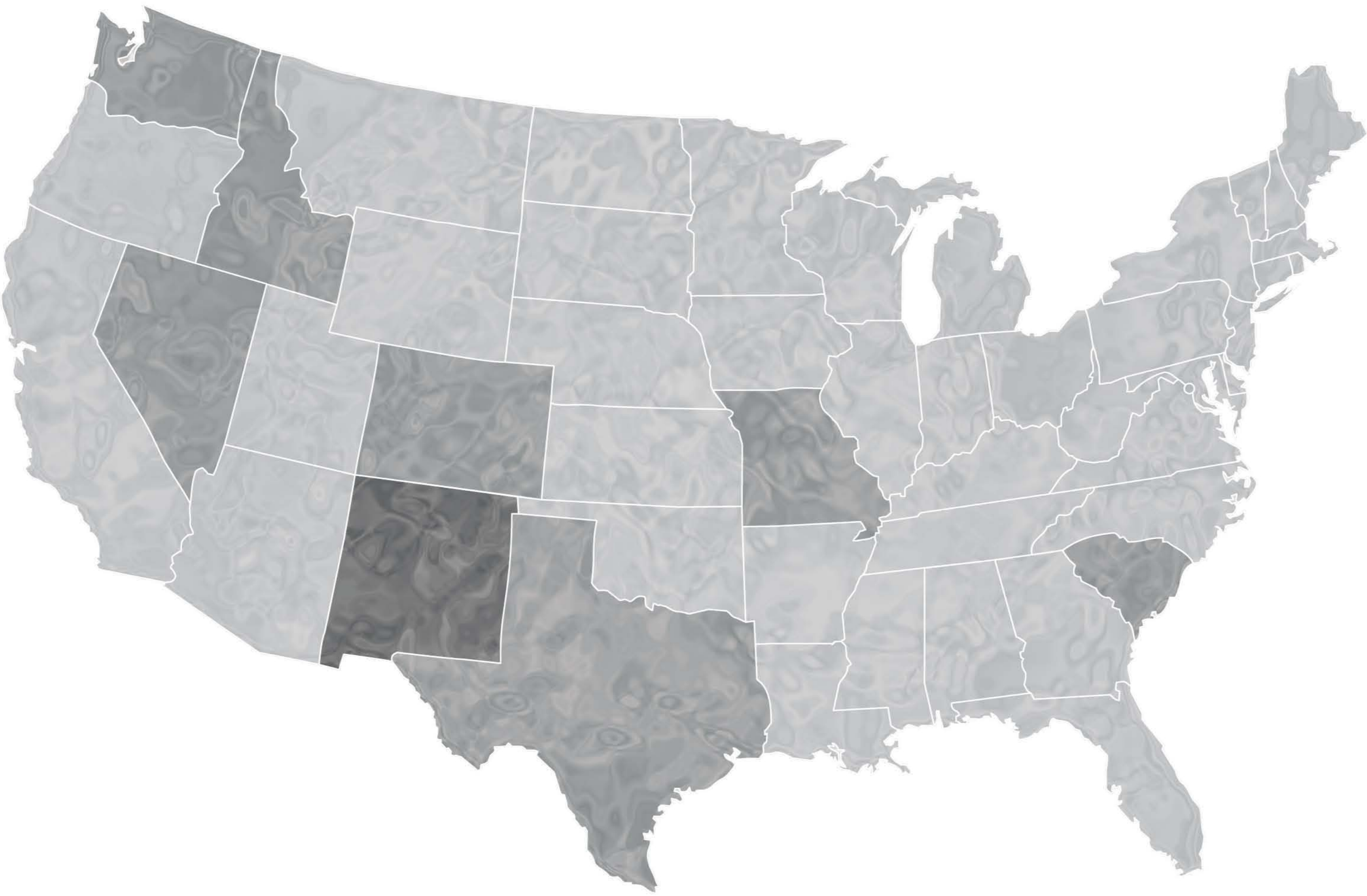
DOE/EIS-0423-S1
March 2013

Draft

Long-Term Management and Storage of Elemental Mercury

Supplemental Environmental Impact Statement



U.S. Department of Energy
Office of Environmental Management
Washington, DC

Availability of this
Draft Long-Term Management and Storage of Elemental Mercury Supplemental Environmental Impact Statement

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DRAFT
LONG-TERM MANAGEMENT AND STORAGE OF ELEMENTAL MERCURY SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT

Cover Sheet

Lead Agency: U.S. Department of Energy (DOE)

Cooperating Agencies: U.S. Environmental Protection Agency (EPA)
U.S. Bureau of Land Management (BLM)

Title: *Draft Long-Term Management and Storage of Elemental Mercury Supplemental Environmental Impact Statement (Draft Mercury Storage SEIS)* (DOE/EIS-0423-S1)

Candidate Locations for Storage Facility(ies): Colorado, Idaho, Missouri, Nevada, New Mexico, South Carolina, Texas, Washington

Contacts: For copies of this draft supplemental environmental impact statement (SEIS), visit DOE's National Environmental Policy Act (NEPA) website at http://energy.gov/nepa or contact David Levenstein at the address below.

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Abstract: Pursuant to the Mercury Export Ban Act of 2008 (P.L. 110-414), DOE was directed to designate a facility or facilities for the long-term management and storage of elemental mercury generated within the United States. Therefore, DOE has analyzed the storage of up to 10,000 metric tons (11,000 tons) of elemental mercury in a facility(ies) constructed and operated in accordance with the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (RCRA) (74 FR 31723). DOE issued the *Final Long-Term Management and Storage of Elemental Mercury Environmental Impact Statement (Final Mercury Storage EIS)* (DOE/EIS-0423) in January 2011. The *Final Mercury Storage EIS* analyzed the potential environmental, human health, and socioeconomic impacts of elemental mercury storage at seven candidate locations: Grand Junction Disposal Site near Grand Junction, Colorado; Hanford Site near Richland, Washington; Hawthorne Army Depot near Hawthorne, Nevada; Idaho National Laboratory near Idaho Falls, Idaho; Kansas City Plant in Kansas City, Missouri; Savannah River Site near Aiken, South Carolina; and Waste Control Specialists, LLC, site near Andrews, Texas. As required by Council on Environmental Quality (CEQ) NEPA regulations, the No Action Alternative was also analyzed as a basis for comparison. DOE has subsequently reconsidered the range of reasonable alternatives evaluated in the *Final Mercury Storage EIS*. Accordingly, DOE has prepared this *Draft Mercury Storage SEIS* to evaluate three additional locations for a long-term mercury storage facility(ies), all three of which are in the vicinity of the Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico. Both the January 2011 *Final Mercury Storage EIS* and this *Draft Mercury Storage SEIS* were prepared in accordance with NEPA (42 U.S.C. 4321 et seq.), the CEQ implementing regulations (40 CFR 1500–1508), and DOE's NEPA

implementing procedures (10 CFR 1021). DOE intends to decide (1) where to locate the elemental mercury storage facility(ies), and (2) whether to use existing buildings, new buildings, or a combination of existing and new buildings. In the January 2011 *Mercury Storage EIS*, DOE identified the Waste Control Specialists, LLC, site near Andrews, Texas, as the Preferred Alternative for the long-term management and storage of mercury. At this time, DOE has not changed the Preferred Alternative. Based on analysis from this *Draft Mercury Storage SEIS* and public comment, the Preferred Alternative may or may not change in the *Final Mercury Storage SEIS*. DOE will issue a Record of Decision no sooner than 30 days after publication of the EPA Notice of Availability for the *Final Mercury Storage SEIS* in the *Federal Register*. The selection of a site will be based on the January 2011 *Mercury Storage EIS*, this *Mercury Storage SEIS*, and other appropriate factors and will be announced in a Record of Decision in the *Federal Register*.

On January 1, 2013, the prohibition on the export of mercury went into effect pursuant to the Mercury Export Ban Act of 2008. As of March 1, 2013, several waste management companies have notified DOE of their intent to accumulate and store excess mercury at RCRA-permitted facilities in accordance with Section 5(g)(2)(b) of the Act. All of these companies have certified that they will ship the excess elemental mercury to a DOE-designated facility(ies), when such a facility(ies) is operational and ready to accept the mercury. Until such time that DOE has designated a facility(ies) and is ready to accept mercury for long-term management and storage, similar notifications may be received by DOE from other waste management companies.

Public Comments: On June 5, 2012, DOE published the "Notice of Intent to Prepare a Supplemental Environmental Impact Statement for the Long-Term Management and Storage of Elemental Mercury" in the *Federal Register* (77 FR 33204). Publication of the Notice of Intent initiated a 30-day public scoping period. During this time, DOE solicited comments from Federal, state, and local agencies; stakeholders; tribal nation representatives; and the general public to assist in defining the scope of this *Draft Mercury Storage SEIS*. A summary of these scoping comments is found in Chapter 1, Section 1.6.1, of this *Draft Mercury Storage SEIS*. Comments on this *Draft Mercury Storage SEIS* may be submitted during the 45-day public comment period, which will begin upon publication of EPA's Notice of Availability in the *Federal Register*. Public hearings on this *Draft Mercury Storage SEIS* will be held during this 45-day public comment period. The dates, times, and locations of these public hearings will be published in a DOE *Federal Register* notice and will be announced through other media. DOE will consider any comments received after the comment period ends to the extent practicable.

A Message to Stakeholders

I am pleased to present for your review and comment this *Draft Long-Term Management and Storage of Elemental Mercury Supplemental Environmental Impact Statement (Draft Mercury Storage SEIS)*. It is a key step in carrying out the intent of Congress in the Mercury Export Ban Act of 2008 to reduce mercury in the global environment. The U.S. Environmental Protection Agency and the U.S. Bureau of Land Management are cooperating agencies in the preparation of this *Draft Mercury Storage SEIS*.

DOE's goal is to provide safe, secure, long-term mercury storage by establishing a facility(ies) that can accept U.S. elemental mercury. This *Draft Mercury Storage SEIS*, together with the January 2011 *Final Long-Term Management and Storage of Elemental Mercury Environmental Impact Statement*, is intended to provide decisionmakers and the public with clear, reliable, and credible information about the impacts of the proposed action and reasonable mercury storage alternatives. You can also find additional information on the website at *www.mercurystorageeis.com* and in the reading rooms listed in Section 6 of the *Summary and Guide for Stakeholders* in this *Draft Mercury Storage SEIS*.

I look forward to receiving your comments on this *Draft Mercury Storage SEIS*, and I hope you will continue to participate in the decisionmaking process as we develop the *Final Mercury Storage SEIS* and the Record of Decision.

David Levenstein
EIS Document Manager
U.S. Department of Energy

For additional information on this *Draft Mercury Storage SEIS*, contact:

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Table of Contents

List of Figures

List of Tables

List of Abbreviations and Acronyms

°C	degrees Celsius
°F	degrees Fahrenheit
1-MT	1-metric-ton
3-L	3-liter
ACGIH	American Conference of Governmental Industrial Hygienists
ACS	*American Community Survey*
AEGL	Acute Exposure Guideline Level
bgs	below ground surface
BLM	U.S. Bureau of Land Management
BNSF	Burlington Northern Santa Fe
C&D	construction and demolition
CEQ	Council on Environmental Quality
CFR	*Code of Federal Regulations*
CH	contact-handled
CO	carbon monoxide
CWC	Central Waste Complex
dBA	decibels A-weighted
DLA	Defense Logistics Agency
DNSC	Defense National Stockpile Center
DOE	U.S. Department of Energy
Draft Mercury Storage SEIS	*Draft Long-Term Management and Storage of Elemental Mercury Supplemental Environmental Impact Statement*
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
ERPG	Emergency Response Planning Guideline
FL	frequency level
FLPMA	Federal Land Policy and Management Act
GJDS	Grand Junction Disposal Site
GTCC	greater-than-Class C
GTCC EIS	*Draft Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste*
Hanford	Hanford Site

IDA	intentional destructive act
IDLH	immediately dangerous to life or health
INL	Idaho National Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
Interim Guidance	*U.S. Department of Energy Interim Guidance on Packaging, Transportation, Receipt, Management, and Long-Term Storage of Elemental Mercury*
KCP	Kansas City Plant
LCF	latent cancer fatality
L_{dn}	day–night average sound level
LLW	low-level radioactive waste
LMP	Land Management Plan
LWA	Land Withdrawal Act
LWB	land withdrawal boundary
MB	marker bed
Mercury Storage EIS	*Long-Term Management and Storage of Elemental Mercury Environmental Impact Statement*
MM EIS	*Final Mercury Management Environmental Impact Statement*
MSL	mean sea level
NEPA	National Environmental Policy Act
NMAC	*New Mexico Administrative Code*
NMSA	*New Mexico Statutes Annotated*
NO_2	nitrogen dioxide
NOI	Notice of Intent
NRC	U.S. Nuclear Regulatory Commission
O_3	ozone
PAC	Protective Action Criterion
PCB	polychlorinated biphenyl
PGA	peak ground acceleration
PM_n	particulate matter with an aerodynamic diameter less than or equal to *n* micrometers
PPE	personal protective equipment
ppm	part(s) per million
PSD	Prevention of Significant Deterioration

R&R	reclamation and recycling
RCRA	Resource Conservation and Recovery Act
RfC	reference concentration
RH	remote-handled
ROD	Record of Decision
ROI	region of influence
RWMC	Radioactive Waste Management Complex
SEIS	supplemental environmental impact statement
SHPO	State Historic Preservation Officer
SL	severity level
SO_2	sulfur dioxide
SRS	Savannah River Site
SWDA	Solid Waste Disposal Act
TEEL	Temporary Emergency Exposure Limit
the Act	Mercury Export Ban Act of 2008
TLV	threshold limit value
TRAGIS	Transportation Routing Analysis Geographic Information System
TRU	transuranic
TSCA	Toxic Substances Control Act
TSD	treatment, storage, and disposal
TWA	time-weighted average
USGS	U.S. Geological Survey
VOC	volatile organic compound
VRM	Visual Resource Management
WCS	Waste Control Specialists, LLC, site
WIPP	Waste Isolation Pilot Plant
WIPP SEIS II	*Waste Isolation Pilot Plant Disposal Phase Final Supplemental Environmental Impact Statement*
Y–12	Y–12 National Security Complex

Measurement Units

The principal measurement units used in this *Long-Term Management and Storage of Elemental Mercury Supplemental Environmental Impact Statement (Mercury Storage SEIS)* are SI units (the abbreviation for the Système International d'Unites). The SI system is an expanded version of the metric system that was accepted in 1966 in Elsinore, Denmark, as the legal standard by the International Organization for Standardization. In this system, most units are made up of combinations of seven basic units, of which length in meters, mass in kilograms, and volume in liters are of most importance in this *Mercury Storage SEIS*. Exceptions are radiological units that use the English system (e.g., rem, millirem).

SCIENTIFIC (EXPONENTIAL) NOTATION

Numbers that are very small or very large are often expressed in scientific, or exponential, notation as a matter of convenience. For example, the number 0.000034 may be expressed as 3.4×10^{-5} or 3.4E-05, and 65,000 may be expressed as 6.5×10^{4} or 6.5E+04. In this *Mercury Storage SEIS*, numerical values that are less than 0.001 or greater than 9,999 are generally expressed in scientific notation, i.e., 1.0×10^{-3} and 9.9×10^{3}, respectively.

Multiples or submultiples of the basic units are also used. A partial list of prefixes that denote multiples and submultiples follows, with the equivalent multiplier values expressed in scientific notation.

Prefix	Symbol	Multiplier	
atto	a	0.000 000 000 000 000 001	1×10^{-18}
femto	f	0.000 000 000 000 001	1×10^{-15}
pico	p	0.000 000 000 001	1×10^{-12}
nano	n	0.000 000 001	1×10^{-9}
micro	μ	0.000 001	1×10^{-6}
milli	m	0.001	1×10^{-3}
centi	c	0.01	1×10^{-2}
deci	d	0.1	1×10^{-1}
deka	da	10	1×10^{1}
hecto	h	100	1×10^{2}
kilo	k	1,000	1×10^{3}
mega	M	1,000,000	1×10^{6}
giga	G	1,000,000,000	1×10^{9}
tera	T	1,000,000,000,000	1×10^{12}
peta	P	1,000,000,000,000,000	1×10^{15}
exa	E	1,000,000,000,000,000,000	1×10^{18}

The following symbols are occasionally used in conjunction with numerical expressions:

$<$	less than
$\leq$	less than or equal to
$>$	greater than
$\geq$	greater than or equal to

Conversions

English to Metric			Metric to English		
Multiply	**by**	**To get**	**Multiply**	**by**	**To get**
Area			**Area**		
square inches	6.4516	square centimeters	square centimeters	0.155	square inches
square feet	0.092903	square meters	square meters	10.7639	square feet
square yards	0.8361	square meters	square meters	1.196	square yards
acres	0.40469	hectares	hectares	2.471	acres
square miles	2.58999	square kilometers	square kilometers	0.3861	square miles
Length			**Length**		
inches	2.54	centimeters	centimeters	0.3937	inches
feet	30.48	centimeters	centimeters	0.0328	feet
feet	0.3048	meters	meters	3.281	feet
yards	0.9144	meters	meters	1.0936	yards
miles	1.60934	kilometers	kilometers	0.6214	miles
Temperature			**Temperature**		
degrees Fahrenheit	Subtract 32, then multiply by 0.55556	degrees Celsius	degrees Celsius	Multiply by 1.8, then add 32	degrees Fahrenheit
Volume			**Volume**		
fluid ounces	29.574	milliliters	milliliters	0.0338	fluid ounces
gallons	3.7854	liters	liters	0.26417	gallons
cubic feet	0.028317	cubic meters	cubic meters	35.315	cubic feet
cubic yards	0.76455	cubic meters	cubic meters	1.308	cubic yards
Weight			**Weight**		
ounces	28.3495	grams	grams	0.03527	ounces
pounds	0.45360	kilograms	kilograms	2.2046	pounds
short tons	0.90718	metric tons	metric tons	1.1023	short tons

SUMMARY AND GUIDE FOR STAKEHOLDERS

SUMMARY AND GUIDE FOR STAKEHOLDERS

S.1 INTRODUCTION

This *Summary and Guide for Stakeholders* presents a concise overview of the major issues addressed in this *Draft Long-Term Management and Storage of Elemental Mercury Supplemental Environmental Impact Statement (Draft Mercury Storage SEIS)*.

The U.S. Department of Energy (DOE) prepared this draft SEIS as part of DOE's ongoing process to establish a facility(ies) for storing elemental mercury in accordance with the Mercury Export Ban Act of 2008 (the Act). The U.S. Environmental Protection Agency (EPA) and the U.S. Bureau of Land Management (BLM) are cooperating agencies on this SEIS.

The Mercury Export Ban Act of 2008 (the Act)

- The Act prohibits the sale, distribution, or transfer of mercury by Federal agencies to other government agencies and private entities as of October 14, 2008.
- It bans the export of elemental mercury from the United States as of January 1, 2013.
- The U.S. Department of Energy (DOE) must designate a facility(ies) for long-term management and storage of mercury generated in the United States.
- Any such facility(ies) must comply with applicable requirements of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (42 U.S.C. 6901 et seq.).
- The Act does not specify how long mercury may require storage at the DOE-designated facility(ies).
- DOE is required to charge a fee to cover the cost of mercury storage.
- The Act requires the U.S. Environmental Protection Agency (EPA) to report to Congress on whether to expand the export ban to cover one or more mercury compounds. This report was issued in October 2009.
- EPA must report to Congress by January 1, 2017, on the global supply and trade of elemental mercury, including whether additional primary mercury mining has occurred as a consequence of the Act.

The text box at left provides a synopsis of the relevant features of the Act, and Appendix A of this draft SEIS contains a complete copy of the Act.

To evaluate the range of reasonable alternatives for siting, constructing, and operating a facility or facilities to meet its obligations under the Act, DOE prepared the *Final Long-Term Management and Storage of Elemental Mercury Environmental Impact Statement (Mercury Storage EIS)* (DOE/EIS-0423) in accordance with the National Environmental Policy Act (NEPA) of 1969 and its implementing regulations (40 CFR 1500–1508, 10 CFR 1021). The *Final Mercury Storage EIS*, issued in January 2011 (76 FR 5156), evaluated seven candidate locations for the elemental mercury storage facility(ies), as well as a No Action Alternative. Those sites are the Grand Junction Disposal Site near Grand Junction, Colorado; Hanford Site near Richland, Washington; Hawthorne Army Depot near Hawthorne, Nevada; Idaho National Laboratory near Idaho Falls, Idaho; Kansas City Plant in Kansas City, Missouri; Savannah River Site near Aiken, South Carolina; and Waste Control Specialists, LLC, site near Andrews, Texas. As stated in DOE's Notice of Intent issued on June 5, 2012 (77 FR 33204), DOE has subsequently reconsidered the range of reasonable alternatives evaluated in the January 2011 *Mercury Storage EIS*. Accordingly, DOE identified two candidate locations that would be evaluated in an SEIS for the long-term management and storage of elemental mercury in its Notice of Intent. Subsequently, after consideration of scoping comments received, DOE identified a third candidate location. DOE has prepared this draft SEIS to evaluate three additional alternative sites for a long-term mercury storage facility(ies), all of which are located in the vicinity of the Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico, which DOE operates for disposal of defense transuranic waste. DOE is not proposing changes to any other key parameters of the January 2011 *Mercury Storage EIS*, including the quantity or characteristics of the mercury inventory, the approach for long-term storage and management of this inventory, the design of the facilities, or the 40-year period of analysis.

