Appendix C
Facility and Activity Data

This appendix presents facility and activity data relevant to the mercury management alternatives. Table C–1 presents information on the storage alternatives (No Action and Consolidated Storage) for each of the Defense National Stockpile Center depots, New Haven, Somerville, and Warren; and the U.S. Department of Energy's Y–12 National Security Complex (Y–12). For each existing site, this table includes the following type of data:

- mercury inventory (e.g., number of flasks, drums, and pallets)
- warehouse features and construction (e.g., dimensions of warehouses, building materials, fraction of space occupied by stored mercury, and fire protection systems)
- facility operations requirements (e.g., resource requirements, waste generation, and mercury container replacement estimates)
- transportation requirements

Table C–2 presents similar information for consolidation at the Hawthorne Army Depot, PEZ Lake Development, and the Utah Industrial Depot.

Table C–3 provides information for the Sales Alternatives for each of the four existing storage facilities. This information includes the:

- quantity of mercury currently stored at each facility
- number of years required to sell the mercury inventory at each facility under the maximum allowable market rate alternative
- number of days required to ship the entire inventory of mercury if sold to one mercury mining company

Table C–1. Information on the No Action and Consolidated Storage Alternatives for Existing Storage Facilities

Parameter	New Haven Depot		Somerville Depot		Warren Depot		Y–12	
	No Action	Consolidated Storage	No Action	Consolidated Storage	No Action	Consolidated Storage	No Action	Consolidated Storage[a]
General Information								
Mercury inventory (metric tons)	557	4,436	2,617	4,436	563	4,436	699	NA
Number of flasks	16,151	128,662	75,880	128,662	16,355	128,662	20,276	NA
Number of drums	2,692	21,444	12,647	21,444	2,726	21,444	3,379[b]	NA
Number of pallets	538	4,289	2,529	4,289	545	4,289	676[b]	NA
Building length, width, and height (feet) for mercury sections	180×240×16	Same as No Action	200×200×15	Same as No Action	200× 200×16	Same as No Action	150×90×20	NA
Total warehouse space available (square feet)	1,104,730	Same as No Action	1,026,065	Same as No Action	1,381,082	Same as No Action	14,000	NA
Building area occupied (square feet)	43,200	216,000	80,000	200,000	40,000	200,000	4,400	NA
Fraction of space occupied by stored mercury	0.039	0.196	0.078	0.195	0.029	0.145	0.326	NA
Number of building sections for mercury	1	5	2	5	1	5	1	NA

[a] Consolidation would not occur at Y–12 because of insufficient space in the building and storage of DNSC mercury is not consistent with Y–12's mission.

[b] Number of drums and pallets that would be used if mercury flasks are overpacked.

Table C–1. Information on the No Action and Consolidated Storage Alternatives for Existing Storage Facilities (Continued)

Parameter	New Haven Depot		Somerville Depot		Warren Depot		Y–12	
	No Action	Consolidated Storage	No Action	Consolidated Storage	No Action	Consolidated Storage	No Action	Consolidated Storage[a]
General Information (continued)								
Building construction	Sealed, concrete floors; concrete block walls; wood support beams; single-ply, modified bitumen roof	Same as No Action	Sealed, concrete floors; block walls; steel support beams; single-ply, mechanically fastened rubber roof	Same as No Action	Sealed, concrete floors; concrete block walls; steel support beams; roof is foam over gypsum board	Same as No Action	Concrete block structure, designed and built for the storage of mercury; steel support beams; roof is gypsum (4-ply and asphalt)	NA
Features that prevent unauthorized entry	Armed guards on gate, 7 days a week, 24 hours per day; padlocked warehouses; barbed wire on perimeter fence; restricted access to mercury storage area; sign-in log maintained	Same as No Action	Armed guards on gate, 7 days a week, 24 hours per day; padlocked warehouses; 6-foot high perimeter fence with triple strand of barded wire; canted out, restricted access to mercury storage area; sign-in log maintained	Same as No Action	Armed guards on gate, 7 days a week, 24 hours per day; padlocked warehouses; 6-foot high perimeter fence with triple strand of barded wire; canted out, restricted access to mercury storage area; sign-in log maintained	Same as No Action	Locked warehouse, located in a secure area with 24-hour armed guards on gate; area protected by a perimeter intrusion detection and alarm system; outside patrol daily	NA

Table C–1. Information on the No Action and Consolidated Storage Alternatives for Existing Storage Facilities (Continued)

