmental Protection (NDEP) to retire the current population of 76-lb commercial mercury flasks by transferring the mercury content into newer containers, which may be of similar or larger capacity. This re-containerization or repackaging effort will take place over a phased-in period of 10 to 20 years. Repackaging will be carried out in-house at HWAD.

Repackaging is a localized effort, eliminating movement of mercury through transportation to off-site location from Hawthorne Army Depot (HWAD). Therefore, mercury repackaging capability needs to exist at HWAD. DLA will establish this capability at HWAD by designing and constructing a unit operation facility for repackaging of mercury metal into newer containers. This unit operation will also consider health and safety issues to minimize exposure to mercury metal or its vapor to the operators engaged in transferring the metal.

DLA is evaluating a number of options for the in-house facility at HWAD. The primary consideration is whether the transfer station be a permanent station or something that is movable from one storage warehouse to another to minimize mass movement of current mercury containers to a permanent location for transfer. Other considerations are the size and capacity of the of the transfer station, new container capacities, and the transfer mechanisms employed. Regulatory considerations focused on Nevada's Chemical Accident Prevention Program (CAPP) will be addressed separately; however, requirements and recommendation that need to be considered from such bodies as the American Conference of Government and Industrial Hygienists; National Institute for Occupational Safety, etc. will be part of the design for the mercury transfer capability.

DLA will also consider whether the retirement could be carried out on a campaign basis versus over a long-term period as currently proposed.

Milestones for Proposed Activities

[1] DLA's field activity, Defense National Stockpile Center (DNSC) has been renamed as the DLA Strategic Materials as of July 19, 2010. The name change is effective as of July 19, 2019. Stationeries and other materials may still refer to DNSC until these resources have been exhausted as a cost-saving effort at DLA.

1. Repackaging Design and Construction

- Operation Concept and Preliminary Design Contract Award

  June 4, 2010 (Accomplished and substantiated with NDEP)

- Concept Submittal to DLA by contractor

  September 30, 2010

- Design Evaluation, Alteration, Rejection (in-house at DLA Strategic Materials)

  October 1 through 31, 2010

- Design Selection / Consultations with NDEP

  November 1 through 30, 2010

- Design Drawings Contract Award

  December 1, 2010

- Drawings Completion

  February 28, 2011

- Construction and Equipment Acquisition Award

  May 1, 2011

- Construction and Equipment Acquisition Completion

  November 30, 2011

- Utility Period

  December 1 – 31, 2011

- Testing and Shakedown

  January 1 – 31, 2012

2. Repackaging

- Fiscal Year 2012 - Five percent of the inventory (approximately 6,000 flasks and subject to Anti Deficiency Act.

- Fiscal Years 2013 and on – Based on experience gained during Fiscal Year 2012. Consult with NDEP in establishing throughputs for upcoming years subject to Anti Deficiency Act.

During mercury stock transfer period as well as during the storage period, any incident resulting in damage to the current 30-gal drum overpack or release of mercury from the drum overpack, which necessitates replacement of drum overpack with or without any transfer of mercury from flasks contained in that drum overpack to newer flasks, such a drum overpack may be placed in a 55-gallon steel salvage drum, properly secured with lid and locking ring and sent off-site for remediation and transfer of mercury into newer flasks as necessary. This need may no longer exist once the repackaging capability for a mercury transfer station is realized at HWAD.

Definitions

Repackaging: Repackaging is retirement of current population of 76-lb commercial mercury flasks by transferring their mercury contents into newer containers, which may be of similar or larger capacities. Repackaging does not take into account whether a flask is leaking or not. It simply involves retirement of current flask inventory over a phased-in period of 10 to 20 years.

Reflasking: Reflasking is the process of transferring mercury contents from a leaking flask to a newer flask. Reflasking is addressed as a response measure prior to construction and operation of the reflasking facility at HWAD to address health and safety concerns arising out of a mercury release or spill. Reflasking will be performed using off-site commercial facilities on incident basis.