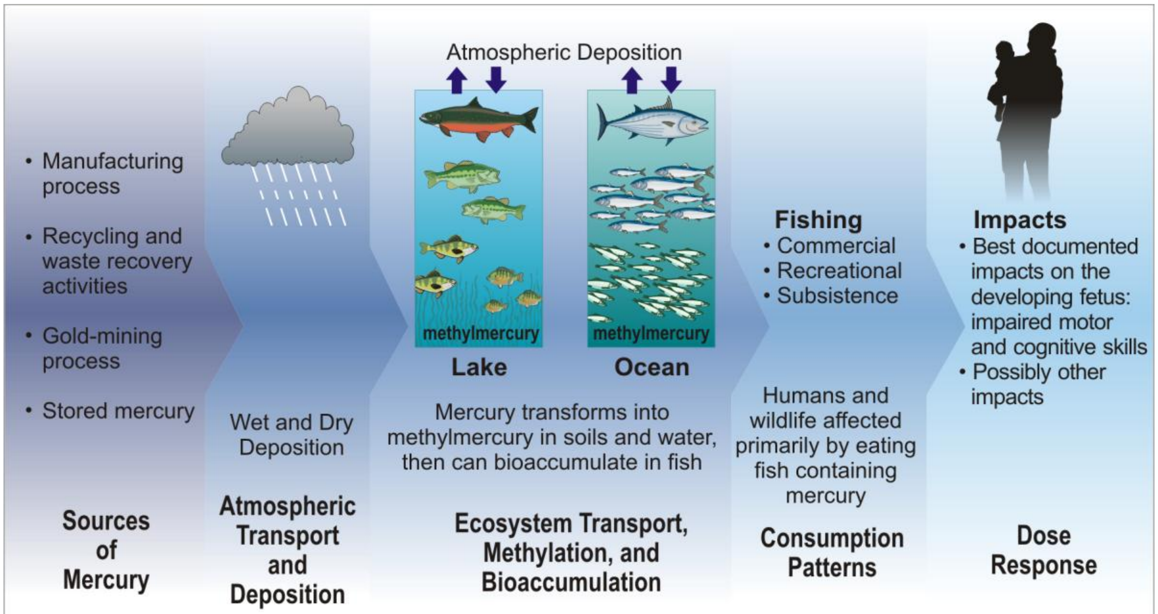
DOE's process for siting, constructing, and operating the requisite facility(ies) involves compliance with the provisions of NEPA, which requires Federal agencies to integrate environmental values into their decisionmaking by considering the potential environmental impacts of proposed actions and the range of reasonable alternatives to those actions. For major Federal actions significantly affecting the quality of the human environment, agencies must prepare an environmental impact statement, which considers the potentially affected environment, including the natural physical environment (e.g., air, water, geology, soils, plant and animal life) and the relationship between humans and the environment (e.g., health, safety, jobs, schools, housing, cultural resources, and aesthetics). Addressing environmental justice, the process of identifying and addressing disproportionately high and adverse effects of agency programs, policies, and activities on minority and low-income populations, is also a key component of an environmental impact statement. As discussed in Appendix E, Section E.4, environmental documentation that has become available since publication of the January 2011 *Mercury Storage EIS* has been reviewed, and with the exception of the socioeconomics and environmental justice resource areas, no other changes to the affected environment as presented in Chapter 3 of the January 2011 *Mercury Storage EIS* were found to be necessary. The analyses presented in Chapter 4 of the January 2011 *Mercury Storage EIS* remain valid and are incorporated into this draft SEIS with two exceptions: (1) the occupational and public health and safety analysis; and (2) the socioeconomics and environmental justice analysis. This draft SEIS includes updates to the occupational and public health and safety analysis resulting from changes to the definition of severity levels (i.e., magnitude of impacts) for acute-inhalation exposures to the public under certain accident scenarios. This draft SEIS also includes updates to the socioeconomics and environmental justice analyses to incorporate 2010 decennial census information that was not available at the time the January 2011 *Mercury Storage EIS* was published. The updates to the analyses are presented in Appendix B and Appendix E of this draft SEIS. Relevant information and data from the January 2011 *Mercury Storage EIS* that remain unchanged have been reproduced and presented in this draft SEIS for the convenience of the reader.

S.1.1 Why Reduce the Amount of Mercury in the Environment?

> For purposes of this supplemental environmental impact statement, "mercury" refers to elemental mercury unless otherwise indicated.

Mercury is an element that enters the environment as a result of natural processes (e.g., volcanoes, wildfires, surface emissions) and human activities (see Figure S–1). Mercury and its compounds are toxic; therefore, they pose human health and ecological risks. The potential effects may be widespread because mercury is easily dispersed throughout the environment. Moreover, the free trade of elemental mercury on the world market has encouraged its continued use, resulting in increasingly higher levels of mercury in the global environment. This has increased the risk of neurological and reproductive effects for humans and wildlife, and it means mercury is a pollutant of environmental concern throughout the world. By banning the export of U.S. mercury, Congress anticipated reducing the amount of mercury available in commerce worldwide, thus reducing the associated health risks.

Elemental mercury—the form DOE would manage and store—has long been used in manufacturing processes because it is a good conductor of electricity and it alloys, or mixes, readily with other metals. Historically, it has been used in batteries, paint, thermometers, thermostats, auto lighting switches, fluorescent lights, dental fillings, and medical devices such as blood pressure monitors. Many of these uses have declined in recent years.



Source: EPA website 2013.
Note: Figure modified to include potential sources of mercury other than emissions from manufacturing processes.

Figure S–1. The Mercury Cycle

S.1.2 What Are DOE's Objectives?

DOE prepared the January 2011 *Mercury Storage EIS*, and subsequently this draft SEIS, to evaluate the potential impacts of the proposed action, i.e., to establish a facility(ies) for the long-term management and storage of mercury. In accomplishing this, DOE is committed to the following overall objectives for its mercury storage program:

- Protect human health and the environment and ensure the safety of workers and the public.
- Meet the requirements of the Mercury Export Ban Act of 2008.
- Comply with applicable Federal, state, and local laws and regulations.

S.1.3 How Much Mercury Could DOE Manage and Store?

Based on the best available information, DOE anticipates that approximately 10,000 metric tons (11,000 tons) of excess mercury will need to be managed and stored in a facility(ies) designed to last at least 40 years. The Mercury Export Ban Act of 2008 does not specify how long the DOE mercury storage facility(ies) would need to be operated. Therefore, it is possible that more or less than 10,000 metric tons (11,000 tons) of mercury could eventually require storage for a period longer or shorter than 40 years. Additional NEPA documentation would be required to expand the facility(ies) to accept more than 10,000 metric tons (11,000 tons) of mercury or extend its operations beyond the 40-year period of analysis.

Further discussion of the estimated mercury inventory is presented in Chapter 1, Section 1.3.1, of this draft SEIS.

S.1.4 Where Would the Mercury Come From?

Potential sources of mercury that may require long-term storage by DOE are shown in Chapter 2, Figure 2–1. They include the following: chlor-alkali plants that continue to use mercury-cell technology; gold mining, which produces byproduct mercury; mercury waste reclamation and recycling; and, potentially, some or all of the mercury currently stored at the Y–12 National Security Complex.

Shipment estimates from the January 2011 *Mercury Storage EIS* are presented in Appendix C, Section C.1, of this draft SEIS. It is estimated that there would be about 79 truck shipments per year during the first two years of operation, 39 per year between the third and seventh years of operation, and 27 per year between the eighth and fortieth years of operation. If transported by rail, there would be about 23 rail shipments per year during the first two years of operation, 8 per year between the third and seventh years of operation, and only 5 per year between the eighth and fortieth years of operation.[1]

S.2 WHAT DOES THIS SEIS ADDRESS?

This draft SEIS addresses the short- and long-term potential health and environmental effects of establishing and operating a DOE facility(ies) to provide the necessary capability for this storage at three new candidate locations in the vicinity of WIPP near Carlsbad, New Mexico.

S.2.1 Decisions to Be Made

In making long-term mercury management decisions, DOE will consider the results of the January 2011 *Mercury Storage EIS* and this draft SEIS, public comments, and other relevant factors. DOE intends to make the following decisions:

- Where to locate the mercury storage facility(ies)
- Whether to use existing buildings, new buildings, or a combination of existing and new buildings for mercury storage

DOE will make a decision on the proposed action no sooner than 30 days after publication of EPA's Notice of Availability of the *Final Mercury Storage SEIS* in the *Federal Register*. DOE will announce its decision in a Record of Decision (ROD) published in the *Federal Register*.

S.2.2 Scope of This SEIS

This draft SEIS includes the following:

- Identification of candidate sites for the mercury storage facility(ies)
- Consideration of the No Action Alternative
- Consideration of construction of new facilities
- Potential health and environmental effects, including transportation to potential storage facility(ies), and cumulative effects of establishing and operating a storage facility(ies)
- Comparison of the analytic results for all sites
- The issues and concerns raised by stakeholders during the public scoping period for this draft SEIS, along with DOE's responses
- The DOE Preferred Alternative

[1] For purposes of analysis, the January 2011 *Mercury Storage EIS* assumes a 40-year operational period with the first year starting in 2013 and the fortieth year, in 2052. An operational start date is not known at this time; however, the period of analysis remains 40 years. For example, if the mercury storage facility(ies) were to start operations in 2014, the last year of operations would likewise shift to 2053, and so forth.

S.2.3 Affected Environment and Environmental Consequences

Chapter 2 of this draft SEIS presents a description of the three new candidate locations in the vicinity of WIPP near Carlsbad, New Mexico, and a summary and comparison of potential impacts associated with providing a capability for the long-term management and storage of elemental mercury. These locations will be referred to individually as "WIPP Vicinity Section 10"; "WIPP Vicinity Section 20"; and "WIPP Vicinity Section 35" or together as the "WIPP Vicinity reference locations." The No Action Alternative is also discussed as required under NEPA for use as a basis of comparison.

The affected environment for the WIPP Vicinity reference locations is described in Chapter 3 of this draft SEIS and includes land use and visual resources; geology, soils, and geologic hazards; water resources; meteorology, air quality, and noise; ecological resources; cultural and paleontological resources; site infrastructure; waste management; occupational and public health and safety; socioeconomics; and environmental justice.

In Chapter 4 of this draft SEIS, DOE presents the potential environmental impacts of the proposed action for the three new alternative sites within defined regions of influence (ROIs) specific to each resource area and site evaluated. ROIs encompass the geographic areas within which any meaningful potential impact is expected to occur, and can include the area within which the proposed action would take place, the site as a whole, or nearby offsite areas. ROIs that are defined with the term "nearby offsite areas" may be different for each site depending on the extent to which meaningful impacts are expected to occur. For example, impacts on historic resources were evaluated at specific facility locations within each candidate site, whereas human health risks to the general public were assessed for offsite areas of the candidate location. Brief descriptions of the ROIs for each resource area are presented in Appendix B.

Resource areas analyzed for each candidate site include land use and visual resources; geology, soils, and geologic hazards; water resources; meteorology, air quality, and noise; ecological resources; cultural and paleontological resources; site infrastructure; waste management; occupational and public health and safety; ecological risk; socioeconomics; and environmental justice. The potential impacts analyzed from construction and modification of a mercury storage facility(ies) include those related to visual, ecological, and water resources; land disturbance; resource use; air emissions and noise; and employment. Operational impacts, including those related to resource use, air emissions, and human health effects, and transportation impacts, including those related to air emissions, human health, and ecological risk, are also analyzed. See Section S.5, "Comparison of Impacts and Alternatives," of this *Summary and Guide for Stakeholders*.

S.3 MERCURY STORAGE SITE ALTERNATIVES

To meet the requirements of the Act, DOE proposes to designate one or more existing or new facilities for the long-term management and storage of mercury. As required by NEPA, the No Action Alternative is evaluated to serve, among other things, as a basis for comparison with the action or site alternatives. Under the No Action Alternative, DOE would not establish a facility(ies) for long-term management and storage of mercury as is required by the Act. Because the Act also prohibits the export of mercury after January 1, 2013, companies in the United States would have to find another way to manage their excess mercury. Any excess mercury would remain the responsibility of its owners or would be sent to commercial waste management facilities. Approximately 1,200 metric tons (1,300 tons) of DOE mercury currently stored at the DOE Y–12 National Security Complex in Tennessee would continue to be managed and stored at this location.

S.3.1 Candidate Sites Evaluated in the January 2011 *Mercury Storage EIS*

The January 2011 *Mercury Storage EIS* evaluated seven candidate sites for the long-term management and storage of elemental mercury:

- New construction at the Grand Junction Disposal Site
- New construction in the 200-West Area at the Hanford Site
- Existing storage buildings in the Central Magazine Area at the Hawthorne Army Depot
- New construction at Idaho National Laboratory's Idaho Nuclear Technology and Engineering Center or existing storage buildings at the Radioactive Waste Management Complex
- Existing building at the Bannister Federal Complex's Kansas City Plant
- New construction in E Area at the Savannah River Site
- New construction at the Waste Control Specialists, LLC, site

S.3.2 Candidate Sites Evaluated in This *Draft Mercury Storage SEIS*

This draft SEIS evaluates three additional candidate sites for the long-term management and storage of elemental mercury:

- New construction at WIPP Vicinity Section 10
- New construction at WIPP Vicinity Section 20
- New construction at WIPP Vicinity Section 35

WIPP is the Nation's only underground repository for the permanent disposal of defense-generated transuranic waste. The WIPP site, located in Eddy County, New Mexico, encompasses approximately 41 square kilometers (16 square miles) under the jurisdiction of DOE pursuant to the Waste Isolation Pilot Plant Land Withdrawal Act (WIPP LWA) (P.L. 102-579). Three options for long-term storage of mercury in the vicinity of WIPP have been identified: (1) new construction in Section 10 outside the land withdrawal boundary; (2) new construction in Section 20 inside the land withdrawal boundary;[2] and (3) new construction in Section 35 outside the land withdrawal boundary. The candidate sites analyzed in the January 2011 *Mercury Storage EIS* and in this draft SEIS are presented below in Figure S–2 and discussed further in Chapter 2, Section 2.3, of this draft SEIS.

[2] The WIPP LWA, Public Law No. 102-579, was signed into law on October 20, 1992, and was later amended by the WIPP LWA Amendments of 1996, Public Law No. 104-201. The WIPP LWA withdrew approximately 41 square kilometers (16 square miles) of land from the public domain for the purpose of creating and operating WIPP, the geologic repository in New Mexico designated as the national disposal site for transuranic waste generated by atomic energy defense activities.

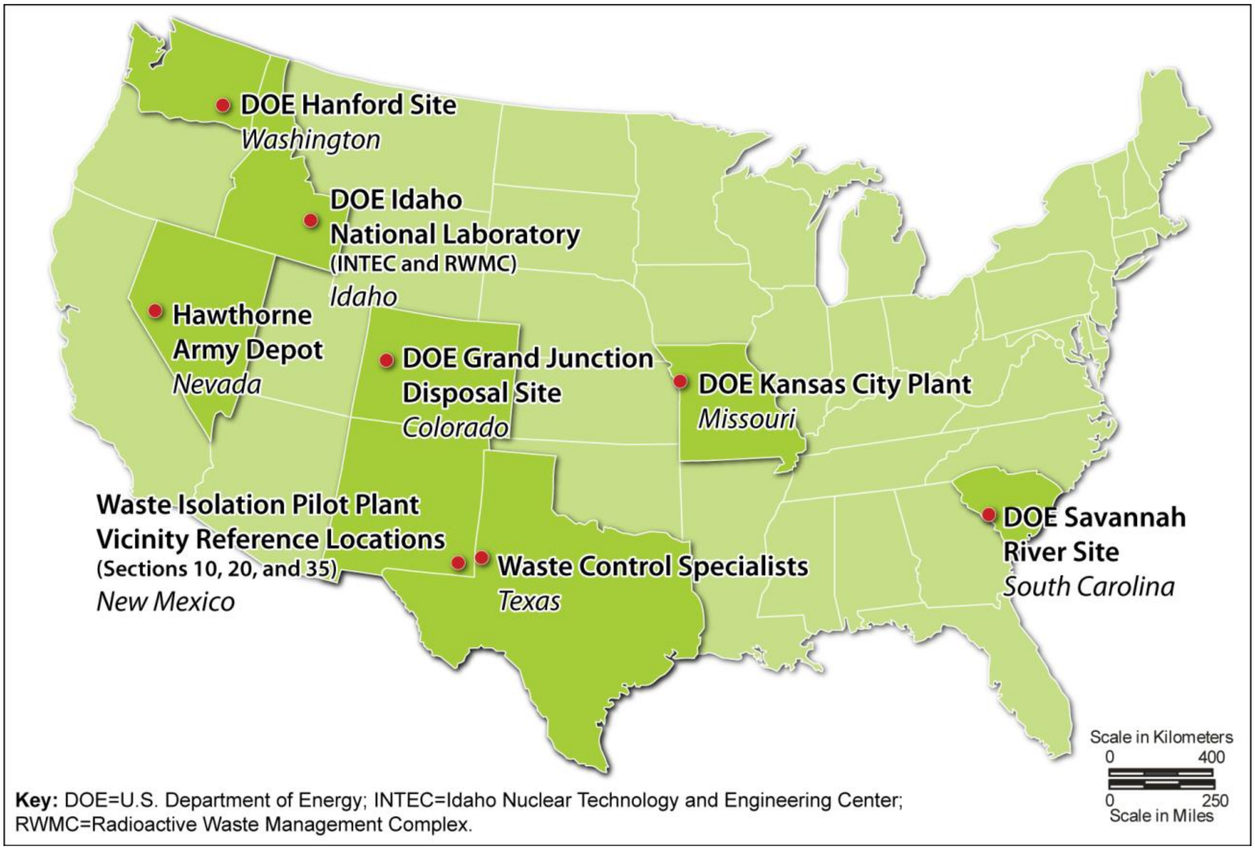


Figure S–2. Alternative Sites Analyzed for U.S. Department of Energy Storage of Mercury

S.4 DOE MERCURY STORAGE FACILITY(IES) DESCRIPTION

The DOE mercury storage facility(ies) would include the following characteristics:

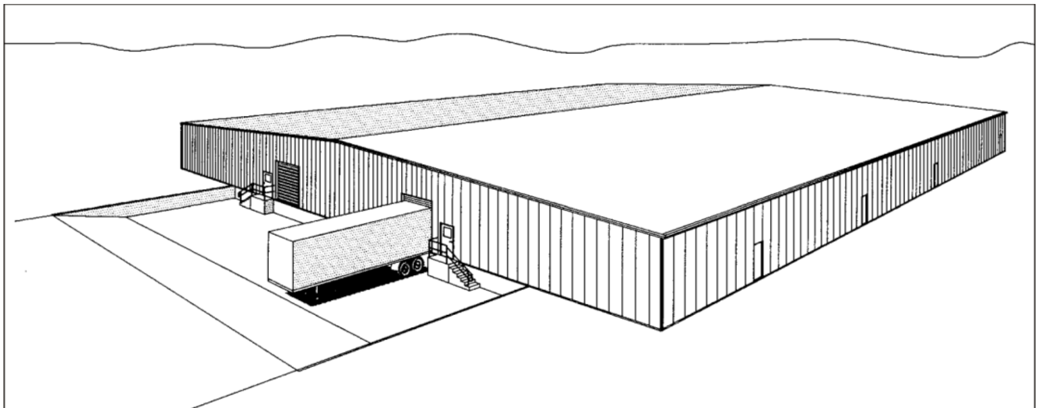
- Resource Conservation and Recovery Act (RCRA)–regulated/permitted design with proper spill containment features and emergency response procedures
- Security and access control
- Fire suppression systems
- Ventilated storage and handling area(s)
- Fully enclosed weather-protected building(s)
- Reinforced-concrete floors able to accommodate mercury storage

The mercury storage facility(ies) would have areas for administration, receiving and shipping, storage, and handling. The Storage Area would constitute approximately 90 percent of the floor space. The Storage Area would generally be a large open space similar to a warehouse, where storage, inspection, and monitoring could be effectively performed. The mercury storage facility(ies) would accept two types of mercury containers: 3-liter (34.6-kilogram [76-pound]) flasks and 1-metric-ton (1.1-ton) containers. Other containers could be approved and accepted on a case-by-case basis. The 3-liter flasks would be single-, double-, or triple-stacked, and the 1-metric-ton containers would be single- or double-stacked.