	New Haven Depot		Somerville Depot		Warren Depot		Y–12	
Parameter	**No Action**	**Consolidated Storage**	**No Action**	**Consolidated Storage**	**No Action**	**Consolidated Storage**	**No Action**	**Consolidated Storage[a]**
General Information (continued)								
Fire protection systems	Dry charge sprinkler system; fire extinguishers	Same as No Action	Dry charge sprinkler system; fire extinguishers	Same as No Action	Dry charge sprinkler system; fire extinguishers	Same as No Action	Dry-pipe sprinkler system	NA
Height of building vents (feet)	16	Same as No Action	18	Same as No Action	16	Same as No Action	13	NA
Features that prevent mercury spills and mercury from escaping the facility	Catch trays beneath sealed drums; sealed floors; no floor drains	Same as No Action	Catch trays beneath sealed drums; sealed floors; no floor drains	Same as No Action	Catch trays beneath sealed drums; sealed floors; no floor drains	Same as No Action	Sealed floor slopes to a sealed catch basin; no floor drains	NA
Extent of monitoring for mercury	Visual inspection includes monitoring air in warehouse using hand-held mercury vapor analyzer; personnel monitoring as required to check against permissible exposure level; baseline medical monitoring for all personnel	Same as No Action	Visual inspection includes monitoring air in warehouse using hand-held mercury vapor analyzer; personnel monitoring as required to check against permissible exposure level; baseline medical monitoring for all personnel	Same as No Action	Visual inspection includes monitoring air in warehouse using hand-held mercury vapor analyzer; personnel monitoring as required to check against permissible exposure level; baseline medical monitoring for all personnel	Same as No Action	DNSC inspections every 6 months that include air monitoring with a mercury vapor analyzer; personnel monitoring as required to check against permissible exposure level; baseline medical monitoring for all personnel	NA

Table C–1. Information on the No Action and Consolidated Storage Alternatives for Existing Storage Facilities (Continued)

Parameter	New Haven Depot		Somerville Depot		Warren Depot		Y–12	
	No Action	Consolidated Storage	No Action	Consolidated Storage	No Action	Consolidated Storage	No Action	Consolidated Storage[a]
General Information (continued)								
Mercury storage configuration	Six mercury flasks stored in a plastic lined, 30-gallon drum; five drums are placed on a catch tray on top of wooden pallet (pallets are not stacked to facilitate periodic inspection)	Same as No Action	Six mercury flasks stored in a plastic lined, 30-gallon drum; five drums are placed on a catch tray on top of wooden pallet (pallets are not stacked to facilitate periodic inspection)	Same as No Action	Six mercury flasks stored in a plastic lined, 30-gallon drum; five drums are placed on a catch tray on top of wooden pallet (pallets are not stacked to facilitate periodic inspection)	Same as No Action	Mercury stored in steel flasks, in wooden box pallets, stacked two high; about 45 flasks per pallet (catch tray not required because floors are sealed)	NA
Major facility modifications	None	None	None	None	None	None	None	NA
Facility Operations								
Number of FTEs associated with mercury storage	0.24	1.90	1.12	1.90	0.24	1.90	0.046	NA
Electrical usage (KWh)[c]	5,116	25,580	10,232	25,580	5,116	25,580	197	NA
Propane	At year 40, 15 gallons per fork lift per day	Same as No Action	At year 40, 15 gallons per fork lift per day	Same as No Action	At year 40, 15 gallons per fork lift per day	Same as No Action	15 gallons per fork lift per day	NA
Fuel oil (gal/yr)	0	0	0	0	0	0	0	NA
Potable water (gal/yr)	1,352	10,767	6,352	10,767	1,367	10,767	261	NA
Overpack drum replacement	None	None	None	None	None	None	None	NA

[c] 5,116 kilowatt-hours multiplied by number of sections. Value for Y–12 was divided by 26 to account for difference in inspection frequency.

Table C–1. Information on the No Action and Consolidated Storage Alternatives for Existing Storage Facilities (Continued)