Remediation: Remediation is the process of bringing materials and equipment exposed to mercury vapors to below the action level of 25 ug/cubic meter through decontamination procedures. Mercury vapors may not necessarily mean there was mercury metal release. It may simply be residual mercury contamination. In case of mercury metal release, remediation is the process of stabilizing release and containing release, followed by bringing materials and equipment exposed to mercury vapors to below the action level of 25 ug/cubic meter through decontamination procedures.

Failure to Perform

Mercury transfer and consolidation at HWAD is conditioned upon achievement of the milestones described above on construction and operational readiness of the proposed reflasking facility at HWAD. DLA Strategic Materials will exercise all due care in achieving the milestones. In the event DLA Strategic Materials experiences delays related to the construction of the reflasking facility, further mercury shipments to HWAD for consolidation and storage will cease in a manner described below to allow for achievement of the milestones related to the reflasking facility.

DLA Strategic Materials will first transfer its mercury inventory from the Somerville, NJ Depot. The transfer process will initiate in September of 2010 after the results of the earlier mercury transfer trial runs have been properly evaluated and the transfer process adjusted accordingly. Somerville inventory transfer will take approximately 4 months to complete with allowance for contingencies.

In case, construction of the reflasking facility is behind schedule, DLA Strategic Materials will reduce the number of mercury shipments from its Somerville, NJ Depot on a routine basis. In the rare event, the milestones are not being met on the reflasking facility; DLA Strategic Materials will cease additional shipments from its Somerville, NJ Depot until DLA Strategic Materials had time and opportunity to catch up with the promised milestones. This process allows for a smoother flow of shipments and enables DLA Strategic Materials to meet its transportation contracts commitments.

Once the Somerville inventory transfer is complete, DLA Strategic Materials will not initiate any mercury shipments from its New Haven, IN Depot or Warren, OH Depot. DLA Strategic Materials will solely focus itself on review of the progress made on the reflasking facility. DLA Strategic Materials will report the progress with reflasking facility to NDEP. DLA Strategic Materials will negotiate for additional time to meet the milestones with a new completion date if the original milestones have not been achieved. Once DLA Strategic Materials and NDEP have mutually agreed that the reflasking facility completion is back on target as originally proposed or with additional time as requested, DLA Strategic Materials will arrange for transportation contracts for the New Haven, IN Depot.

DLA Strategic Materials will prepare and present to NDEP mercury transfer schedule for its New Haven, IN inventory. Mercury inventory transfer from New Haven will be subject to progress on reflasking facility in the same manner as the Somerville Depot. Once the New Haven inventory transfer is complete in about a period of two months, DLA Strategic Materials will not initiate any mercury shipments from its Warren, OH Depot subject to review of progress made on the reflasking facility. DLA Strategic Materials will analyze the status of progress on the reflasking facility regardless of whether it is being achieved or not and will not proceed with any mercury transfers from the Warren, OH Depot.

Once the progress on reflasking facility has resumed to Parties' satisfaction, DLA Strategic Materials will present mercury transfer schedule for its Warren, OH inventory. Mercury inventory transfer from Warren will be subject to progress on reflasking facility in the same manner as previously mentioned. DLA Strategic Materials is confident that at this point in time such major commitments will have been made and milestones achieved that the Warren, OH inventory transfer process should not suffer any failures or drawbacks thus successfully completing the entire consolidation project.

ndep NEVADA DIVISION OF ENVIRONMENTAL PROTECTION
protecting the future for generations

STATE OF NEVADA
Department of Conservation & Natural Resources
DIVISION OF ENVIRONMENTAL PROTECTION

Jim Gibbons, Governor
Leo M. Drozdoff, P.E., Acting Director
Colleen Cripps, Ph.D., Acting Administrator

September 13, 2010

Mr. Ronnie L. Favors, Administrator
Defense Logistics Agency
Strategic Materials
8725 John J. Kingman Road
Fort Belvoir, Virginia 22060-6223

Re: MERCURY STOCKPILE TRANSFER TO HAWTHORNE ARMY DEPOT

Dear Mr. Favors:

Between August 23 and September 2, 2010, the Defense Logistics Agency (DLA) and Hawthorne Army Depot (HWAD) conducted a Pilot Scale transfer of a portion of the DLA's mercury stockpile. Representatives from the Nevada Division of Environmental Protection - Bureau of Air Pollution Control (NDEP-BAPC) were present to witness part of the project. The Pilot Scale transfer was to be completed prior to beginning transfer of the remaining portion of the stockpile in order for the NDEP-BAPC, DLA and HWAD to evaluate the SOPs and complete the training requirements of Nevada's Chemical Accident Prevention Program (CAPP).