Appendix C of the January 2011 *Mercury Storage EIS* addressed both the potential construction of new facilities and the potential modification of existing facilities for purposes of mercury storage at the candidate sites evaluated in the January 2011 *Mercury Storage EIS*. Since there are no existing facilities available for use at the three WIPP Vicinity reference locations, a new facility(ies) would have to be constructed. As such, only data for new construction are reproduced in Appendix C of this draft SEIS.

S.4.1 New Storage Facility(ies) Design and Construction

If a new mercury storage facility(ies) were built, it would be designed and constructed to provide the safe and secure long-term storage of up to 10,000 metric tons (11,000 tons) of mercury for at least 40 years. Figure S–3 provides a conceptual illustration of what the exterior of a new mercury storage facility(ies) might look like. Chapter 2 and Appendix C of this draft SEIS provide a conceptual layout of the interior and how the mercury containers might be stored, as well as additional details and data related to the requirements for construction and operation of a new facility(ies).



Source: DOE **Note:** Not to scale.

Figure S–3. Conceptual Exterior of a New Mercury Storage Facility(ies)

A new mercury storage facility(ies) could require up to approximately 13,610 square meters (146,500 square feet) of storage space. The height of the building(s) would be approximately 6.1 meters (20 feet) to accommodate the potential for triple stacks of pallets of 3-liter flasks. The new facility(ies) design would feature a specific Handling Area where container integrity inspections and any necessary reflasking activities would be performed. The new facility(ies) would also have a reinforced-concrete floor, strong enough to withstand the heavy loads from mercury storage. The floors would be treated with an epoxy sealant to add strength and spill containment properties. Lighting, ventilation, fire suppression, and security systems would be incorporated into the facility(ies) design. Security systems could include security alarms and surveillance cameras. A new full-size, standalone facility would encompass approximately 3.1 hectares (7.6 acres). The facility(ies) would be RCRA-regulated and -permitted, and, as such, would require secondary containment (e.g., curbing), regular inspection of stored materials, strict record-keeping, and periodic reporting to the state.

S.4.2 Existing Facility(ies) Modification and Upgrades

Existing facilities were considered in the January 2011 *Mercury Storage EIS* only if their former use was consistent with the storage of hazardous materials, thus keeping the need for modifications to a minimum. Alternative locations with existing facilities analyzed in the January 2011 *Mercury Storage EIS* were the storage buildings at the Hawthorne Army Depot, the Radioactive Waste Management Complex at DOE's Idaho National Laboratory, and the Main Manufacturing Building at DOE's Kansas City Plant in Missouri. The Container Storage Building at the Waste Control Specialists, LLC, site was also considered for interim storage pending construction of a new facility(ies). The analysis presented in this draft SEIS only considers new construction for the long-term management and storage of mercury at the WIPP Vicinity reference locations.

S.4.3 Operation of a Mercury Storage Facility(ies)

Regardless of the candidate site chosen, mercury storage operations would include the following:

- Facility(ies) security
- Shipping and receiving
- Inspections
- Monitoring and long-term storage
- Record-keeping
- Emergency and small-spill response

These tasks are described in greater detail in Chapter 2, Section 2.2.3, and Appendix C of this draft SEIS.

S.5 COMPARISON OF IMPACTS AND ALTERNATIVES

The overall conclusion of the impact analyses presented in this draft SEIS is that there would be no major differences in impacts on resource areas among the mercury storage site alternatives. This conclusion is based upon the evaluation of the candidate sites analyzed in the January 2011 *Mercury Storage EIS* and the three additional WIPP Vicinity reference location sites analyzed in this draft SEIS.

Chapter 2, Section 2.6, presents a more detailed comparison of the alternatives analyzed in this draft SEIS and the January 2011 *Mercury Storage EIS*, including a No Action Alternative. Table 2–2 presents a comparison of potential impacts on resources from the transportation, receipt, and long-term storage of mercury at each of the candidate mercury storage sites. The potential environmental consequences for all resource areas are summarized further in Chapter 2 of this draft SEIS. Additional details on potential environmental consequences are discussed in Chapter 4 of the January 2011 *Mercury Storage EIS* and this draft SEIS.

Potential impacts presented in the January 2011 *Mercury Storage EIS* associated with the No Action Alternative would remain unchanged relative to the scope of this draft SEIS. The No Action Alternative would affect all sources of mercury and would involve various mercury storage locations, many of which are undetermined. Such facilities could vary in location, size, natural and human environments, and in the nature of their operations. Because of the various sites and circumstances in which mercury would be stored under the No Action Alternative, the potential environmental consequences would be highly speculative. The DOE mercury currently stored at the Y–12 National Security Complex would continue to be managed and stored in this location. No new construction would be required at the Y–12 National Security Complex, nor would any incremental increase in impacts on resource areas occur because storage operations at the Y–12 National Security Complex would not change.

On January 1, 2013, the prohibition on the export of mercury went into effect pursuant to the Mercury Export Ban Act of 2008. As of March 1, 2013, five waste management companies have notified DOE of their intent to accumulate and store excess mercury at RCRA-permitted facilities in accordance with Section 5(g)(2)(b) of the Act. The companies and storage locations that have submitted notifications are (1) Chemical Waste Management, Inc., at its facility in Emelle, Alabama; (2) Clean Harbors Environmental Services, Inc., at its facility in Wichita, Kansas; (3) EQ Detroit, Inc., at its facility in Detroit, Michigan; (4) Veolia ES Technical Solutions, L.L.C., at its facility in Port Washington, Wisconsin; and (5) Waste Management Mercury Waste, Inc., at its facility in Union Grove, Wisconsin.[3] All of these companies have certified that they will ship the excess elemental mercury to a DOE-designated facility(ies) when such a facility(ies) is operational and ready to accept the mercury.

[3] The listing of companies by name is for informational purposes only and does not imply or suggest an endorsement by DOE. Until such time that DOE has designated a facility(ies) and is ready to accept mercury for long-term management and storage, similar notifications may be received by DOE from other waste management companies.

S.5.1 Major Conclusions

The impacts on the various resource areas at any of the candidate sites analyzed in the January 2011 *Mercury Storage EIS* or this draft SEIS from construction and operation of a mercury storage facility(ies) would range from none to minor. The analyses in this draft SEIS support the following conclusions, all of which remain valid for the seven candidate sites initially evaluated in the January 2011 *Mercury Storage EIS* and now similarly apply to the three additional WIPP Vicinity candidate sites subsequently evaluated in this draft SEIS.

- Impacts on **land use and visual resources** are expected to range from negligible to minor at all candidate sites.

- In the areas of **geology, soils, and geologic and meteorological hazards**, construction of a new storage facility(ies) would expose surface soil for up to 6 months. Although unlikely to occur over the 40-year analysis period, geologic hazards such as earthquakes could potentially have an adverse effect on a mercury storage facility(ies). However, design for construction of a new facility(ies) or modification of existing buildings would take seismic and meteorological risks into consideration to minimize potential adverse impacts.

- Construction and/or operation of a mercury storage facility(ies) are not expected to impact **surface-water or groundwater resources.** Under all alternatives, best management practices, including adherence to an integrated contingency plan and spill prevention, control, and countermeasures plan for mercury storage, would be employed to prevent **spills and releases**, including the use of spill trays under mercury containers, spill containment features, and regular inspections.

- Minor, short-term (6-month) **air quality** impacts would occur under alternatives involving construction of a new storage facility(ies). Impacts would include a small increase in air pollutant emissions from activities in the immediate vicinity of the construction site during working hours.

- **Air emissions** associated with operations using existing buildings for mercury storage would be negligible and limited to employee vehicles, trucks, semiannual testing of emergency generators, and small amounts of mercury vapor from storage containers or residual contamination, where applicable. Occasionally, some mercury vapors would result from repackaging of mercury in new containers. The Handling Area would be outfitted with a vacuum air exhaust and mercury vapor filter that would maintain air emissions exhausted to the outside at negligible concentrations. Carbon dioxide is a compound associated with global climate change. The addition of carbon dioxide to the environment from constructing and/or operating a mercury storage facility(ies) at any of the candidate sites would have a negligible effect on the global climate.

- **Engine exhaust emissions from transporting mercury** would be in proportion to the number of miles required to transport the mercury to the storage facility(ies). For the WIPP Vicinity reference locations, these emissions are projected to fall within the range established for the candidate sites evaluated in the January 2011 *Mercury Storage EIS*. Truck and/or rail transport from various locations to the DOE long-term mercury storage facility(ies) would generate engine exhaust air emissions along routes of transport. Peak exhaust emissions from transport of mercury are expected to occur during the first year of facility(ies) operation. The frequency of truck and/or rail shipments is expected to decrease over time.

- **Noise** levels would not increase substantially above background levels at any of the candidate sites.

- There would be negligible impacts on **ecological resources** at candidate sites whether a new facility(ies) is built or existing buildings are used.

- No impacts on **cultural or paleontological resources** are expected under site alternatives involving the use of existing buildings because no new construction or external modifications of the buildings would be required. New facility(ies) construction would result in negligible impacts on cultural resources because it would occur in previously disturbed industrialized areas, except at the DOE Grand Junction Disposal Site in Colorado and the WIPP Vicinity reference locations in New Mexico, where procedures would need to be developed to plan for the possibility of inadvertent discoveries during construction.

- Adverse impacts on a potential site's **infrastructure** could occur if available capacity is approached or exceeded. Infrastructure includes roads and railways, electricity, fuel, and water supplies. Existing utility capacity in the vicinity of the candidate sites is adequate and could easily accommodate utility demands for construction and operations at all candidate sites except at the DOE Grand Junction Disposal Site in Colorado. For the WIPP Vicinity reference locations, minor to moderate infrastructure upgrades would be necessary to connect to existing utility infrastructure.

- Impacts on the site's **waste management infrastructure** of construction and operation of a mercury storage facility(ies) would be negligible under all alternatives.

- **Impacts on human health during normal operations** at the mercury storage facility(ies) were determined to be negligible for workers and the public under all alternatives evaluated with negligible associated risks. Risks were determined using the risk matrix approach, which defines levels of risk in terms of frequency of release and severity of consequence (see Figure S–4). DOE, EPA, and other Government agencies use this approach. Events have a high (level IV) frequency if they occur once in 100 years or more frequently; moderate (level III) between once in 10,000 years and once in 100 years; low (level II) between once in 1 million years and once in 10,000 years; and negligible (level I) less than once in 1 million years. Consequence severity levels depend on the receptor (human or ecological) and the pathway (e.g., inhalation or ingestion). For example, for acute (up to about 8-hour) inhalation exposures, severity level IV corresponds to the possibility of fatality; severity level III to severe, nonlethal health effects; severity level II to reversible health effects; and severity level I to negligible health effects or minor irritation. Risks are considered negligible if either frequency or severity is at level I. Frequency levels and severity levels are discussed in more detail in Chapter 4, Section 4.2.9, and Appendix D of this draft SEIS.

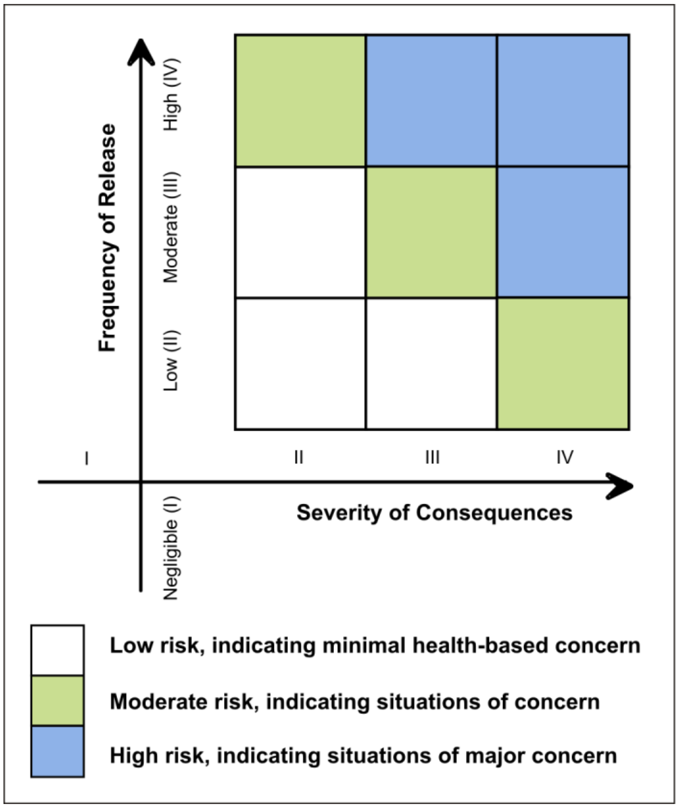


Figure S–4. Risk Ranking Matrix

- **Human health impacts from facility(ies) accidents** would range from severity level I to level II with an associated negligible-to-low risk for both involved and noninvolved workers and negligible risk to members of the public at all candidate sites evaluated.

- **Transportation impacts** under all alternatives would be dependent on the method of transportation (i.e., truck or rail), the number of miles traveled, and the nature of the potential accident. For truck travel, the projected frequency of fatalities due to mechanical impact would range from 7.8×10^{-4} to 1.2×10^{-3} per year for the action alternatives. For rail travel, the range would be slightly lower—from 1.0×10^{-4} to 1.9×10^{-4} fatalities per year. For the WIPP Vicinity reference locations, these impacts are projected to fall within the range established for the candidate sites evaluated in the January 2011 *Mercury Storage EIS*. In addition to the possibility of fatal accidents due to mechanical impact, exposure to mercury from spills could impact human health. For truck or rail spills directly onto the ground, the consequences could range from severity level I to IV with negligible risk. For truck or rail spills directly into water bodies, the consequences could be as high as severity level II with negligible-to-low risk (but with a large degree of uncertainty). For truck and rail spills with fire resulting in airborne mercury vapors, the consequences from the inhalation pathway could be severity level II with low risk or as high as severity level III with negligible risk. For truck or rail spills with fire, the consequences from deposition of airborne mercury onto soil could be severity level I with an associated negligible risk. For truck or rail spills with fire, the consequences from deposition of airborne mercury into water bodies, the transformation of mercury into methylmercury and bioaccumulation in fish, followed by the subsequent consumption of fish, could be severity level I to II with an associated negligible-to-low risk. Transportation impacts considered Truck Scenarios 1 and 2. Scenario 1 assumes fully loaded truck shipments, whereas Scenario 2 assumes a portion of mercury shipments would be on partially loaded trucks. Truck Scenarios 1 and 2 are defined in more detail in Appendix D, Section D.2.2.

- **Socioeconomic impacts** would be negligible to minor on overall employment and population trends under all alternatives.

- The minimal increase in the number of vehicle trips projected for construction and operations of a mercury storage facility(ies) over baseline **traffic** would be negligible for all alternative sites.

- Minority and/or low-income populations have not been identified within the 16-kilometer (10-mile) or the 3.2-kilometer (2-mile) ROI associated with any of the WIPP Vicinity reference locations. Environmental justice analyses previously presented in the January 2011 *Mercury Storage EIS* were updated to reflect the 2010 decennial census and resulted in some changes to the data associated with those candidate sites previously analyzed, as discussed in Appendix B and Appendix E, Section E.3.1, of this draft SEIS. Census data indicate that minority and/or low-income populations are now present within the 16-kilometer (10-mile) ROI at the Hanford Site and Hawthorne Army Depot, in addition to the populations previously identified at the DOE Kansas City Plant, the DOE Savannah River Site, and the Waste Control Specialists, LLC, site. Within a smaller 3.2-kilometer (2-mile) radius, minority and low-income populations are now present at the Hawthorne Army Depot, in addition to those previously identified at the DOE Kansas City Plant. However, **environmental justice** analyses indicate that no disproportionately high and adverse effects on minority or low-income populations would be expected at any of the candidate sites due to construction or operations of a mercury storage facility(ies).

S.5.2 Cumulative Impacts

Cumulative impacts are those impacts on the environment that would result from the proposed action when added to other past, present, and reasonably foreseeable future actions. Actions that may contribute to cumulative impacts include onsite and offsite projects conducted by government agencies, businesses, or individuals that are within the ROIs of the actions considered in this draft SEIS. For the WIPP Vicinity reference locations, the ROIs used in the cumulative impacts analysis were generally assumed to be within a 16-kilometer (10-mile) radius of the locations. This radius was selected because any adverse impacts from normal operations and facility(ies) accidents would be limited to a distance significantly less than 16 kilometers (10 miles).

Projected impacts on the various resource areas of constructing and operating a mercury storage facility(ies) range from none, to negligible, to minor. Those resource areas that were predicted to be impacted in a minor way were evaluated for their potential to contribute to cumulative impacts within the ROI; specifically, this draft SEIS analysis includes an evaluation of land use, air quality, infrastructure, and ecological resources. It was determined that the potential contribution to cumulative impacts on those resource areas evaluated would be negligible, as summarized in Table S–1 and addressed in greater detail in Chapter 2, Section 2.6.2, and Chapter 4, Section 4.4, of this draft SEIS. These findings are consistent with the level of cumulative impacts projected for the seven candidate storage locations evaluated in the January 2011 *Mercury Storage EIS* (see Chapter 2, Section 2.7.2, and Chapter 4, Section 4.11, of the January 2011 *Mercury Storage EIS*).

For the WIPP Vicinity reference locations, the only major projects ongoing or planned within the 16-kilometer (10-mile) ROI are the operations of WIPP for disposal of defense-generated transuranic wastes, the proposed greater-than-Class C (GTCC) waste disposal facility, which could be located in close proximity to WIPP, underground potash mining, and the operation of production oil wells. Depending on the type of facility selected (i.e., borehole, trench, or vault), the GTCC waste disposal facility could require up to 44 hectares (110 acres).

Table S–1. Summary of Cumulative Impacts Assessment

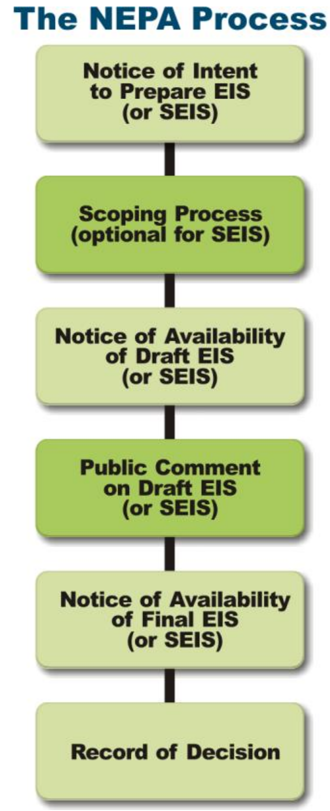
Alternative	Resource Area	Cumulative Impacts	Contribution of Proposed Action to Cumulative Impacts
WIPP Vicinity Reference Locations (Sections 10, 20, and 35)	Land Use	Rural area; limited development expected within the ROI. GTCC waste disposal facility could require up to 44 hectares (110 acres) if WIPP vicinity is selected; one of the locations being considered is WIPP Vicinity Section 35. A mercury storage facility and GTCC waste disposal facility could be located within the 260-hectare (640-acre) area that comprises Section 35 without interference with operations or compromising the safety and security of these facilities. Also present within the ROI are a number of oil wells and underground potash mines located in the vicinity of WIPP, including an existing potash mine lease on WIPP Vicinity Section 10 and one oil well in WIPP Vicinity Section 35. No substantial cumulative impacts on land use.	Negligible
	Air Quality	No exceedance of air quality standards.	Negligible
	Infrastructure	No substantial cumulative impacts on regional power consumption or impact on existing capacities. A maximum of 79 shipments would be made to the proposed mercury storage facility during the peak year of operations and is not expected to appreciably increase demands on transportation systems near the WIPP Vicinity reference locations.	Negligible
	Ecological Resources	No substantial cumulative impacts on terrestrial resources or loss of habitat due to disturbance of land (see Land Use above).	Negligible

Key: GTCC=greater-than-Class C; ROI=region of influence; WIPP=Waste Isolation Pilot Plant.