Parameter	New Haven Depot		Somerville Depot		Warren Depot		Y–12	
	No Action	Consolidated Storage	No Action	Consolidated Storage	No Action	Consolidated Storage	No Action	Consolidated Storage[a]
Facility Operations (continued)								
Flask replacement[d]	120	956	564	956	121	956	151	NA
Pallet replacement	None	None	None	None	None	None	151[e]	NA
Catch tray replacement	None	None	None	None	None	None	None	NA
Sanitary wastewater (gal/yr)	1,300	10,353	6,108	10,353	1,314	10,353	251	NA
Waste flasks (ft^3)	60	478	282	478	61	478	75	NA
Hazardous waste (ft^3)[lb][f]	60 [1,200]	478 [9,560]	282 [5,640]	478 [9,560]	61 [1,220]	478 [9,560]	75 [1,500]	NA
Solid, nonhazardous waste (ft^3)	60	478	282	478	61	478	75	NA
Annual Truck Trips Associated with Mercury Storage								
New flasks	1 (at year 40)	Same as No Action	1 (at year 40)	Same as No Action	1 (at year 40)	Same as No Action	1 per year	NA
Waste flasks (sent to retort facility)	1 (at year 40)	Same as No Action	1 (at year 40)	Same as No Action	1 (at year 40)	Same as No Action	1 per year	NA
Hazardous waste	1 (at year 40)	Same as No Action	1 (at year 40)	Same as No Action	1 (at year 40)	Same as No Action	1 per year	NA
Nonhazardous waste	1 (at year 40)	Same as No Action	1 (at year 40)	Same as No Action	1 (at year 40)	Same as No Action	1 per year	NA

[d] The number of flasks requiring replacement was estimated using information for suspected leaking flasks at the New Haven Depot; 152 possible leaking flasks in a 55-year period equals 3 per year or 120 leaking flasks over the 40-year storage period. The number of leaking flasks at the other sites was estimated using the leakage rate from the New Haven Depot adjusted for the different number of flasks stored at the other sites.

[e] Worst-case scenario.

[f] Hazardous waste includes personal protective equipment, cushioning pads, liners, and wipes. Assumed to have a density of 20 pounds per cubic foot.

Table C–1. Information on the No Action and Consolidated Storage Alternatives for Existing Storage Facilities (Continued)

Parameter	New Haven Depot		Somerville Depot		Warren Depot		Y–12	
	No Action	Consolidated Storage	No Action	Consolidated Storage	No Action	Consolidated Storage	No Action	Consolidated Storage[a]
Transport to Consolidated Storage Facility								
Process used to transport the mercury to the storage location	NA	Overpacked flasks are shipped in closed vans; drums are belly banded to each other on pallets; and forklift is used to load onto truck	NA	Overpacked flasks are shipped in closed vans; drums are belly banded to each other on pallets; and forklift is used to load onto truck	NA	Overpacked flasks are shipped in closed vans; drums are belly banded to each other on pallets; and forklift is used to load onto truck	NA	NA
Number of flasks, pallets, and overpacks replaced before transport	NA	None	NA	None	NA	None	NA	NA
Truck Transport[g]								
Number of pallets per truck (weight limited)	NA	14	NA	14	NA	14	NA	NA
Number of trucks to transport mercury	NA	268	NA	126	NA	267	NA	NA
Number of truck trips[h]	NA	536	NA	252	NA	534	NA	NA
Duration of transport (days)[i]	NA	91	NA	25	NA	91	NA	NA

[g] 40,000-pound capacity, closed vans.

[h] Estimated as twice the number of trucks used to transport the mercury as listed in the preceding row. Assumes two trips for each truck; one onto the site to deliver the mercury, and one leaving the site when empty.

[i] Assumes two trucks per storage location per day.

Table C–1. Information on the No Action and Consolidated Storage Alternatives for Existing Storage Facilities (Continued)

Parameter	New Haven Depot		Somerville Depot		Warren Depot		Y–12	
	No Action	Consolidated Storage	No Action	Consolidated Storage	No Action	Consolidated Storage	No Action	Consolidated Storage[a]
Truck Transport[g] (continued)								
Number of FTEs associated with loading and unloading	NA	0.31	NA	0.14	NA	0.31	NA	NA
Number of FTEs to transport	NA	1.30	NA	0.67	NA	0.96	NA	NA
Rail Transport[j]								
Number of pallets per railcar (space limited)	NA	28	NA	28	NA	28	NA	NA
Number of railcars to transport mercury	NA	134	NA	63	NA	134	NA	NA
Number of rail trips[k]	NA	268	NA	126	NA	268	NA	NA
Duration of transport (days)[l]	NA	91	NA	25	NA	91	NA	NA
Number of FTEs associated with loading and unloading	NA	0.31	NA	0.14	NA	0.31	NA	NA
Number of FTEs to transport	NA	0.03	NA	0.02	NA	0.03	NA	NA

[j] Standard, 59-foot, 75-ton capacity boxcar.

[k] Estimated as twice the number of railcars used to transport the mercury as listed in the preceding row. Assumes two trips for each railcar; one onto the site to deliver the mercury, and one leaving the site when empty.

[l] Assumes one railcar per day per storage location.