I am happy to report that the Pilot Scale project was very successful and resulted in a more complete understanding of the details needed to complete the mercury transfer process. It is my understanding that subtle changes and updates to some of the mercury transfer SOPs are currently being prepared by HWAD as a result of information obtained during the Pilot project. Upon completion of those changes, HWAD will need to ensure that the SOPs will be made available for NDEP-BAPC review and that CAPP required training is conducted against the revised SOPs.

The NDEP-BAPC is also hereby providing approval for the DLA and HWAD to commence transfer and storage of the balance of the mercury stockpile in accordance with the schedule established in DLA's proposal for repackaging facility dated July 19, 2010.

If you have any questions, please feel free to contact me directly at (775) 687-9329.

Sincerely,

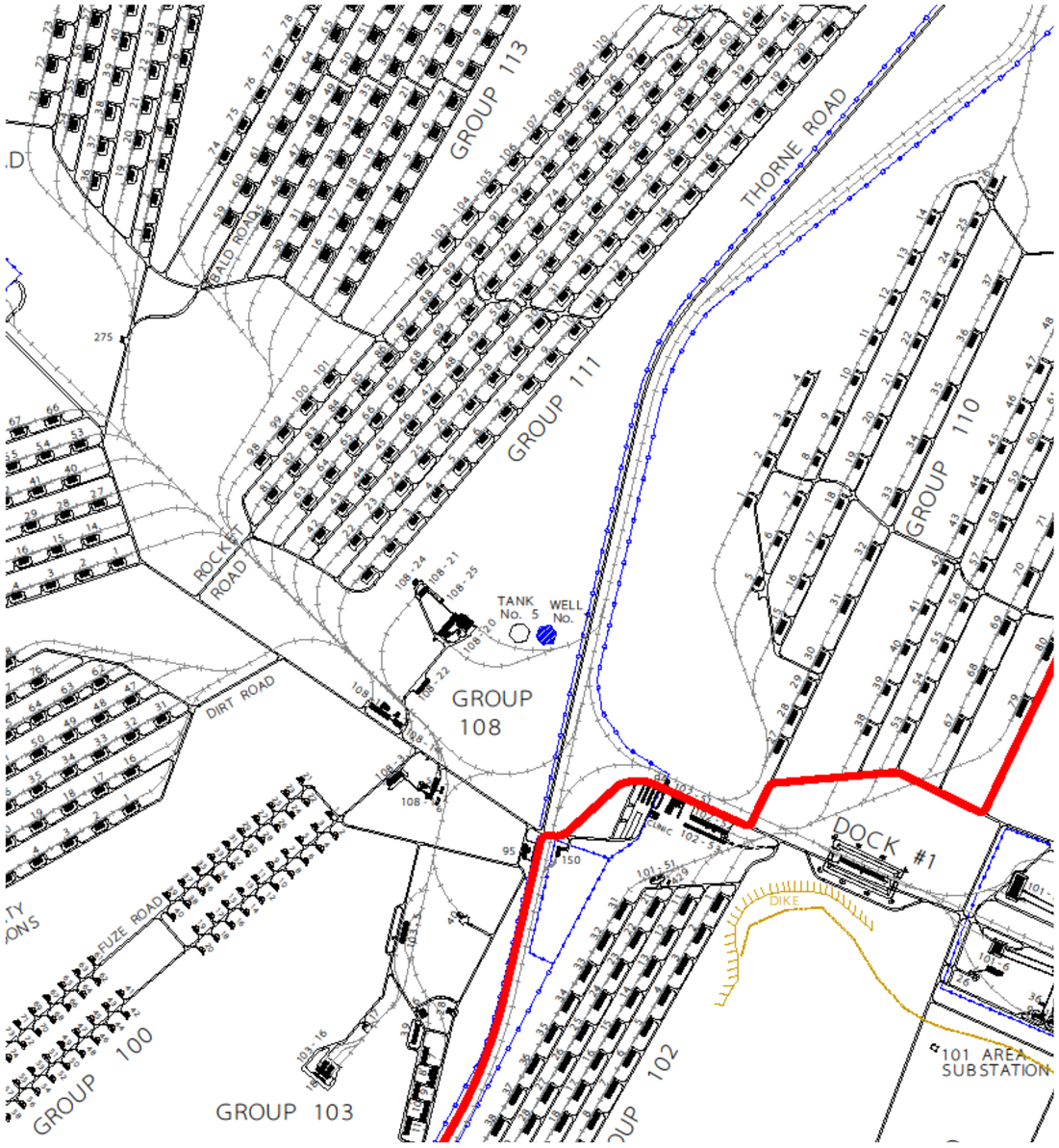
Michael Elges, Chief
Bureau of Air Pollution Control
Nevada Division of Environmental Protection