S.5.3 The Preferred Alternative

In the January 2011 *Mercury Storage EIS*, DOE identified the Waste Control Specialists, LLC, site near Andrews, Texas, as the Preferred Alternative for the long-term management and storage of mercury. At this time, DOE has not changed the Preferred Alternative. Based on analysis from this draft SEIS and public comment, the Preferred Alternative may or may not change in the final SEIS. DOE will issue a ROD no sooner than 30 days after publication of the EPA Notice of Availability for the *Final Mercury Storage SEIS* in the *Federal Register*. The selection of a site will be based on the January 2011 *Mercury Storage EIS*, this *Mercury Storage SEIS*, and other appropriate factors and will be announced in a ROD in the *Federal Register*.

S.6 PUBLIC INVOLVEMENT



On June 5, 2012, DOE published the "Notice of Intent to Prepare a Supplemental Environmental Impact Statement for the Long-Term Management and Storage of Elemental Mercury" in the *Federal Register* (77 FR 33204). Publication of the Notice of Intent initiated a 30-day public scoping period. During this time, DOE solicited comments from Federal, state, and local agencies; stakeholders; tribal nation representatives; and the general public to assist in defining the scope of this draft SEIS.

S.6.1 Public Scoping Meetings

DOE hosted two scoping meetings to obtain public comments on the proposed scope of this draft SEIS:

- June 26, 2012, in Carlsbad, New Mexico
- June 28, 2012, in Albuquerque, New Mexico

Approximately 65 people attended these public scoping meetings at which DOE provided information on the Mercury Export Ban Act of 2008, the January 2011 *Mercury Storage EIS*, and the scope of this draft SEIS.

S.6.2 Public Scoping Comments

As discussed in Chapter 1, Section 1.6, of this draft SEIS, DOE received 92 comment documents (emails, faxes, letters, and transcripts of oral comments) during the scoping period, including some comments that were received after the scoping period ended. DOE considered all oral and written public comments in refining the scope of this draft SEIS.

Comments received during the public scoping period focused primarily on opposition to or support for including locations in the WIPP vicinity among the candidate sites, and environmental, health, and safety concerns associated with transporting and storing mercury.

S.6.3 How Can I Participate in This Process?

DOE is soliciting comments on this draft SEIS during the 45-day public comment period, during which public hearings will be held to provide interested members of the public with opportunities to learn more about the content of this draft SEIS, hear DOE representatives present a summary of the results of the draft SEIS analyses, ask clarifying questions, and provide oral and written comments. The dates, times, and locations of public hearings will be published in DOE's Notice of Availability in the *Federal Register* for this draft SEIS. The project website (http://www.mercurystorageeis.com) also informs the public about the January 2011 *Mercury Storage EIS*, the preparation of the *Final Mercury Storage SEIS*, public hearings, comment submission, and other pertinent information.

To submit written comments or request more information, contact:

David Levenstein, Document Manager
Office of Environmental Compliance (EM–11)
U.S. Department of Energy
Post Office Box 2612
Germantown, MD 20874
Website: http://www.mercurystorageeis.com

S.6.4 Watch for the *Final Mercury Storage SEIS*

When the final SEIS is published, its availability will be announced in EPA's *Federal Register* Notice of Availability, in local newspapers, and via U.S. mail. The *Final Mercury Storage SEIS* will be sent to those who request it in compact disk or print formats. It also will be available on the project website (http://www.mercurystorageeis.com), on DOE's NEPA website (http://energy.gov/nepa), and for review in public reading rooms. Oral and written comments received during the public comment period will be considered equally in preparing the final SEIS, and DOE responses will be presented in a comment response document that will be published as part of the final SEIS.

DOE will announce a decision regarding future actions in a ROD to be published in the *Federal Register* no sooner than 30 days after EPA's Notice of Availability for the final SEIS is published. The ROD will describe the alternative selected for implementation and explain how environmental impacts will be avoided, minimized, or mitigated.

S.6.5 Visit a Reading Room

Review copies of this *Draft Mercury Storage SEIS* and other pertinent documents are available at the following reading rooms.

Colorado

Mesa County Library
530 Grand Avenue
Grand Junction, CO 81502-5019
(970) 243-4442

U.S. Department of Energy
Office of Legacy Management
2597 Legacy Way
Grand Junction, CO 81503
(970) 248-6089

District of Columbia

U.S. Department of Energy
Freedom of Information Reading Room
1000 Independence Avenue, SW
Room 1G-033
Washington, DC 20585
(202) 586-5955

Georgia

Augusta State University
Reese Library
2500 Walton Way
Augusta, GA 30904
(706) 737-1745

Savannah State University
Asa H. Gordon Library
2200 Tompkins Road
Savannah, GA 31404
(912) 356-2183

Idaho

U.S. Department of Energy
Public Reading Room
1776 Science Center Drive
Idaho Falls, ID 83402
(208) 526-0833

Missouri

Mid-Continent Public Library
Blue Ridge Branch
9253 Blue Ridge Boulevard
Kansas City, MO 64138
(816) 761-3382

Nevada

Mineral County Library
First & "A" Street
Hawthorne, NV 89415
(775) 945-2778

New Mexico

U.S. Department of Energy
Government Information Department
Zimmerman Library/University of New Mexico
1 University of New Mexico
Albuquerque, NM 87131
(505) 277-7180

U.S. Department of Energy
Carlsbad Field Office
WIPP Information Center
4021 National Parks Highway
Carlsbad, NM 88220
(575) 234-7348

Eunice Public Library
1039 10th Street
Eunice, NM 88231
(575) 394-2336

Oregon

Portland State University
Government Information
Branford Price Millar Library
1875 SW Park Avenue
Portland, OR 97201
(503) 725-5874

South Carolina

University of South Carolina–Aiken
Gregg-Graniteville Library
471 University Parkway
Aiken, SC 29801
(803) 641-3320

South Carolina State Library
1500 Senate Street
Columbia, SC 29211
(803) 734-8026

Texas

Andrews County Library
109 NW 1st Street
Andrews, TX 79714
(432) 523-9819

Washington

U.S. Department of Energy
Public Reading Room
Consolidated Information Center
2770 University Drive
Room 101L
Richland, WA 99352
(509) 372-7443

University of Washington
Suzzallo-Allen Library
Government Publications Division
Seattle, WA 98195
(206) 543-1937

Gonzaga University
Foley Center Library
101-L East 502 Boone
Spokane, WA 99258
(509) 313-5931

CHAPTER 1
INTRODUCTION AND
PURPOSE AND NEED FOR AGENCY ACTION

CHAPTER 1
INTRODUCTION AND PURPOSE AND NEED FOR AGENCY ACTION

The U.S. Department of Energy (DOE) is required to develop a capability for the safe and secure long-term management and storage of elemental mercury pursuant to the Mercury Export Ban Act of 2008 (P.L. 110-414). Accordingly, DOE will identify or construct an appropriate facility(ies) to host this capability. DOE's proposed action is to select a suitable location for the long-term management and storage of elemental mercury generated within the United States. DOE has prepared this *Draft Long-Term Management and Storage of Elemental Mercury Supplemental Environmental Impact Statement (Draft Mercury Storage SEIS)* (DOE/EIS-0423-S1) in accordance with implementing regulations under the National Environmental Policy Act (40 CFR 1500–1508; 10 CFR 1021). To date, DOE has not issued a Record of Decision pursuant to the *Long-Term Management and Storage of Elemental Mercury Environmental Impact Statement (Mercury Storage EIS)* issued in January 2011. Prior to making a final decision, DOE is considering three additional locations that are reasonable to site a storage facility(ies) for elemental mercury. Relevant information and data from the January 2011 *Mercury Storage EIS* that remain unchanged have been reproduced and presented in this draft SEIS for the convenience of the reader. The U.S. Environmental Protection Agency and the U.S. Bureau of Land Management are cooperating agencies in the preparation of this *Draft Mercury Storage SEIS*.

1.1 INTRODUCTION

Mercury is a naturally occurring element. Mercury enters the environment through natural processes such as volcanoes and wildfires. Human activities that release mercury to the environment include fuel burning, incineration, metal smelting, use of mercury in industrial processes, mining, waste disposal, and production of commercial products containing mercury. Sometimes called "quicksilver," liquid mercury has been used in manufacturing processes because it conducts electricity, reacts to temperature changes, and alloys with many other metals. Examples of products that historically contained or currently contain mercury include batteries, paint, thermometers, thermostats, blood pressure monitors, switches for automobile lighting, fluorescent lights, and dental fillings.

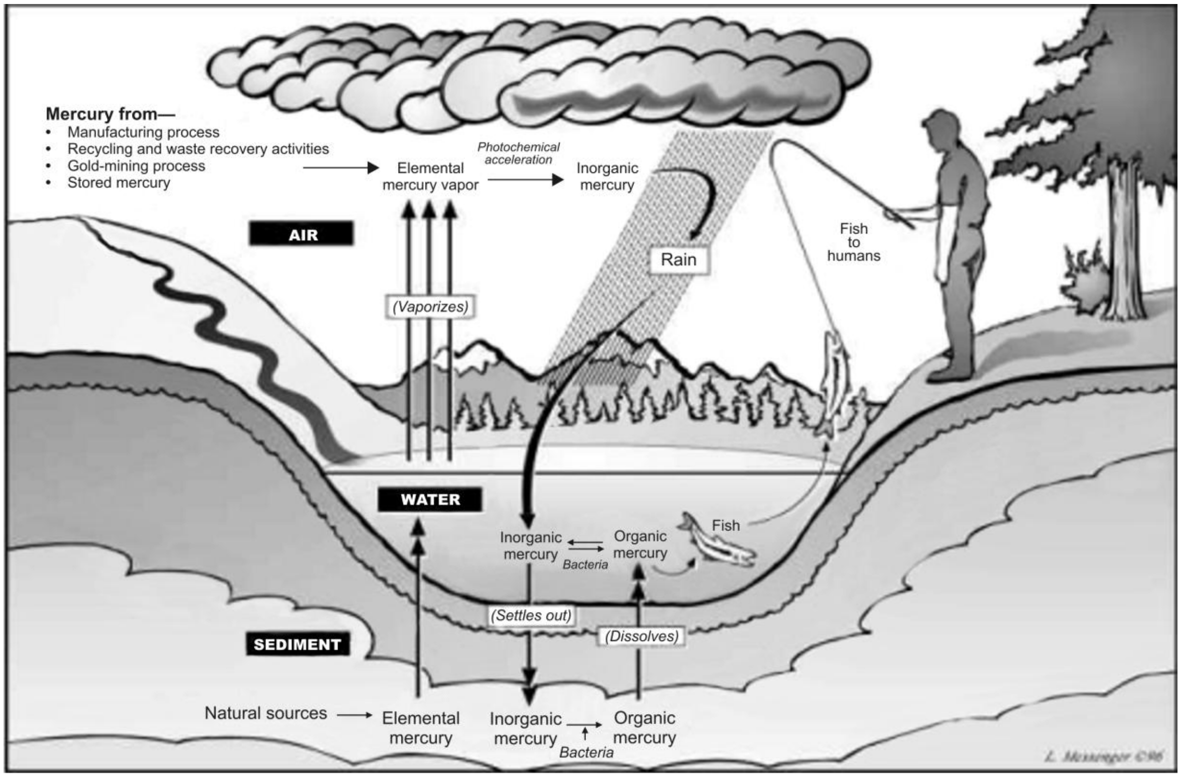
What Is Elemental Mercury? Why is it of Concern?

Elemental mercury is a dense, naturally occurring metal that is liquid at room temperature. Mercury is a globally deposited pollutant, affecting water bodies near industrial sources (e.g., the Great Lakes) and remote areas (e.g., the Arctic Circle). Mercury is found in the environment as elemental mercury (e.g., elemental mercury vapor [Hg^0], inorganic mercury compounds (e.g., mercuric chloride [$HgCl_2$] and mercuric sulfide [HgS]); and organic mercury compounds (e.g., methylmercury [CH_3Hg]).

Mercury and its compounds are persistent, bioaccumulative, and toxic. The toxic effects of mercury depend on its chemical form and the route of exposure. Methylmercury, a mercury compound that is generally not used commercially or stored, is the most toxic form. It can affect the immune system; alter genetic systems; and damage the nervous system, including coordination and the senses of touch, taste, and sight. Methylmercury can be particularly damaging to developing embryos. Exposure to methylmercury is usually by ingestion; it is absorbed more readily than other forms of mercury. Less toxic than methylmercury, elemental mercury (Hg^0) vapors can cause tremors, gingivitis, and excitability when inhaled over a long period of time. If elemental mercury is ingested, it is absorbed relatively slowly and can pass through the digestive system without causing damage (USGS 2000).

It is estimated that since the 19th century, the total amount of mercury available in the environment has increased by a factor of two to five above pre-industrial levels. As the quantity of available mercury in the environment has increased, so have the risks of neurological and reproductive problems for humans and wildlife. These increases in risk make mercury a pollutant of environmental concern in the United States and throughout the world (EPA 2000:1).

The mercury emitted from human activities is primarily in its elemental or inorganic forms. This inorganic form of mercury, when bound to airborne particles (Hg_p) or in its gaseous divalent form (Hg^{+2}), is readily removed from the atmosphere by dry deposition (settling) onto land surfaces and wet deposition (precipitation), including deposition in water bodies. Most of the mercury in water, soil, sediment, plants, and animals is in the form of inorganic mercury salts (e.g., mercuric chloride) and organic mercury (e.g., methylmercury). As it cycles through the environment, mercury undergoes a series of chemical and physical transformations (EPA 1997:2-2, 2000:1). Figure 1–1 provides a simplified diagram of how mercury moves through the environment.



Note: Figure modified to include potential sources of mercury other than emissions from manufacturing processes.
Source: Utah 2009.

Figure 1–1. The Mercury Cycle

1.2 PURPOSE AND NEED FOR AGENCY ACTION

The Mercury Export Ban Act of 2008 (P.L. 110-414), hereafter referred to as "the Act," prohibits, as of October 14, 2008, any Federal agency from conveying, selling, or distributing to any other Federal agency, any state or local government agency, or any private individual or entity any elemental mercury[1] under the control or jurisdiction of the Federal agency (with certain limited exceptions, as described in the Act). A copy of the Act is included in Appendix A. The Act also prohibits the export of mercury from the United States effective January 1, 2013 (subject to certain essential-use exemptions). The United States is a net exporter of mercury, exporting over 600 metric tons (660 tons) of mercury between 2004 and 2007 (USGS 2009). Therefore, banning the export of mercury from the United States is expected to result in surplus inventories of mercury.

Section 5 of the Act, "Long-Term Storage," directs the U.S. Department of Energy (DOE) to designate a DOE facility(ies) for the long-term management and storage of mercury generated within the United States.[2] DOE needs to provide such a facility(ies) capable of managing a mercury inventory estimated to

[1] Unless the context indicates otherwise, elemental mercury is referred to hereafter simply as "mercury" in this supplemental environmental impact statement.

[2] DOE has interpreted Section 5 of the Act to authorize DOE to designate an existing and/or new storage facility(ies) at property owned or leased by DOE. Accordingly, if DOE decides to designate a facility that currently is owned by a commercial entity or by another Federal agency, DOE would acquire an appropriate ownership or leasehold interest in that facility to comply with Section 5 of the Act. DOE would ensure that any such facility currently owned by a commercial entity or by another Federal agency would afford DOE the same level of responsibility and control over stored mercury as a facility owned by DOE.

range up to 10,000 metric tons (11,000 tons) based on a 40-year period of analysis, as described in the next section. The Act specifies that the new DOE mercury storage facility(ies) shall not include the Y–12 National Security Complex (Y–12) or any other portion or facility of the Oak Ridge Reservation in Oak Ridge, Tennessee.

Section 5 of the Act authorizes DOE to assess and collect a fee at the time of delivery of mercury to the DOE storage facility(ies) to cover certain costs of long-term management and storage. These costs include operations and maintenance, security, monitoring, reporting, personnel, administration, inspections, training, fire suppression, closure, and other costs required for compliance with applicable laws; such costs shall not include costs associated with land acquisition or permitting. A fee structure has not been determined; however, it is expected that it would be competitive with the costs of other mercury storage options. In addition, the generators of the mercury will be responsible for the costs of shipping mercury to the DOE storage facility(ies). Therefore, much of the costs of mercury storage will be borne by the generators of mercury. The incentive for generators to send their mercury to the DOE facility(ies) is that DOE would take ownership of the mercury and indemnify the generator from future liability, in accordance with Section 5(e) of the Act.

1.3 PROPOSED ACTION

As stated in the January 2011 *Long-Term Management and Storage of Elemental Mercury Environmental Impact Statement (Mercury Storage EIS)*, DOE proposes to construct one or more new facilities and/or select one or more existing facilities (including modification as needed) for the long-term management and storage of mercury, as mandated by Section 5 of the Act. Any such facility(ies) must comply with applicable requirements of Section 5 of the Act, "Management Standards for a Facility," including the requirements of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (RCRA) (42 U.S.C. 6901 et seq.) and other permitting requirements.

1.3.1 Estimated Mercury Inventory

Chapter 1, Section 1.3.1, of the January 2011 *Mercury Storage EIS* provides information on the inventory developed for analysis and is hereby incorporated into this *Draft Long-Term Management and Storage of Elemental Mercury Supplemental Environmental Impact Statement (Draft Mercury Storage SEIS)*. The same inventory is used in this draft SEIS and is shown in Table 1–1.

The Act does not specify how long the DOE mercury storage facility(ies) would need to be operated. For purposes of analysis in the January 2011 *Mercury Storage EIS* and this draft SEIS, DOE assumed the mercury storage facility(ies) would operate over a 40-year timeframe. For purposes of analysis, the January 2011 *Mercury Storage EIS* assumes a 40-year operational period with the first year starting in 2013 and the fortieth year, in 2052. An operational start date is not known at this time; however, the period of analysis remains 40 years. For example, if the mercury storage facility(ies) were to start operations in 2014, the last year of operations would likewise shift to 2053, and so forth. This corresponds to the 40-year planning projection for receipt into storage of up to 10,000 metric tons (11,000 tons) of mercury. A 40-year period of analysis is consistent with the timeframe used in previous analyses by the Defense Logistics Agency (DLA 2004) and the U.S. Environmental Protection Agency (EPA) (EPA 2007). These are estimates with a degree of uncertainty; therefore, it is possible that more or less than 10,000 metric tons of mercury could eventually require storage for a period longer or shorter than 40 years. Additional National Environmental Policy Act (NEPA) documentation would be required to expand the facility(ies) to accept more than 10,000 metric tons of mercury or extend its operations beyond the 40-year period of analysis.

Table 1–1. Anticipated Mercury Inventory

Source	**Years Sent to Storage**[a]	**Quantity (metric tons)**[b]
DOE Y–12 National Security Complex in Oak Ridge, Tennessee[c]	1st – 2nd	1,200
Closure of chlor-alkali plants or conversion to non-mercury-cell technology	1st – 7th	1,100
Waste reclamation and recycling facilities	1st – 40th	2,500
Byproduct of gold mining	1st – 40th	3,700–4,900
Total		**8,500–9,700**

a For purposes of analysis, the January 2011 *Long-Term Management and Storage of Elemental Mercury Environmental Impact Statement* and this *Draft Long-Term Management and Storage of Elemental Mercury Supplemental Environmental Impact Statement* assume a 40-year operational period. It was assumed that the mercury from the Y–12 National Security Complex would be shipped to the DOE-designated storage facility(ies) in the first 2 years of operation; chlor-alkali plant mercury would be shipped in the first 7 years of operation; and waste reclamation and recycling facility and gold-mining byproduct mercury would be shipped over the entire 40-year period of analysis.

b Rounded to two significant figures.

c Depending on ongoing DOE mission needs, the entire inventory of Y–12 National Security Complex mercury or a portion of this inventory could be retained in storage at Y–12 National Security Complex. It is also possible that other governmental sources of elemental mercury could be transferred to the storage facility(ies).

Note: To convert metric tons to tons, multiply by 1.1023.

Key: DOE=U.S. Department of Energy.

There is considerable uncertainty regarding the 10,000-metric-ton (11,000-ton) estimate of mercury that could be sent to DOE for storage. Estimates of mercury generated from gold mining are dependent on the amount of gold mining conducted. Mercury from gold mining could decrease as existing gold deposits are depleted or could increase if additional deposits are discovered. The amount of gold mined is also dependent on the price of gold. The quantity of mercury from waste reclamation and recycling facilities is dependent on the volume of waste and recyclable materials processed and is likely to decrease as programs to collect mercury-containing thermometers, thermostats, switches, and natural gas metering devices are completed. In addition, chlor-alkali plants may close or convert their mercury-cell processes before 2013.