Note: Assumptions—1 FTE is equal to 1,744 hours per year; 52 weeks per year; 26 gallons per day per person water use; 25 gallons per day per person sanitary wastewater generation.

Key: DNSC, Defense National Stockpile Center; FTE, full-time equivalent; ft^3, cubic foot; gal/yr, gallons per year; kg, kilograms; KWh, kilowatt-hour; lb, pound; m, meter; NA, not applicable; Y–12, U.S. Department of Energy's Y–12 National Security Complex.

Source: Lynch 2002.

Table C–2. Information on the Consolidated Storage Alternative for Additional Candidate Sites

Parameter	Hawthorne Army Depot	PEZ Lake Development	Utah Industrial Depot
General Information			
Mercury inventory (metric tons)	4,436	4,436	4,436
Number of flasks	128,662	128,662	128,662
Number of drums	21,444	21,444	21,444
Number of pallets	4,289	4,289	4,289
Building length, width, and height (feet)	200×50×35[a]	500×180×24[b]	500×180×16[c]
Number of buildings used	20[a]	2[b]	2[c]
Building construction	Concrete floor, walls and columns with steel roof trusses and transite roofing[a]	Concrete floor and walls with wood ceiling support beams and roof trusses[d]	Concrete floor with wood, walls, ceilings, roof, and ceiling support beams. Exterior protected by concrete or asbestos shake siding[c]
Features that prevent unauthorized entry	Locked and alarmed doors, security system, security patrols	Locked and alarmed doors, security system, security patrols	Locked and alarmed doors, security system, security patrols
Fire protection systems	Fire suppression system, fire extinguishers, and fire alarms	Dry pipe sprinkler system, fire extinguishers, and fire alarms	Dry pipe sprinkler system, fire extinguishers, and fire alarms
Height of building vents	Wall vents 3 feet 6 inches off the ground; roof vents 35 feet high[a]	None[b]	Wall vents 4 feet off the ground; roof vents 16 feet high[e]
Features that prevent mercury spills and mercury from escaping the facility	Catch trays beneath sealed drums; sealed floors; no floor drains	Catch trays beneath sealed drums; sealed floors; no floor drains	Catch trays beneath sealed drums; sealed floors; no floor drains
Extent of monitoring for mercury	Periodic visual inspection includes monitoring air in warehouse using hand-held mercury vapor analyzer; personnel monitoring as required to check against permissible exposure level; baseline medical monitoring for all personnel	Periodic visual inspection includes monitoring air in warehouse using hand-held mercury vapor analyzer; personnel monitoring as required to check against permissible exposure level; baseline medical monitoring for all personnel	Periodic visual inspection includes monitoring air in warehouse using hand-held mercury vapor analyzer; personnel monitoring as required to check against permissible exposure level; baseline medical monitoring for all personnel
Mercury storage configuration	Six mercury flasks stored in a plastic lined, 30-gallon drum; five drums are placed on a catch tray on top of wooden pallet (pallets are not stacked to facilitate periodic inspection)	Six mercury flasks stored in a plastic lined, 30-gallon drum; five drums are placed on a catch tray on top of wooden pallet (pallets are not stacked to facilitate periodic inspection)	Six mercury flasks stored in a plastic lined, 30-gallon drum; five drums are placed on a catch tray on top of wooden pallet (pallets are not stacked to facilitate periodic inspection)
Major facility modifications	None	None	None

Table C–2. Information on the Consolidated Storage Alternative for Additional Candidate Sites (Continued)