cc:

Leo M. Drozdoff
Director

Colleen Cripps
Administrator

William Johnson, Jr.
Lieutenant Colonel, U.S. Army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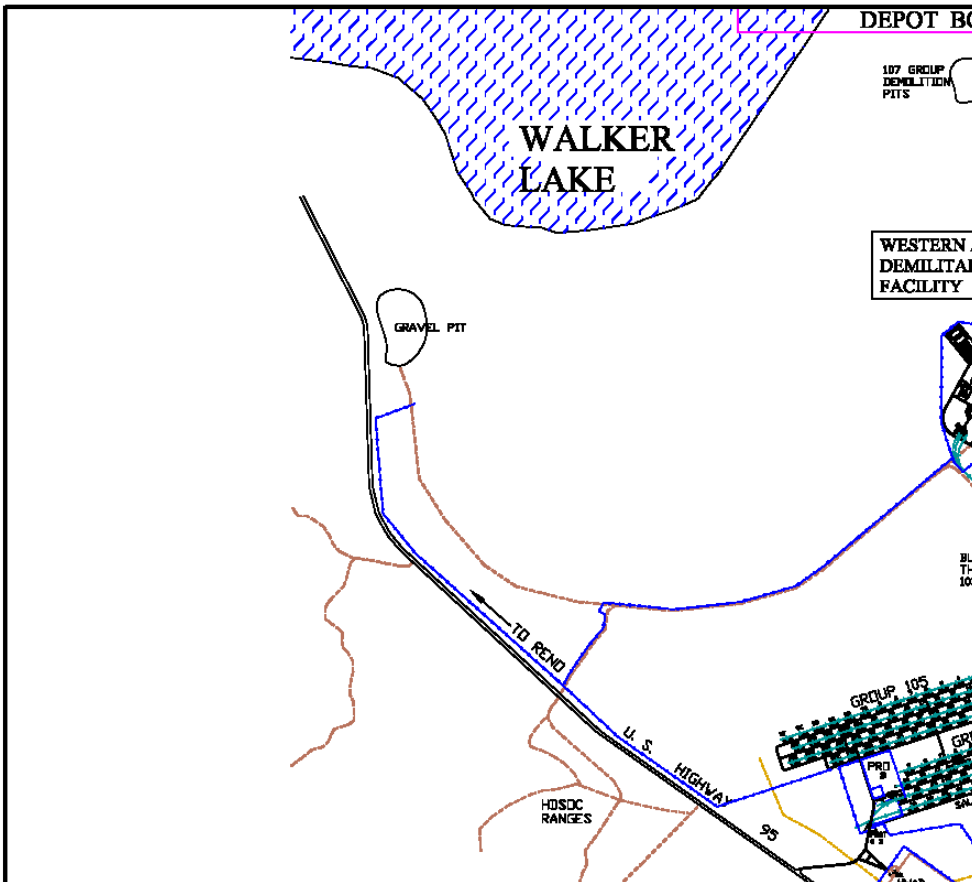
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