The Act prohibits the export of elemental mercury from the United States beginning in 2013. The Act does not ban the export of mercury compounds. Recognizing the potential for exported mercury compounds to be processed into elemental mercury, Congress directed EPA to publish, no later than 1 year after the date of enactment of the Act, a report on "mercuric chloride, mercurous chloride or calomel, mercuric oxide, and other mercury compounds, if any, that may currently be used in significant quantities in products or processes." EPA submitted a report entitled *Potential Export of Mercury Compounds from the United States for Conversion to Elemental Mercury* to Congress in October 2009. The report provides information on sources, amounts, and uses of mercury compounds; assesses the potential for these compounds to be processed into elemental mercury after export; and provides information for Congress to consider in determining whether to extend the Act's mercury export prohibition to include one or more of these mercury compounds. The report concludes that one mercury compound—mercury(I) chloride (also known as mercurous chloride or calomel)—is likely to be exported and processed into elemental mercury after export. Mercury(I) chloride is currently produced in significant quantities from pollution-control equipment at U.S. gold mines. The report also finds that three other mercury compounds—mercury(II) oxide, mercury(II) sulfate, and mercury(II) nitrate—could possibly be exported and processed into elemental mercury after export (EPA 2009). If certain mercury compounds are eventually added to the mercury export ban, additional environmental review may be necessary. Mercury must meet the acceptance criteria for the DOE storage facility(ies) and must be at least 99.5 percent pure elemental mercury (DOE 2009a).

1.4 DECISIONS TO BE MADE

DOE intends to decide (1) where to locate the mercury storage facility(ies), and (2) whether to use existing buildings, new buildings, or a combination of existing and new buildings.

DOE's objectives for the long-term management and storage of mercury are important to DOE, EPA, and the public. They are, in part, as follows:

- Protect human health and the environment and ensure safety of the public and facility workers.
- Meet the requirements of the Mercury Export Ban Act of 2008.
- Comply with applicable Federal, state, and local statutes and regulations.

DOE will make a decision on the proposed action no sooner than 30 days after publication of EPA's Notice of Availability of the *Final Mercury Storage SEIS* in the *Federal Register*. DOE will announce its decision in a Record of Decision published in the *Federal Register*.

1.5 SCOPE OF THIS SEIS

In the January 2011 *Mercury Storage EIS*, DOE analyzed the following alternative locations for hosting the mercury storage facility(ies).

- Grand Junction Disposal Site near Grand Junction, Colorado
- Hanford Site in the 200-West Area near Richland, Washington
- Hawthorne Army Depot in the Central Magazine Area near Hawthorne, Nevada
- Idaho National Laboratory's Idaho Nuclear Technology and Engineering Center or Radioactive Waste Management Complex near Idaho Falls, Idaho
- Bannister Federal Complex's Kansas City Plant in Kansas City, Missouri
- Savannah River Site E Area near Aiken, South Carolina
- Waste Control Specialists, LLC, site near Andrews, Texas

The analyses presented in the January 2011 *Mercury Storage EIS* remain valid and are incorporated into this draft SEIS with two exceptions: (1) the occupational and public health and safety analysis; and (2) the socioeconomics and environmental justice analysis. This draft SEIS includes updates to the occupational and public health and safety analysis resulting from changes to the definition of severity levels (i.e., magnitude of impacts) for acute-inhalation exposures to the public under certain accident scenarios. This draft SEIS also includes updates to the socioeconomics and environmental justice analyses to incorporate 2010 decennial census information that was not available at the time the January 2011 *Mercury Storage EIS* was published. The updates to the analyses are presented in Appendix B and Appendix E of this draft SEIS. Relevant information and data from the January 2011 *Mercury Storage EIS* that remain unchanged have been reproduced and presented in this draft SEIS for the convenience of the reader.

In this draft SEIS, DOE analyzes three additional locations in the vicinity of the Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico. WIPP is a deep geologic repository for the disposal of radioactive transuranic (TRU) waste generated through defense-related activities. Chapter 3, "Affected Environment," provides a description of this area.

One of the locations addressed in this draft SEIS lies within the boundary stipulated for WIPP under the WIPP Land Withdrawal Act, while the other two locations are outside this boundary but near WIPP to take advantage of existing infrastructure used for WIPP such as roads and electricity. Chapter 2, Figure 2–6, shows the section, township, and range of these parcels of land.

1.5.1 Candidate Site Identification

Chapter 1, Section 1.5.1, of the January 2011 *Mercury Storage EIS* provides information on the screening approach used to identify the sites included in the environmental impact statement (EIS). The candidate sites were included in the EIS analyses if they met most of the criteria listed below. The same approach applies to the identification of the locations analyzed in this draft SEIS.

- The facility(ies) will not create significant conflict with any existing DOE site mission and will not interfere with future mission compatibility.
- The candidate host location has an existing facility(ies) suitable for mercury storage with the capability and flexibility for operational expansion, if necessary.
- The facility(ies) is, or will be, capable of complying with RCRA permitting requirements (see Chapter 5, Sections 5.2.4 and 5.3, of the January 2011 *Mercury Storage EIS*).
- The facility(ies) has supporting infrastructure and a capability or potential capability for flooring that would support mercury loadings.
- Storage of mercury at the facility(ies) is compatible with local and regional land use plans, and new construction would be feasible, as may be required.
- The facility(ies) is accessible to major transportation routes.
- The candidate location has sufficient information on hand to adequately characterize the site.

Recognizing that existing buildings are not available at the three WIPP locations addressed in this draft SEIS, DOE evaluated construction and operation of a new facility(ies) that would meet RCRA requirements. Because the mercury would of necessity be transported to the designated facility(ies), DOE included transportation analyses in the scope of this draft SEIS. These three aspects of this draft SEIS follow the same approach as that used in the January 2011 *Mercury Storage EIS* and are introduced in the sections below.

1.5.2 Construction

Construction impacts are those related to land disturbance, water and air resources, employment, and resource use. Chapter 2, Section 2.2.2, and Appendix C, Section C.2.3, describe construction activities. Chapter 4, Sections 4.2.1, 4.2.3, 4.2.4, 4.2.11, and 4.6, describe the environmental impacts of the construction activities.

1.5.3 Operations

Operational impacts include those related to water and air resources, human health effects, including accidents, and resource use. Chapter 2, Section 2.2.3, and Appendix C, Section C.2.4, describe operational activities. Chapter 4, Sections 4.2.3, 4.2.4, 4.2.9, and 4.6 describe the environmental impacts of the operational activities.

1.5.4 Transportation

Transportation impacts include those related to air emissions, human health, and ecological risk. DOE analyzed the transport of mercury from potential source locations to the designated DOE mercury storage facility(ies), including potential transport of DOE mercury from existing storage at Y–12 in Oak Ridge, Tennessee. DOE evaluated impacts for the transportation of mercury by truck and rail, including transportation accidents, in Chapter 4, Section 4.2.9.1.3.

1.5.5 Closure of Mercury Storage Facility(ies)

For a complete life-cycle analysis, DOE considered the possibility that the facility(ies) could be no longer needed. If the mercury storage facility(ies) is no longer needed at some point in the future, DOE would close it, as described in Chapter 4, Section 4.3. More detailed analysis of closure activity impacts is not possible at this time because DOE has not yet developed plans for future use or closure of this building(s). Reuse or closure plans would be subject to additional environmental analysis, as appropriate.

1.6 PUBLIC INVOLVEMENT IN DEVELOPING THE SCOPE OF THIS SEIS

As a preliminary step in the development of an EIS (or SEIS), regulations established by the Council on Environmental Quality (40 CFR 1501.7) and DOE require "an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a Proposed Action." The purpose of this scoping process is (1) to inform the public about a proposed action and the alternatives being considered and (2) to identify and clarify issues relevant to the EIS by soliciting public comments.

On June 5, 2012, DOE published the "Notice of Intent to Prepare a Supplemental Environmental Impact Statement for the Long-Term Management and Storage of Elemental Mercury" in the *Federal Register* (77 FR 33204) (see Appendix A). Publication of the Notice of Intent initiated a 30-day public scoping period. During this time, DOE solicited comments from Federal, state, and local agencies; stakeholders; tribal nation representatives; and the general public to assist in defining the scope of this draft SEIS. DOE hosted two meetings to obtain public comments on the proposed scope of this draft SEIS. The public scoping meetings were held on June 26, 2012, in Carlsbad, New Mexico, and June 28, 2012, in Albuquerque, New Mexico.

A total of approximately 65 people attended these meetings. Each meeting began with a short DOE presentation on the NEPA process and the proposed scope of this draft SEIS. Following the presentation, attendees were invited to provide comments. Oral comments were recorded by a court reporter; written comments were also accepted. In addition, the public was provided with the opportunity to discuss issues directly with DOE management and technical specialists who staffed an exhibit area.

For those individuals who could not attend one of the public scoping meetings, DOE provided other methods to submit comments: (1) the mercury storage project website (http://www.mercurystorageeis.com), (2) email to David.Levenstein@em.doe.gov, and (3) U.S. mail to Mr. David Levenstein, Document Manager, Office of Environmental Compliance (EM–11), U.S. Department of Energy, Post Office Box 2612, Germantown, Maryland 20874.

DOE received 92 comment documents during the scoping period. A total of 19 oral comments were recorded in the meeting transcripts. DOE considered all public comments equally in refining the scope of this draft SEIS; the comments and DOE's responses are summarized below.

1.6.1 Summary of Major Public Scoping Comments and DOE's Responses

Candidate Sites in the WIPP Vicinity

Comments: Commentors expressed concern about New Mexico becoming a "dumping ground," and opposition to expansion of the WIPP mission. Several commentors stated that mercury storage would do nothing to clean up existing mercury contamination in the region and would not reduce mercury levels in New Mexico. Other commentors pointed out that there are legal restrictions under the WIPP Land

Withdrawal Act limiting WIPP to the disposal of TRU waste from defense activities. Opposition to locating a disposal facility for greater-than-Class C (GTCC) and DOE GTCC-like waste in the WIPP vicinity was included in a number of comments about the scope of the SEIS.

Other commentors expressed support for including the locations in the WIPP vicinity among the candidate sites for long-term management and storage of mercury. Some commentors noted that the Act created a real need for the long-term storage facility. Other commentors stated that the mercury storage facility would not interfere with the mission of WIPP. A few commentors noted that there is an existing potash mining lease associated with one of the proposed locations (i.e., WIPP Vicinity Section 10), which could potentially interfere with siting a mercury storage facility at this location.

Response: This draft SEIS is being prepared in response to a specific requirement that DOE identify, construct, and operate a facility(ies) for mercury storage as opposed to disposal. Mercury cleanup is addressed under other statutes and regulations. The Act considers the Nation's best interests in removing excess mercury in the United States from global commerce by placing it in a safe and secure facility(ies). DOE acknowledges that new legislation may be required for DOE to construct and operate a facility for long-term management and storage of mercury at any of the WIPP Vicinity reference locations. In the Notice of Intent published on June 5, 2012, DOE identified two candidate locations that would be evaluated in an SEIS for the long-term management and storage of elemental mercury. After consideration of scoping comments received, DOE decided to evaluate a third candidate location. The third location is WIPP Vicinity Section 35, located adjacent to and outside of the WIPP land withdrawal boundary approximately 5.6 kilometers (3.5 miles) southeast of the WIPP facility.

Environmental Considerations

Comments: Commentors expressed concern regarding safety aspects of transporting the mercury to the storage facility, the potential for spills, and potential mercury toxicity to downstream surface-water locations. Commentors recognized that DOE has established an excellent safety record regarding transportation to and disposal of TRU waste at WIPP, and that job creation in the Carlsbad area would benefit the community. DOE was encouraged to include information on habitat areas and threatened and endangered species in Eddy County. Commentors expressed concern about potential environmental justice issues and requested that an adequate region of influence be included in the SEIS. One commentor asked that the SEIS define what "long-term" management means and include consideration of disposal in salt.

Response: As discussed in Chapter 4, Section 4.2.9.1.3, DOE evaluates potential health and safety impacts of transportation in this draft SEIS, including accidents and routine operations. DOE agrees that WIPP has established an excellent transportation and onsite safety record. The scope of analysis for this draft SEIS includes land use and visual resources; geology, soils, and geologic hazards; water resources; meteorology, air quality, and noise; ecological resources; cultural and paleontological resources; site infrastructure; waste management; occupational and public health and safety; ecological risk; socioeconomics; and environmental justice. The region of influence for environmental justice analysis was defined taking into consideration the distance from the candidate sites where significant impacts would occur. The SEIS scope does not include analysis related to final disposal of mercury; long-term management and storage of mercury has been defined as 40 years for purposes of analysis, but may be indefinite until a final disposal pathway can be identified that complies with all disposal regulations.

1.7 OTHER RELEVANT NATIONAL ENVIRONMENTAL POLICY ACT REVIEWS

The January 2011 *Mercury Storage EIS* contains descriptions of relevant NEPA documents, including NEPA documents pertaining to the candidate sites analyzed in that EIS. Those descriptions are incorporated in this draft SEIS, and the reader is referred to Chapter 1, Section 1.9, of the January 2011 *Mercury Storage EIS*. The following additional documents are relevant to this draft SEIS.

1.7.1 ***Final Environmental Impact Statement for the Waste Isolation Pilot Plant*** **and Two Associated SEISs**

In the *Final Environmental Impact Statement for the Waste Isolation Pilot Plant* (DOE/EIS-0026) (DOE 1980) and two SEISs (DOE/EIS-0026-S-1 and DOE/EIS-0026-S-2) issued in 1990 and 1997 (DOE 1990, 1997), DOE analyzed the development, operation, and transportation activities associated with WIPP, a mined repository for TRU waste near Carlsbad, New Mexico. In the 1997 *Waste Isolation Pilot Plant Disposal Phase Final Supplemental Environmental Impact Statement (WIPP SEIS II)*, DOE analyzed the impacts from management and operation of WIPP to support disposal of TRU waste. DOE determined that the operation of WIPP during the period when it would be accepting waste shipments from around the DOE complex could be accomplished safely and that WIPP would not be expected to result in any long-term (over 10,000 years) impacts on human health as long as the repository was not disturbed after decommissioning (DOE 1997). In the Record of Decision associated with the 1997 *WIPP SEIS II* (63 FR 3624), DOE announced its decision that WIPP would be developed and begin accepting TRU waste for disposal. Since then, DOE published eight supplement analyses of the 1997 *WIPP SEIS II*. The supplement analyses indicated that the identified and projected impacts for all resource areas, including cumulative impacts, were not substantially changed from those previously evaluated, nor did they represent significant new circumstances or information relative to environmental concerns (DOE 2009b).

1.7.2 ***Draft Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste***

DOE prepared the *Draft Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste (Draft GTCC EIS)* (DOE/EIS-0375) (DOE 2011) to evaluate the potential environmental impacts associated with the proposed development, operation, and long-term management of a disposal facility or facilities for GTCC low-level radioactive waste (LLW) and DOE GTCC-like waste. GTCC LLW has radionuclide concentrations exceeding the limits for Class C LLW established by the U.S. Nuclear Regulatory Commission (NRC). GTCC LLW is generated by activities licensed by the NRC or Agreement States and cannot be disposed of in currently licensed commercial LLW disposal facilities. DOE prepared this EIS in response to its obligations set forth in Section 631 of the Energy Policy Act of 2005.

The NRC LLW classification system does not apply to radioactive wastes generated or owned by DOE and disposed of in DOE facilities. However, DOE owns or generates LLW and non-defense-generated TRU radioactive waste, which have characteristics similar to those of GTCC LLW and for which there may be no path for disposal. DOE included these wastes for evaluation in the *Draft GTCC EIS* because similar approaches may be used to dispose of both types of radioactive waste. For the purposes of the *Draft GTCC EIS*, DOE referred to this waste as "GTCC-like waste." The total volume of GTCC LLW and DOE GTCC-like waste addressed in the *Draft GTCC EIS* is about 12,000 cubic meters (420,000 cubic feet), and it contains about 160 million curies of radioactivity. About three-fourths of this volume is GTCC LLW, with DOE GTCC-like waste making up the remaining one-fourth of the volume. DOE evaluated potential disposal locations at the Hanford Site in Washington; Idaho National Laboratory; Los Alamos National Laboratory in New Mexico; the Nevada National Security Site; the Savannah River Site in South Carolina; WIPP, including a location within and a location outside the land withdrawal boundary (Sections 27 and 35) in New Mexico; and generic commercial sites assumed to be located throughout the United States in the four NRC regions. DOE evaluated WIPP deep geologic repository disposal and disposal in intermediate-depth boreholes, near-surface trenches, and aboveground vaults, as appropriate to each site.

1.7.3 *Final Site-Wide Environmental Impact Statement for the Y–12 National Security Complex*

As one of the National Nuclear Security Administration's major production facilities, Y–12 is the primary site for enriched uranium processing and storage, and one of the primary manufacturing facilities for maintaining the U.S. nuclear weapons stockpile. Y–12 supplies nuclear weapons components, dismantles weapons components, safely and securely stores and manages special nuclear material, supplies special nuclear material for use in naval and research reactors, and dispositions surplus materials. The *Final Site-Wide Environmental Impact Statement for the Y–12 National Security Complex* (DOE/EIS-0387) (NNSA 2011) analyzes the potential environmental impacts of reasonable alternatives for ongoing and foreseeable future operations, facilities, and activities at Y–12. This EIS is relevant because it includes management of the 1,200 metric tons (1,300 tons) of mercury currently stored at Y–12.

1.8 ORGANIZATION OF THIS *MERCURY STORAGE SEIS*

This draft SEIS consists of one volume, which includes the *Summary and Guide for Stakeholders*. The chapters are briefly described below.

- Chapter 1, "Introduction and Purpose and Need for Agency Action," introduces the health and environmental concern about mercury, provides background information on the Mercury Export Ban Act of 2008, describes the purpose and need for action and the proposed action, and summarizes the mercury inventory used in this draft SEIS, as well as the January 2011 *Mercury Storage EIS*. It also describes the scope of this draft SEIS and other relevant NEPA documents.

- Chapter 2, "Facility Description, Alternatives, and Comparison of Environmental Consequences," describes the new mercury storage candidate sites analyzed in this draft SEIS, the activities that would take place, and a comparison of impacts associated with the candidate sites analyzed in this draft SEIS and in the January 2011 *Mercury Storage EIS*.

- Chapter 3, "Affected Environment," describes the potentially affected environments in the WIPP vicinity. The level of detail presented for each resource (e.g., air quality, water resources) depends on the likelihood that the resource would be affected by mercury management and storage activities.

- Chapter 4, "Environmental Consequences," describes the potential impacts on the affected environment of the proposed mercury storage facility alternatives, including cumulative impacts and unavoidable adverse impacts. It also discusses potential future closure activities, irreversible and irretrievable commitments of resources, the relationship between short-term uses of the environment and long-term productivity, and mitigation.

- Chapter 5, "Environmental Laws, Regulations, Permits, and Other Potentially Applicable Requirements," describes the environmental and health and safety compliance requirements governing implementation of the alternatives, a summary of permit requirements, and the status of consultations with Federal and state agencies and American Indian tribal governments.

- Chapters 6, 7, 8, and 9 are the "Glossary," "List of Preparers," "Distribution List," and "Index," respectively.

The appendices include descriptions of methods used to estimate environmental impacts of the alternatives and detailed information to support the impact analyses. The appendices are as follows:

- Appendix A – "The Mercury Export Ban Act of 2008 and *Federal Register* Notices"
- Appendix B – "Impact Assessment Methodology"
- Appendix C – "Storage Facility Construction and Operations Data"
- Appendix D – "Human Health and Ecological Risk Assessment Analysis"
- Appendix E – "Updates to the January 2011 *Mercury Storage EIS*"
- Appendix F – "Common and Scientific Names of Plant and Animal Species"
- Appendix G – "Cooperating Agency Agreements"
- Appendix H – "Contractor National Environmental Policy Act Disclosure Statement"
- Appendix I – "Responses to Consultation Requests"

1.9 REFERENCES

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CHAPTER 2

FACILITY DESCRIPTION, ALTERNATIVES, AND COMPARISON OF ENVIRONMENTAL CONSEQUENCES

CHAPTER 2
FACILITY DESCRIPTION, ALTERNATIVES, AND COMPARISON OF ENVIRONMENTAL CONSEQUENCES

Chapter 2 provides descriptions of basic design requirements for a new facility(ies) that may be used for the long-term management and storage of elemental mercury and the alternative locations that are being considered in this *Draft Long-Term Management and Storage of Elemental Mercury Supplemental Environmental Impact Statement (Draft Mercury Storage SEIS)*. Seven candidate sites were previously evaluated as alternatives for long-term mercury storage in the January 2011 *Long-Term Management and Storage of Elemental Mercury Environmental Impact Statement (Mercury Storage EIS)* (DOE 2011) and are still under consideration. A summary description of these alternative locations is provided in this chapter; however, detailed descriptions can be found in Chapter 2 of the January 2011 *Mercury Storage EIS*. This chapter concludes with a summary of impacts and a comparison of impacts analyzed in this *Draft Mercury Storage SEIS* with those analyzed in the January 2011 *Mercury Storage EIS*.