Parameter	Hawthorne Army Depot	PEZ Lake Development	Utah Industrial Depot
Facility Operations			
Number of FTEs associated with mercury storage	1.90	1.90	1.90
Electrical usage (KWh)	0	25,580	25,580
Propane	At year 40, 15 gallons per fork lift per day	At year 40, 15 gallons per fork lift per day	At year 40, 15 gallons per fork lift per day
Gasoline (gal/yr)	900	0	0
Potable water (gal/yr)	10,767	10,767	10,767
Overpack drum replacement	None	None	None
Flask replacement[f]	956	956	956
Pallet replacement	None	None	None
Drip pan replacement	None	None	None
Sanitary wastewater (gal/yr)	10,353	10,353	10,353
Waste flasks (ft^3)	478	478	478
Hazardous waste (ft^3) [lb][g]	478 [9,560]	478 [9,560]	478 [9,560]
Solid, nonhazardous waste (ft^3)	478	478	478
Annual Truck Trips Associated with Mercury Storage			
New flasks	1 (at year 40)	1 (at year 40)	1 (at year 40)
Waste flasks (sent to retort facility)	1 (at year 40)	1 (at year 40)	1 (at year 40)
Hazardous waste	1 (at year 40)	1 (at year 40)	1 (at year 40)
Nonhazardous waste	1 (at year 40)	1 (at year 40)	1 (at year 40)
Transport to Consolidated Storage Facility			
Process used to transport the mercury to the storage location	Overpacked flasks are shipped in closed vans; drums are belly banded to each other on pallets; and forklift is used to load onto truck	Overpacked flasks are shipped in closed vans; drums are belly banded to each other on pallets; and forklift is used to load onto truck	Overpacked flasks are shipped in closed vans; drums are belly banded to each other on pallets; and forklift is used to load onto truck
Number of flasks, pallets, and overpacks replaced before transport	None	None	None
Truck Transport[h]			
Number of pallets per truck (weight limited)	14	14	14
Number of trucks to transport mercury	308	308	308
Number of truck trips[i]	616	616	616
Duration of transport (days)[j]	91	91	91
Number of FTEs associated with loading and unloading	0.31	0.31	0.31
Number of FTEs to transport	7.07	1.08	5.66

Table C–2. Information on the Consolidated Storage Alternative for Additional Candidate Sites (Continued)

Parameter	Hawthorne Army Depot	PEZ Lake Development	Utah Industrial Depot
Rail Transport[k]			
Number of pallets per railcar (space limited)	28	28	28
Number of railcars to transport mercury	156	156	156
Number of rail trips[l]	312	312	312
Duration of transport (days)[m]	91	91	91
Number of FTEs associated with loading and unloading	0.31	0.31	0.31
Number of FTEs to transport	0.15	0.03	0.13

[a] Downs 2002.
[b] Palumbo 2002a.
[c] Smith 2002a.
[d] Palumbo 2002b.
[e] Smith 2002b.
[f] The number of flasks requiring replacement was estimated using information for suspected leaking flasks at the New Haven Depot; 152 possible leaking flasks in a 55-year period equals 3 per year or 120 leaking flasks over the 40-year storage period. The number of leaking flasks at the other sites was estimated using the leakage rate from the New Haven Depot adjusted for the different number of flasks stored at the other sites.
[g] Hazardous waste includes personal protective equipment, cushioning pads, liners, and wipes. Assumed to have a density of 20 pounds per cubic foot.
[h] 40,000-pound capacity, closed vans.
[i] Estimated as twice the number of trucks used to transport the mercury as listed in the preceding column. Assumes two trips for each truck; one onto the site to deliver the mercury, and one leaving the site when empty.
[j] Assumes two trucks per day per storage location.
[k] Standard, 59-foot, 75-ton capacity boxcar.
[l] Estimated as twice the number of railcars used to transport the mercury as listed in the preceding column. Assumes two trips for each railcar; one onto the site to deliver the mercury, and one leaving the site when empty.
[m] Assumes one railcar per day per storage location.

Key: FTE, full-time equivalent; ft^3, cubic foot; gal/yr, gallons per year; KWh, kilowatt-hour; lb, pound.

Note: Assumptions—1 FTE is equal to 1,744 hours per year; 52 weeks per year; 26 gallons per day per person water use; 25 gallons per day per person sanitary wastewater generation.

Table C–3. Information for the Sales Alternatives

Parameter	New Haven Depot	Somerville Depot	Warren Depot	Y–12	Total
General information					
Quantity of mercury	557 metric tons 16,151 flasks	2,617 metric tons 75,880 flasks	563 metric tons 16,355 flasks	699 metric tons 20,276 flasks	4,436 metric tons 128,662 flasks
Percent of total DNSC inventory	12.6%	59.0%	12.7%	15.8%	100%
Sale at the Maximum Allowable Market Rate					
Number of years to sell mercury[a]	13	26	14	15	NA
Sales to Reduce Mercury Mining					
Days required to ship mercury[b]	20	91	20	25	NA
Number of trucks to transport mercury[c]	39	181	39	49	308
Number of railcars to transport mercury[c]	20	91	20	25	156

[a] Assumption: total of 5,000 flasks (172.4 metric tons) per year; sold uniformly from each depot.
[b] Assumption: shipping 840 flasks (29 metric tons) per depot per day equals 2 trucks or 1 railcar per depot per day.
[c] Multiply by 2 to get numbers of truck or rail trips.
Key: %, percent; DNSC, Defense National Stockpile Center; NA, not applicable; Y–12, U.S. Department of Energy's Y–12 National Security Complex.

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