2.1 INTRODUCTION

As previously discussed in Chapter 1, Section 1.2, "Purpose and Need for Agency Action," the U.S. Department of Energy (DOE) estimates that up to approximately 10,000 metric tons (11,000 tons) of excess elemental mercury may be eligible for long-term management and storage in a DOE-designated facility(ies) based on a 40-year period of analysis.[1, 2] DOE's selection of a mercury storage facility(ies) would comply with the requirements of Section 5(a) of the Mercury Export Ban Act of 2008 (referred to hereafter as "the Act"), entitled "Designation of a Facility." Specifically, Section 5(d) of the Act, entitled "Management Standards for a Facility," requires DOE to construct and operate the facility(ies) in accordance with the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (RCRA) (42 U.S.C. 6901 et seq.). The mercury to be stored at the DOE facility(ies) must be elemental with a purity of 99.5 percent or greater by volume (DOE 2009).[3]

Potential sources of excess mercury in the United States that may require long-term storage in a DOE facility(ies) are illustrated in Figure 2–1 and include (1) that resulting from closure of chlor-akali plants or conversion to non-mercury-cell technology; (2) that generated as a byproduct of the gold-mining process; (3) that reclaimed from recycling and waste recovery activities; (4) DOE mercury at the Y–12 National Security Complex (Y–12); and (5) other relatively minor sources. Only four chlor-alkali plants are expected to still be using mercury-cell technology beyond 2010: Ashta Chemical in Ohio,

[1] Unless the context indicates otherwise, elemental mercury is referred to hereafter simply as "mercury" in this supplemental environmental impact statement.

[2] The Mercury Export Ban Act of 2008 does not require that mercury be stored in a DOE mercury storage facility(ies), nor does the Act specify how long such a facility(ies) would need to be operated. The U.S. Environmental Protection Agency projected in the report *Mercury Storage Cost Estimates* (EPA 2007), that, in addition to governmental stockpiles of mercury, 7,500 to 10,000 metric tons (8,300 to 11,000 tons) of mercury may become excess over the next 40 years. In preparing this *Draft Long-Term Management and Storage of Elemental Mercury Supplemental Environmental Impact Statement*, DOE has reexamined these estimates. For purposes of analysis, DOE assumes the operation of a mercury storage facility(ies) with a capacity of 10,000 metric tons over a 40-year period of analysis. These are estimates with a degree of uncertainty; therefore, it is possible that more or less than 10,000 metric tons of mercury could eventually require storage for a period longer or shorter than 40 years. Additional National Environmental Policy Act analysis may be required to expand the facility(ies) to accept more than 10,000 metric tons of mercury or extend its operations beyond the 40-year period of analysis.

[3] The treatment standard for wastes containing high concentrations of mercury (greater than 260 parts per million) is recovery through roasting or retorting, which is performed at various commercial waste recovery facilities. This process yields high purity (e.g., elemental mercury that is at least 99.5 percent pure by volume) that is generally acceptable for reintroduction back into commerce and is analogous to the materials proposed to be stored in a DOE facility(ies). Therefore, only mercury with greater than 99.5 percent purity by volume would be accepted for long-term storage in a DOE facility(ies).

PPG Industries in West Virginia, and Olin Corporation in Tennessee and Georgia (Chlorine Institute 2008).[4] Mining in the state of Nevada accounts for more than 80 percent of gold production and produces almost all of the byproduct mercury in the United States, although South Dakota reportedly generates small amounts (less than 1 metric ton [1.1 tons] per year) of byproduct mercury (Miller and Jones 2005; Townsend 2009). Comparatively, the latest available data for Nevada report the generation of approximately 97 metric tons (107 tons) of byproduct mercury in 2002 (Miller and Jones 2005). Alaska, California, Colorado, and Utah are active gold-mining states; however, the mines located in these states reportedly do not generate byproduct mercury (Clinkenbeard 2009; Krahulec 2009; Mannon 2009; Szumigala 2009). As reported by the U.S. Geological Survey in 2009, the six reclamation and recycling companies shown on the map in Figure 2–1 account for the majority of secondary mercury reclamation and recycling efforts (USGS 2009). However, virtually all commodity-grade (e.g., elemental) mercury used in the United States is ultimately supplied by Bethlehem Apparatus Company in Pennsylvania or DFG Mercury Corporation in Illinois. These two companies have the high-level purification equipment necessary for producing commercial-grade mercury (EPA 2005).

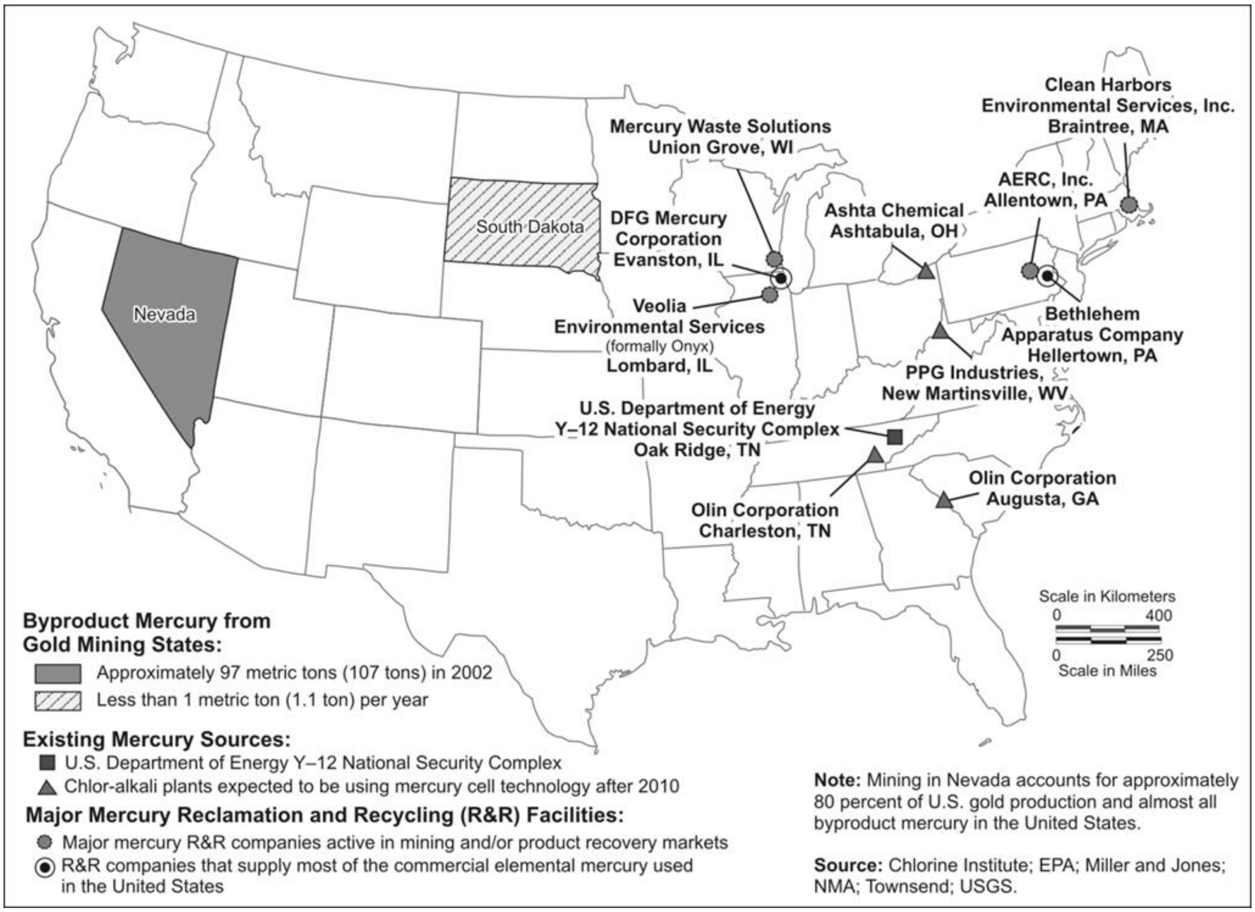

Figure 2–1. Potential Sources of Mercury in the United States

[4] Olin Corporation has announced that its chlor-alkali plants in Tennessee and Georgia will be consolidated and converted to mercury-free technology by the end of 2012 (Pavey 2012). The fate of this mercury is uncertain and may still be eventually shipped to a DOE facility(ies) for long-term management and storage; therefore, the quantities of mercury analyzed in this *Draft Long-Term Management and Storage of Elemental Mercury Supplemental Environmental Impact Statement* remain unchanged.

In March 2004, the Defense Logistics Agency (DLA) Defense National Stockpile Center (DNSC) issued the *Final Mercury Management Environmental Impact Statement (MM EIS)* (DLA 2004), which analyzed alternatives for managing the U.S. Department of Defense stockpile of mercury. The *MM EIS* analyzed consolidated long-term storage at several candidate DNSC and non-DNSC sites. In the Record of Decision (ROD), DLA amended its selection of consolidated storage at one location (69 FR 23733) and DLA selected the Hawthorne Army Depot in Nevada, a non-DNSC candidate site analyzed in the *MM EIS*, for storage of approximately 4,400 metric tons (4,900 tons) of mercury. All 4,400 metric tons (4,900 tons) of defense-related mercury has been successfully transferred to the Hawthorne Army Depot for long-term management and storage (DLA 2012). This quantity of defense-related mercury is not included in the estimates of excess mercury that may require long-term storage in a DOE-designated facility(ies), although the Hawthorne Army Depot site was evaluated in the January 2011 *Long-Term Management and Storage of Elemental Mercury Environmental Impact Statement (Mercury Storage EIS)* for storage of the additional mercury for which DOE would be responsible.

2.2 MERCURY STORAGE FACILITY(IES)

As required by Section 5 of the Act, DOE has developed guidance, entitled *U.S. Department of Energy Interim Guidance on Packaging, Transportation, Receipt, Management, and Long-Term Storage of Elemental Mercury (Interim Guidance)* (DOE 2009), establishing basic standards and procedures for the receipt, management, and long-term storage of mercury at a DOE facility(ies). The guidance is based on laws, regulations, DOE Orders, and best management practices. The *Interim Guidance* discusses DOE's anticipated waste acceptance criteria for discarded mercury to be stored at the facility(ies). All mercury to be stored at the facility(ies) must meet these requirements. Further, it describes the procedures DOE would use to receive, store, and monitor the mercury. In addition, spill and emergency response procedures are described.

Major characteristics of DOE's mercury storage facility(ies) would include, but would not necessarily be limited to, the following (74 FR 31723; DOE 2009):

- RCRA-regulated/permitted with proper spill containment features and emergency response procedures
- Security and access control
- Fire suppression systems
- Ventilated storage and handling area(s)
- Fully enclosed weather protected building
- Reinforced-concrete floors able to withstand structural loads of mercury storage

Additionally, as described in Appendix C, Section C.2.1, the mercury storage facility(ies) would have the following functional areas: Receiving and Shipping Area, Handling Area, Storage Area, and an Office Administration Area. The Office Administration Area is likely to be in a separate building, where all the management, operations, training, and other administrative functions would be conducted. If necessary, transfer of mercury from failed containers into new containers would occur in the Handling Area.

A typical mercury storage facility would be dominated by the Storage Area, which would constitute approximately 90 percent of the floor space. The Storage Area would generally be a large open space similar to a warehouse, where storage, inspection, and monitoring could be effectively performed. The other functional areas would occupy the remaining 10 percent of the facility(ies).

The mercury storage facility(ies) would accept two types of mercury containers: 3-liter (3-L) (34.6-kilogram [76-pound]) flasks and 1-metric-ton (1-MT) (1.1-ton) containers. Other types of containers would be considered on a case-by-case basis.

Figure 2–2 shows the typical 3-L flask and 1-MT container that are used to store and transport mercury. These containers are typically made of carbon steel or stainless steel and also satisfy the U.S. Department of Transportation hazardous materials regulations for mercury transport (49 CFR 172.101). A DOE storage facility with a capacity to store 10,000 metric tons (11,000 tons) of mercury could store up to approximately 116,000 of the 3-L flasks and 6,000 of the 1-MT containers. The numbers of containers are based on an assumed 40:60 percent split between the amount of mercury that is expected to be stored in 3-L flasks (4,000 metric tons [4,400 tons]) and the amount that is expected to be stored in 1-MT containers (6,000 metric tons [6,600 tons]). The 40:60 split is based on a rough estimate of known inventories (DOE 2009). All mercury currently stored at Y–12 is in 3-L flasks. It is anticipated that most of the mercury shipped from the chlor-alkali and mining facilities would be in 1-MT containers, whereas most of the mercury shipped from reclamation and recycling facilities would be in 3-L flasks.

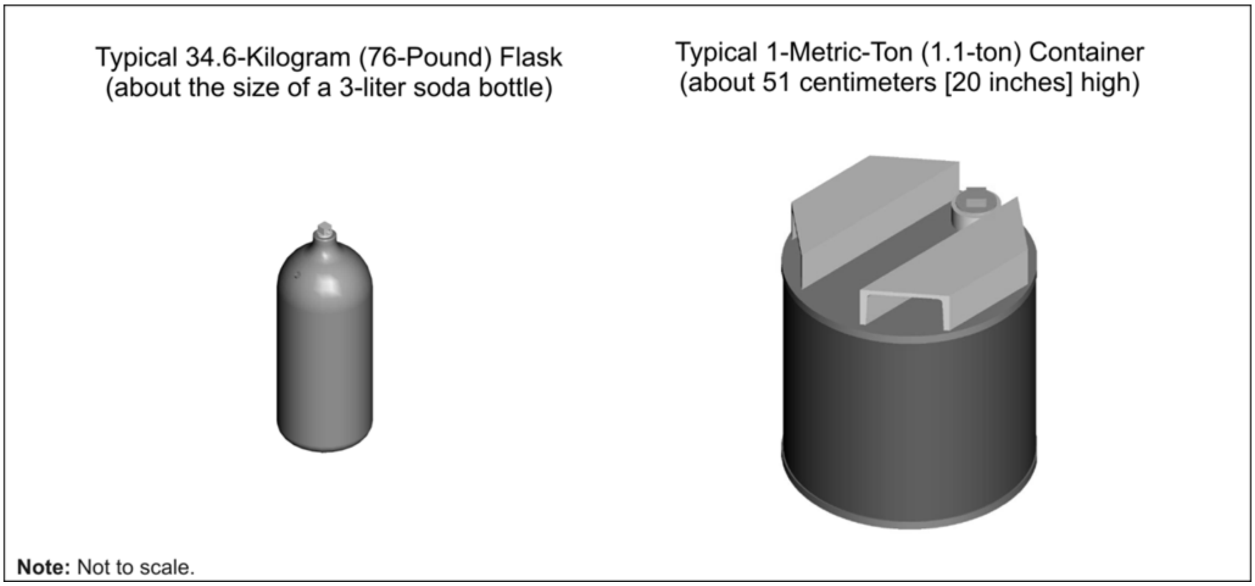

Figure 2–2. Typical Elemental Mercury Storage Containers

2.2.1 New Facility(ies) Description

If constructed, a new mercury storage facility(ies) would be designed and built for the specific purpose of providing the safe and secure long-term storage of mercury. Figure 2–3 provides a conceptual illustration of what the exterior of a new mercury storage facility(ies) might look like, and Figure 2–4 provides a conceptual layout of the interior of a full-size facility (i.e., with a storage capacity of 10,000 metric tons [11,000 tons]) and how the mercury containers might be stored. Appendix C provides additional details and data related to requirements for construction and operation of a new facility(ies).

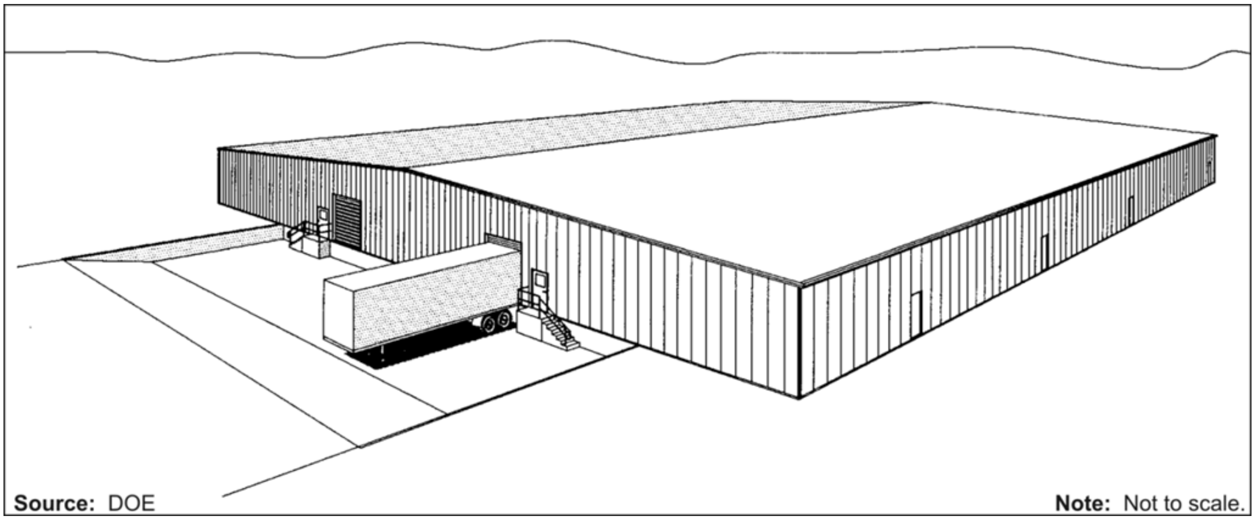

Figure 2–3. Conceptual Exterior Representation of a New Mercury Storage Facility

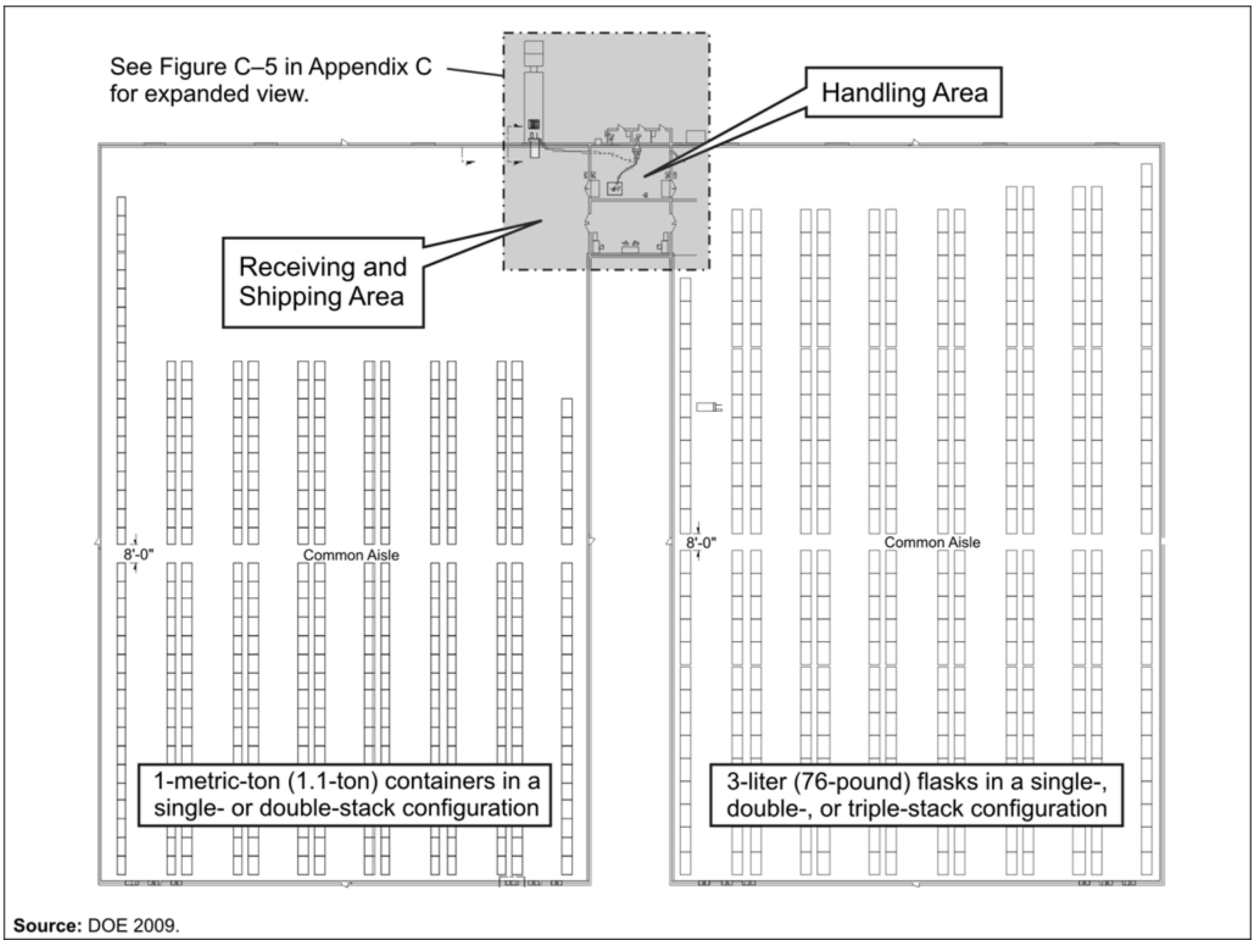

Figure 2–4. Conceptual Layout of a New Mercury Storage Facility

If built, a new mercury storage facility(ies) with a 10,000-metric-ton (11,000-ton) capacity would require approximately 13,610 square meters (146,500 square feet) of storage space. The 1-MT containers may be single- or double-stacked and the 3-L flasks may be single-, double-, or triple-stacked, depending on seismic and safety considerations, as well as the requirements of an RCRA permit. If constructed, the height of the building would be approximately 6.1 meters (20 feet) to accommodate the potential triple stacking of 3-L flasks. The new facility(ies) would have a reinforced-concrete floor, strong enough to withstand the heavy loads from mercury storage. The floors would also be treated with an epoxy sealant to add strength and make them impervious to mercury leaks and spills and water from fire suppression systems. Mercury containers would be stored in spill trays designed to contain at least 10 percent of the volume of mercury stored in each spill tray in the unlikely event one of the containers were to leak. The exterior of the storage facility(ies) would likely be sheet metal panels fastened to structural steel supports and connected together to form a weather-protected structure. The Receiving and Shipping Area would have a loading dock with large rollup doors. Lighting, ventilation, fire suppression, and security monitoring systems would be incorporated into the facility(ies) design. Monitoring systems could include security alarms and surveillance cameras. A new full-size, standalone facility boundary would encompass approximately 3.1 hectares (7.6 acres) and would include a paved area for delivery truck access and vehicle parking. The facility(ies) would also need to be RCRA regulated and permitted, and thus would require, among other things, secondary containment (e.g., curbing), regular inspection of stored materials, strict record-keeping, and periodic reporting.

2.2.2 Construction Requirements

Construction of a new mercury storage facility(ies) with a 10,000-metric-ton (11,000-ton) capacity would require the disturbance of approximately 3.1 hectares (7.6 acres) of land for building construction and equipment laydown areas. When completed, the building footprint would be approximately 1.6 hectares (3.9 acres). Construction of a full-size storage facility would require approximately 6 months; however, due to the uncertainty regarding the timing of the availability of mercury that would require long-term storage, a new facility(ies) could be constructed in a modular fashion to accommodate storage of mercury on an as-needed basis. The ability to build the storage facility(ies) in a modular fashion would also ensure that the facility(ies) is sized correctly for the amount of mercury that would eventually require storage. For example, the Storage Areas of the facility(ies) could be built in two sections, one section at a time, with each section capable of storing 5,000 metric tons (5,500 tons) of mercury.

Construction would entail leveling and grading an area large enough to accommodate the storage building or an area large enough to accommodate each module, which would be built as necessary to meet anticipated storage needs. The foundation would consist of heavily compacted aggregate stone overlain with a reinforced-concrete slab approximately 30 centimeters (12 inches) thick. With the exception of small trenches for connecting to utilities or installing concrete footers, excavation for preparing the site and laying the foundation is not expected to exceed a depth of 0.6 meters (2 feet). Electricity during construction would be provided by portable generators. Complete construction of a full-size facility would require an average of 18 full-time construction workers during a 6-month construction period. Resource requirements for construction of a new mercury storage facility with a 10,000-metric-ton (11,000-ton) capacity are discussed in Chapter 4, Section 4.6.2, and Appendix C, Section C.2.3.

Modifications to existing facilities that may be used for the long-term storage of mercury would likely not require any new disturbance of land. However, minor modifications to candidate existing facilities might include the reconfiguration of space. Examples of possible modifications include installing security monitoring systems, fire suppression systems, and equipment in the Handling Area; upgrading ventilation systems; and implementing spill prevention and containment measures.

2.2.3 Operations Requirements

Worker activity levels at the storage facility(ies) would increase or decrease with the receipt of mercury shipments. Operations personnel would include management and administrative staff, facility technicians, facility maintenance staff, subject matter experts, and security staff. Administrative staff would be responsible for permit maintenance, fee collection, record-keeping, and reporting. The Office Administration Area would require heating, ventilating, and air conditioning for occupants. The Handling Area would be ventilated through the use of a high-negative draw system for removing vapors from mercury "sources" (e.g., container residues, open containers, small spills). The exhaust air would pass through a sulfur filter to remove mercury vapors and be discharged to the outside. An air conditioning unit would be available for maintaining interior temperatures below 21 degrees Celsius (70 degrees Fahrenheit) during times when mercury is being handled to keep its volatility low. The Storage Area would be ventilated using low-vacuum, high-volume, industrial-sized roof- or wall-mounted fans sized to provide multiple air exchanges over a short period of time and to evacuate low-concentration vapors that may accumulate in the storage spaces over time. These fans would operate on an as-needed basis prior to and during occupancy. Facility technicians would be responsible for inspections and leak and small-spill response. Facility maintenance staff would be responsible for maintaining the operability of the building. Subject matter experts would prepare health and safety plans and quality assurance plans and perform industrial hygiene duties. Security provided for the facility(ies) would reduce the threat of inadvertent or deliberate unauthorized access to the facility(ies) and the Storage Area(s). Security measures might include fences, barriers, gates, locks, television monitoring, or surveillance with guards. During the first 7 years of operations, when the facility(ies) is receiving the highest frequency of shipments, approximately eight full-time workers would be required. During the later years of operations, when the frequency of shipments is expected to be much lower, approximately five full-time workers would be required.

If DOE elects to transfer any excess mercury stored at Y–12, it is assumed that this mercury would be shipped to the designated storage facility(ies) within the first 2 years of operation. Closure of the four chlor-alkali plants that use mercury-cell technology, or conversion to mercury-free processes, is expected to be completed by 2020. However, the timing of these closures and/or conversions is difficult to predict; therefore, the frequency of these mercury shipments to the storage facility(ies) is uncertain. Projected shipments to the new storage facility(ies), based on estimated mercury inventories that may become available for long-term storage, are discussed in Appendix D, Section D.2.2. The amount of mercury in each shipment could vary, ranging from a single container up to the maximum load allowable by transportation regulations.

Appendix C, Section C.1, discusses in more detail the projected timing of shipments to the DOE facility(ies).[5] In summary, it is anticipated that the mercury from Y–12 would be transferred in the first 2 years of operation, the mercury from chlor-alkali facilities would be shipped in the first 7 years of operation, and any mercury from mining and reclamation and recycling facilities would be shipped at a steady rate over the 40-year period of analysis. This corresponds to an estimated 66 to 79 truck deliveries (or 23 railcar deliveries) per year in the first two years of operation, 26 to 39 truck deliveries (or 8 railcar deliveries) per year between the third and seventh years of operation, and then 14 to 27 truck deliveries (or 5 railcar deliveries) per year thereafter.

Resource requirements for the operation of a mercury storage facility with a 10,000-metric-ton (11,000-ton) capacity are discussed in Chapter 4, Section 4.6.2, and Appendix C, Section C.2.4.

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5 For purposes of analysis, the January 2011 *Mercury Storage EIS* assumes a 40-year operational period with the first year starting in 2013 and the fortieth year, in 2052. An operational start date is not known at this time; however, the period of analysis remains 40 years. For example, if the mercury storage facility(ies) were to start operations in 2014, the last year of operations would likewise shift to 2053, and so forth.

Operations would include tasks such as facility security, shipping and receiving, inspections, monitoring and long-term storage of mercury, record-keeping, and emergency and small-spill response, as described below (DOE 2009).

- **Facility(ies) Security.** The mercury storage facility(ies) would be within a fenced and secure area with controlled access to the premises. Only authorized vehicles and personnel would be allowed access within the facility(ies) boundary. It is conservatively assumed for labor estimates that security personnel would guard the facility(ies) 24 hours per day, 7 days per week, although this level of security may not be required at all times. Security alarms and surveillance cameras may also be used.

- **Shipping and Receiving.** Mercury containers (3-L flasks and 1-MT containers) would be inspected and prepared for "ready storage" at the originating facility(ies) prior to shipment to the mercury storage facility(ies). All containers shall have sufficient integrity to be transported and placed into long-term storage. Shipments of mercury would most likely be conducted by third-party transportation companies in accordance with regulations governing the transportation of hazardous waste. See Appendix C, Section C.1, for a detailed discussion of shipping containers and methods. After arriving at the facility(ies), if visible mercury contamination or leaking containers are observed, the mercury may be immediately moved to the Handling Area for emergency overpacking or reflasking and may subsequently be returned to the generator, at the generator's expense.

- **Inspections.** Upon arrival at the mercury storage facility(ies), concentrations of mercury vapor would be measured and verified to be below any actionable levels. As discussed in Section 5.3 of the *Interim Guidance,* the actionable level for mercury vapor is the American Conference of Governmental Industrial Hygienists' threshold limit value of 0.025 milligrams per cubic meter as a time-weighted average. A visual inspection would follow to detect any obvious problems that may have occurred while on the truck or railcar. If the initial inspections and manifest documentation are acceptable, then the mercury would be moved to the Shipping and Receiving Area, where additional visual inspections would be performed to check for leaks, structural integrity of pallets and containers, approved container types, corrosion, etc. The mercury would then be moved to the Handling Area for any additional verification that it meets waste acceptance criteria (e.g., 99.5 percent purity). The containers and pallets that pass the acceptance/verification process would be placed into long-term storage and location data would be recorded.

- **Monitoring and Long-Term Storage.** Regular inspections of the mercury containers would be performed in accordance with RCRA regulations within the Storage Area to ensure that no containers are corroding or leaking. Prior to and during occupancy, the Storage Area would be ventilated using low-vacuum, high-volume industrial-sized roof- or wall-mounted vent fans. Monitoring would include testing the airspace for elevated concentrations of mercury vapors.

- **Record-Keeping.** Manifests, inspection records, training logs, and required reports would need to be completed and maintained in accordance with RCRA regulations. These documents would be stored in the Office Administration Area.

- **Emergency and Small-Spill Response.** Spill response would be handled in accordance with the facility's RCRA contingency plan. The Handling Area would be used for transferring mercury from corroding or leaking containers or from containers that have failed inspection upon arrival at the facility(ies) to new containers. The likelihood of these types of occurrences is considered small. When technicians are working with open containers in the Handling Area, the area would be negatively ventilated using a hooded duct system equipped with a sulfur filter designed to remove mercury vapors from the air. Filtered air would be vented to the outside via a small exhaust stack. Personal protective equipment, rags, and spent filters would be placed in 55-gallon (208-liter) drums, characterized, and disposed of off site at an appropriate facility.

2.3 ALTERNATIVE SITES EVALUATED

Chapter 2, Section 2.4, of the January 2011 *Mercury Storage EIS* describes seven candidate sites for the long-term management and storage of elemental mercury. This *Draft Long-Term Management and Storage of Elemental Mercury Supplemental Environmental Impact Statement (Draft Mercury Storage SEIS)* evaluates three additional candidate sites for the long-term management and storage of elemental mercury: Waste Isolation Pilot Plant (WIPP) Vicinity Section 10, WIPP Vicinity Section 20, and WIPP Vicinity Section 35. The names and locations of the candidate sites analyzed in the January 2011 *Mercury Storage EIS* and in this draft SEIS are listed below and presented in Figure 2–5.

- New construction at the Grand Junction Disposal Site
- New construction at the Hanford Site (Hanford) in the 200-West Area
- Existing storage buildings at the Hawthorne Army Depot in the Central Magazine Area
- New construction at Idaho National Laboratory's (INL's) Idaho Nuclear Technology and Engineering Center (INTEC)
- Existing storage buildings at INL's Radioactive Waste Management Complex (RWMC)
- Existing building at the Bannister Federal Complex's Kansas City Plant (KCP)
- New construction at the Savannah River Site (SRS) E Area
- New construction at the Waste Control Specialists, LLC, site (WCS)
- New construction at WIPP Vicinity Section 10
- New construction at WIPP Vicinity Section 20
- New construction at WIPP Vicinity Section 35

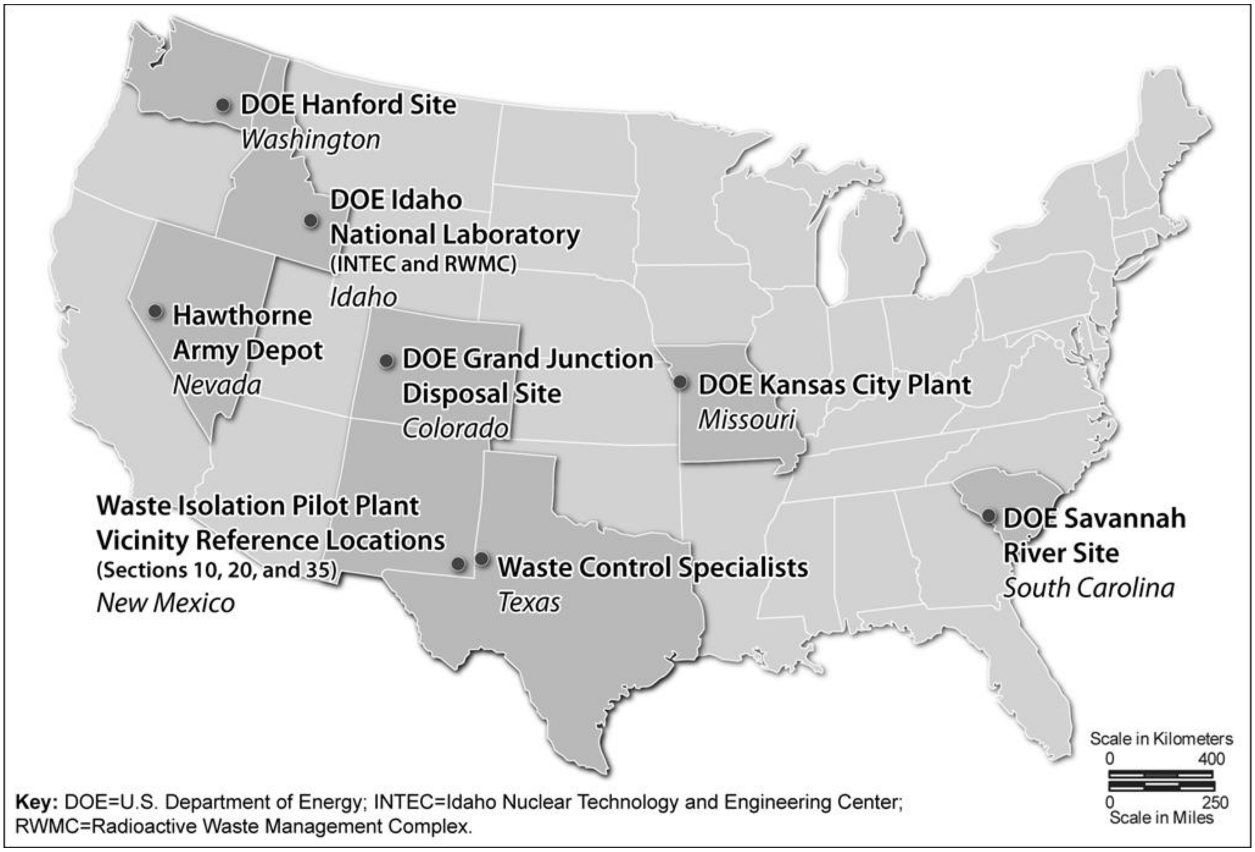

Figure 2–5. Alternative Sites for Long-Term Storage of Mercury

The January 2011 *Mercury Storage EIS* also analyzed the potential impacts associated with the No Action Alternative. The No Action Alternative is discussed in Chapter 2, Section 2.4.1, of the January 2011 *Mercury Storage EIS* (DOE 2011). Under the No Action Alternative, DOE would not designate a facility(ies) for the long-term management and storage of mercury. The No Action Alternative would affect all sources of mercury. Excess mercury that could not be sold would be stored as a commodity to the extent allowed by law. Some mercury would likely be considered waste and would be stored in accordance with law. Such storage would not necessarily occur at the sites identified as potential sources of excess mercury. This storage service might be provided by a commercial waste management company(ies). As discussed further in Chapter 2, Section 2.6.1, several waste management companies have notified DOE of their intent to accumulate and store excess mercury at RCRA-permitted facilities in accordance with Section 5(g)(2)(b) of the Mercury Export Ban Act of 2008. Approximately 1,200 metric tons (1,300 tons) of DOE mercury would continue to be stored at Y–12. This DOE mercury is currently stored in approximately 35,000 of the 3-L flasks at Y–12.

2.3.1 January 2011 *Mercury Storage EIS* Candidate Sites

The candidate sites analyzed in the January 2011 *Mercury Storage EIS* are summarized as follows:

Grand Junction Disposal Site: The Grand Junction Disposal Site is located approximately 29 kilometers (18 miles) southeast of Grand Junction, Colorado. The new facility would be constructed in the northwestern corner of the 146-hectare (360-acre) site, which is owned by DOE and managed by DOE's Office of Legacy Management. Currently, the site has a 38-hectare (94-acre) area used to dispose of uranium mill tailings.

Hanford Site in the 200-West Area: Hanford occupies 151,775 hectares (375,040 acres) along the Columbia River in the southeastern portion of the state of Washington. Hanford is owned by the Federal Government and is managed by DOE. The new facility would be located in the 200-West Area of Hanford at the Central Waste Complex (CWC). Located in the 200-West Area, the CWC receives, stores, and distributes solid radioactive and nonradioactive waste.

Hawthorne Army Depot in the Central Magazine Area: The Hawthorne Army Depot is located approximately 16 kilometers (10 miles) from Hawthorne, Nevada. The 59,500-hectare (147,000-acre) site is owned and managed by the U.S. Department of Defense. DOE would designate a maximum of 29 buildings existing in the Central Magazine Area, which would provide up to approximately 27,000 square meters (290,000 square feet) of storage space for DOE storage of mercury. NOTE: Currently, DLA Strategic Materials (formerly DNSC) is storing approximately 4,400 metric tons (4,900 tons) of elemental mercury at the Hawthorne Army Depot (DLA 2012).

Idaho National Laboratory's Idaho Nuclear Technology and Engineering Center or Radioactive Waste Management Complex: The INL site is a 230,323-hectare (569,135-acre) area located in southeastern Idaho. INL consists of several facility areas situated on an expanse of otherwise undeveloped, cool desert terrain. A new facility would be located at INTEC. Current operations at INTEC include management of sodium-bearing waste, special nuclear material disposition, spent nuclear fuel storage, nuclear material disposition, environmental remediation, and demolition of excess facilities. RWMC has a number of buildings in the Transuranic Storage Area currently dedicated to storage, staging, characterization, and shipping of transuranic (TRU) waste. Seven Type II storage modules could be used for the storage of mercury; each building would provide approximately 2,700 square meters (29,000 square feet) of storage.

Bannister Federal Complex's Kansas City Plant: KCP is part of the 125-hectare (310-acre) Bannister Federal Complex located 13 kilometers (8 miles) south of downtown Kansas City, Missouri. KCP occupies 55 hectares (136 acres) of the complex and is under the custody and control of DOE's National Nuclear Security Administration. Approximately 14,000 square meters (150,000 square feet) of existing storage space within KCP could be available for the long-term storage of mercury.

Savannah River Site E Area: SRS is located in south-central South Carolina and occupies approximately 80,290 hectares (198,400 acres) in Aiken, Barnwell, and Allendale Counties. E Area is located in the central part of SRS. The current land use designation for E Area is Site Industrial Use. E Area, which includes the Old Burial Ground, Mixed Waste Management Facility, TRU waste pads, and E Area Vaults, receives low-level radioactive, TRU, and mixed low-level radioactive waste from all site areas. The new facility would be located in E Area of SRS.

Waste Control Specialists, LLC, Site: Waste Control Specialists, LLC, a commercial entity, owns and operates a large 541-hectare (1,338-acre) site for the treatment, storage, and landfill disposal of various hazardous and radioactive wastes. The site is located approximately 50 kilometers (31 miles) west of Andrews, Texas, and 10 kilometers (6 miles) east of Eunice, New Mexico. The new facility would be located either north or south of the existing WCS complex of buildings. The Container Storage Building, an existing building located within WCS, is presently configured to store hazardous waste and, with minor modifications, could provide storage of up to approximately 2,000 metric tons (2,200 tons) of elemental mercury.

2.3.2 WIPP Facility and Vicinity

WIPP is the Nation's only underground repository for the permanent disposal of defense-generated TRU waste. The WIPP site is located in Eddy County in the Chihuahuan Desert of southeastern New Mexico (see Figure 2–6). The site is about 42 kilometers (26 miles) east of Carlsbad in a region known as Los Medaños, a relatively flat, sparsely inhabited plateau with little surface water. The WIPP site encompasses approximately 41 square kilometers (16 square miles) under the jurisdiction of DOE pursuant to the Waste Isolation Pilot Plant Land Withdrawal Act (WIPP LWA) (P.L. 102-579). The WIPP site covers 16 sections (each section is 2.6 square kilometers [1 square mile]) of Federal land in Township 22 South, Range 31 East, and is divided into four areas under DOE control (see Figures 2–6 and 2–7). A chain-link fence surrounds the innermost Property Protection Area, which includes all of the surface facilities. Surrounding this inner area is the Exclusive Use Area, which is surrounded by a barbed-wire fence. Enclosing these two areas is the Off-Limits Area, which is unfenced to allow livestock grazing but, like the other two areas, is patrolled and posted against trespassing or other land uses. Beyond the Off-Limits Area, the land is managed under the traditional public land use concept of multiple uses, but mining and drilling are restricted. The WIPP site includes all of the necessary surface and subsurface facilities to manage waste handling and disposal operations. In the Notice of Intent published on June 5, 2012, DOE identified two candidate locations that would be evaluated in a supplemental environmental impact statement (SEIS) for the long-term management and storage of elemental mercury. After consideration of scoping comments received that identified potash mining interests in the area, DOE decided to evaluate a third candidate location. A total of three options for long-term storage of mercury in the vicinity of WIPP have been identified: (1) new construction in Section 10 outside the land withdrawal boundary (LWB); (2) new construction in Section 20 inside the LWB;[6] and (3) new construction in Section 35 outside the LWB. These locations will be referred to individually as "WIPP Vicinity Section 10"; "WIPP Vicinity Section 20"; and "WIPP Vicinity Section 35" or together as the "WIPP Vicinity reference locations." Figures 2–6 and 2–7 show the WIPP facility relative to the WIPP Vicinity reference locations.

[6] The Waste Isolation Pilot Plant Land Withdrawal Act (WIPP LWA) (P.L. 102-579) was signed into law on October 20, 1992, and was later amended by the WIPP LWA Amendments of 1996 (P.L. 104-201). The WIPP LWA withdrew approximately 41 square kilometers (16 square miles) of land from the public domain for the purpose of creating and operating WIPP, the geologic repository in New Mexico designated as the national disposal site for TRU waste generated by atomic energy defense activities.

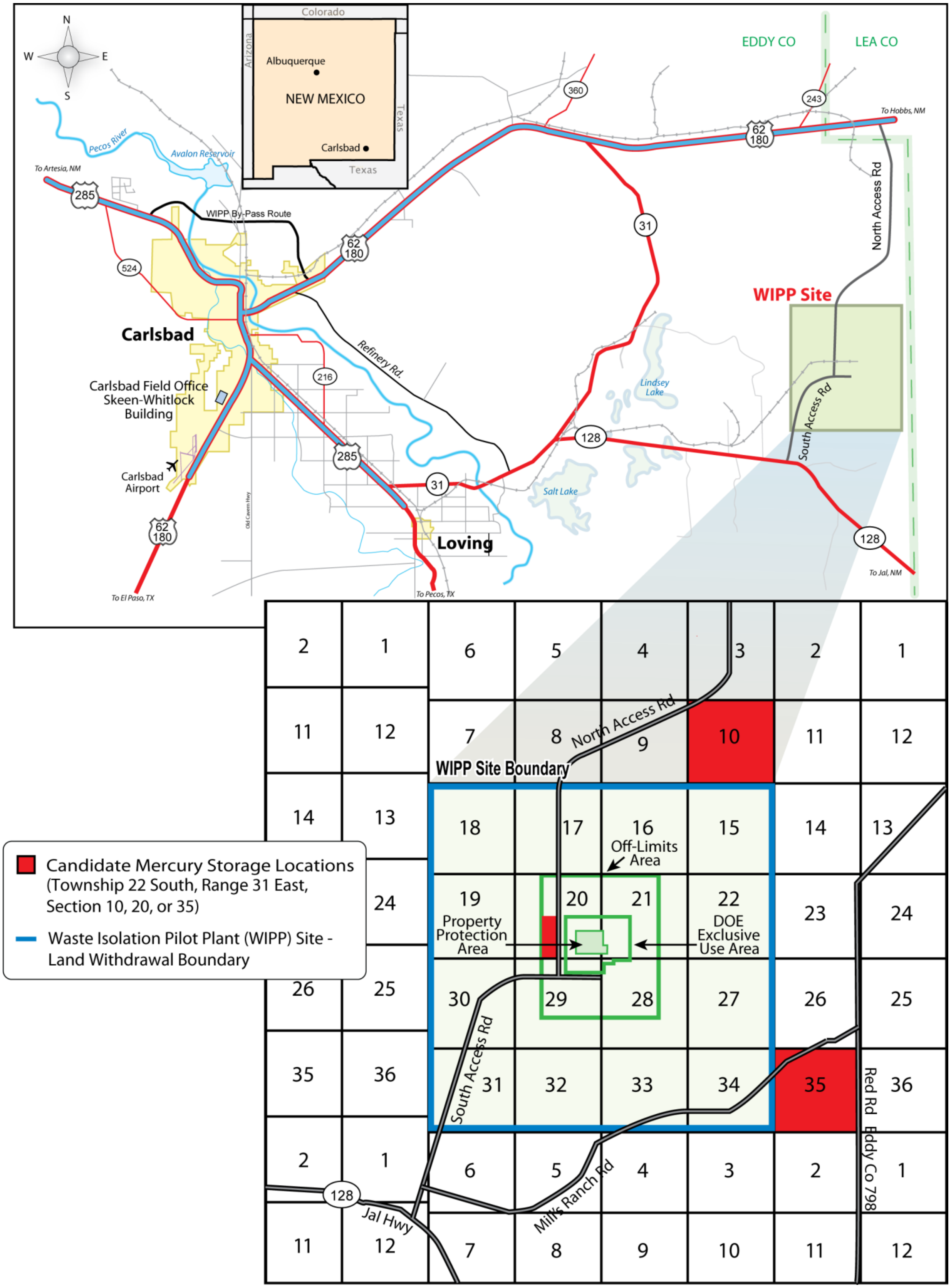

Figure 2–6. WIPP Facility in State of New Mexico

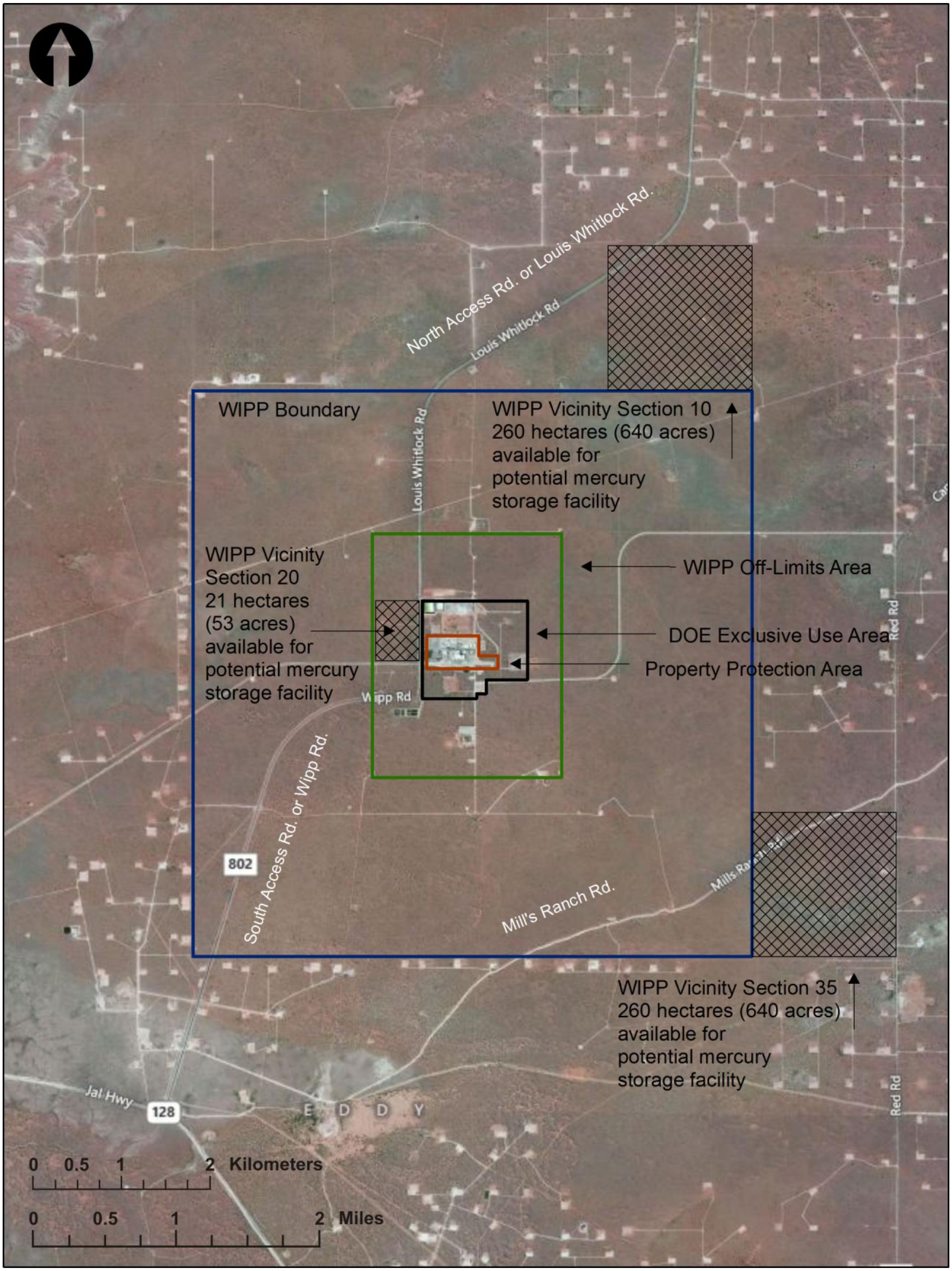

Figure 2–7. WIPP Vicinity Reference Locations

2.3.2.1 WIPP Vicinity Section 10

This alternative involves construction of a new facility, as described in Appendix C, Section C.2. The new facility would be located in Section 10, Township 22 South, Range 31 East, approximately 5.6 kilometers (3.5 miles) north of the WIPP facility, as illustrated in Figures 2–6 and 2–7. A full-size mercury storage facility with up to a 10,000-metric-ton (11,000-ton) capacity would occupy 3.1 hectares (7.6 acres) of the available (approximately 260-hectare [640-acre]) area proposed for locating the facility, as shown in Figure 2–7. The available area for siting a mercury storage facility is not confined to any particular part of Section 10; therefore, the entire 260-hectare (640-acre) Section 10 is defined as the available area. However, it may be more advantageous to site the facility near the North Access Road for truck access and connection to existing utility infrastructure. Truck and rail access are available at the WIPP site.

2.3.2.2 WIPP Vicinity Section 20

This alternative involves construction of a new facility, as described in Appendix C, Section C.2. The new facility would be located in Section 20, Township 22 South, Range 31 East, across the WIPP access road to the west of the WIPP facility within the DOE Exclusive Use Area, as illustrated in Figures 2–6 and 2–7. As shown in Figure 2–7, a full-size mercury storage facility with up to a 10,000-metric-ton (11,000-ton) capacity would occupy 3.1 hectares (7.6 acres) of the available (approximately 21-hectare [53-acre]) area proposed for locating the facility. The available area is defined to the south by a rail line, the east by North Access Road, the west by the boundary of the Off-Limits Area, and the north by the lateral extension of the Exclusive Use Area boundary. Truck and rail access are available at the WIPP site.

2.3.2.3 WIPP Vicinity Section 35

This alternative involves construction of a new facility, as described in Appendix C, Section C.2. The new facility would be located in Section 35, Township 22 South, Range 31 East, approximately 5.6 kilometers (3.5 miles) southeast of the WIPP facility, as illustrated in Figures 2–6 and 2–7. A full-size mercury storage facility with up to a 10,000-metric-ton (11,000-ton) capacity would occupy 3.1 hectares (7.6 acres) of the available (approximately 260-hectare [640-acre]) area proposed for locating the facility, as shown in Figure 2–7. The available area for siting a mercury storage facility is not confined to any particular part of Section 35; therefore, the entire 260-hectare (640-acre) Section 35 is defined as the available area. However, it may be more advantageous to site the facility near Mill's Ranch Road or Red Road for truck access and connection to existing utility infrastructure. Truck and rail access are available at the WIPP site.

2.4 PREFERRED ALTERNATIVE

In the January 2011 *Mercury Storage EIS*, DOE identified WCS near Andrews, Texas, as the Preferred Alternative for the long-term management and storage of mercury. Based on analysis from this draft SEIS and public comment, the Preferred Alternative may or may not change in the final SEIS. At this time, DOE has not changed the Preferred Alternative. In the *Final Mercury Storage SEIS*, DOE will re-evaluate and indicate whether the Preferred Alternative will be changed. DOE will make a decision no sooner than 30 days after publication of the U.S. Environmental Protection Agency Notice of Availability for the *Final Mercury Storage SEIS* in the *Federal Register*. The selection of a site will be based on the January 2011 *Mercury Storage EIS*, this *Mercury Storage SEIS*, and other appropriate factors and will be announced in a ROD in the *Federal Register*.

2.5 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

A number of alternatives were considered but were not evaluated in detail. As required by Council on Environmental Quality regulations (40 CFR 1502.14(a)), the reasons for elimination of these alternatives from detailed study are presented in Chapter 2, Section 2.6, of the January 2011 *Mercury Storage EIS* (DOE 2011). Alternatives may be eliminated from further consideration because of technical immaturity, regulatory unacceptability, or because they do not support the purpose and need for the proposed action.

2.6 COMPARISON OF ALTERNATIVES

This section presents a comparison of alternatives analyzed in this draft SEIS and the January 2011 *Mercury Storage EIS*, including the No Action Alternative. The analyses presented in the January 2011 *Mercury Storage EIS* remain valid and are incorporated into this draft SEIS with two exceptions: (1) the occupational and public health and safety analysis; and (2) the socioeconomics and environmental justice analysis. This draft SEIS includes updates to the occupational and public health and safety analysis resulting from changes to the definition of severity levels (i.e., magnitude of impacts) for acute-inhalation exposures to the public under certain accident scenarios. This draft SEIS also includes updates to the socioeconomics and environmental justice analyses to incorporate 2010 decennial census information that was not available at the time the January 2011 *Mercury Storage EIS* was published. The updates to the analyses are presented in Appendix B and Appendix E of this draft SEIS and are also included as appropriate in the comparison of alternatives presented in this section. Relevant information and data from the January 2011 *Mercury Storage EIS* that remain unchanged have been reproduced and presented in this draft SEIS for the convenience of the reader. Table 2–1 presents a comparison of key physical setting and location factors, i.e., those factors that provide some means of discerning the differences among action alternative sites regarding their surroundings, operational experience, or land use compatibility.

Depending on the resource area, environmental consequences would be negligible, similar with no discernible differences between alternatives, or vary from one alternative to another. Table 2–2 presents a summary comparison of environmental consequences across action alternatives for some resource areas. Those resource area environmental consequences that are projected to be negligible or very low under all action alternatives are not presented in Table 2–2 and include water resources, noise, ecological resources, cultural and paleontological resources, waste management, and socioeconomics.

Because of the various sites and circumstances in which mercury would be stored under the No Action Alternative, environmental consequences would be highly speculative and are not readily quantifiable or comparable to the individual storage sites analyzed under the action alternatives. Mercury storage locations under the No Action Alternative are largely undefined; thus, the potential environmental consequences of storage could be greater or smaller than those presented for the action alternatives. Environmental consequences to land use and visual resources, geology and soils, ecological resources, and cultural and paleontological resources are dependent on the affected environment disturbed and amount of land disturbance that might occur. Because the No Action Alternative could involve expansion and/or modification of storage capacities at multiple locations, it is possible that more or less land, or land with more- or less-sensitive resources than those analyzed under the action alternatives, could be affected. Potential environmental consequences to water resources would depend on the specific location and proximity to surface-water bodies and groundwater aquifers and the current use of these water resources. Therefore, the environmental consequences of the No Action Alternative on water resources could be more or less than under the action alternatives.

Impacts on infrastructure and waste management would depend on the specific infrastructure and waste management capabilities available to support the mercury storage facility(ies). Impacts on socioeconomics and environmental justice would be related to the changes in employment due to mercury storage and the minority and low-income composition of the communities near the mercury storage facility(ies). Because impacts on infrastructure, waste management, socioeconomics, and environmental justice are indeterminate for the No Action Alternative, impacts could be more or less than under the action alternatives.

Under the No Action Alternative, the management and storage of mercury may or may not be conducted in accordance with RCRA regulations. As such, it would be reasonable to conclude that there could be a heightened risk associated with facility accidents and the inconsistent management and storage of mercury containers. This could lead to greater environmental consequences associated with air quality, occupational and public health and safety, and ecological resources. In contrast, because much of the excess mercury would remain at the generating facilities and would not be transferred to a DOE long-term storage facility(ies), it is reasonable to expect that environmental consequences associated with transportation would be somewhat less than those predicted to occur under the action alternatives.

There would be no environmental consequences under the No Action Alternative at any of the candidate sites because a DOE-operated mercury storage facility(ies) would not be constructed and/or operated. Conversely, under any of the action alternatives, there would be beneficial environmental consequences at the various locations where excess mercury is currently stored, including Y–12, because the mercury would be transferred to a DOE facility(ies) for long-term storage.

Action alternatives that involve using existing buildings would result in construction-related impacts that would be very small when compared to action alternatives that involve construction of a new mercury storage facility(ies). In other words, action alternatives in which new construction occurs would likely show somewhat larger impacts than those in which an existing facility(ies) is modified with respect to certain resource areas, e.g., land use, visual resources, air quality, short-term impacts, and commitment of resources.

Table 2–1. Comparison of Action Alternatives – Physical Setting and Location Factors

Site/Resource Factor	Alternatives That Use Existing Buildings			Alternatives That Require New Construction							
									WIPP Vicinity		
	INL RWMC	**Hawthorne Army Depot**	**KCP**	**GJDS**	**Hanford 200-West Area**	**SRS E Area**	**WCS**	**INL INTEC**	**Section 10**	**Section 20**	**Section 35**
Site size in hectares (acres)	INL: 230,323 (569,135) RWMC: 76 (187)	59,500 (147,000)	55 (136)	146 (360)	Hanford: 151,775 (375,040) 200 Areas: 5,064 (12,513)	SRS: 80,290 (198,400) E Area: 134 (330)	Entire site: 5,460 (13,500) Facilities: 541 (1,338)	INL: 230,323 (569,135) INTEC: 107 (264)	WIPP: 4,144 (10,260) Section 10: 260 (640)	WIPP: 4,144 (10,260) Section 20: 21 (53)	WIPP: 4,144 (10,260) Section 35: 260 (640)
Compatible with land use plans?	Yes	Yes; facility use agreement between DoD and DOE may be required.	Yes	1996 MOU possible restriction on land use and current zoning – under evaluation.	Yes	Yes	Yes	Yes	BLM-administered land outside the WIPP LWB used for a mercury storage facility would be withdrawn from all forms of entry, appropriation, and disposal under the public land laws and reserved for the purposes of operating a mercury storage facility. Existing potash mining lease may impact siting a facility.	Land inside the WIPP LWB used for a mercury storage facility would be subject to the provisions of the WIPP LWA and may require Federal legislation.	BLM-administered land outside the WIPP LWB used for a mercury storage facility would be withdrawn from all forms of entry, appropriation, and disposal under the public land laws and reserved for the purposes of operating a mercury storage facility.
Facility or site operates under existing RCRA storage permits.[a]	Yes	Yes	No	No	Yes	Yes	Yes	Yes	WIPP operates under a RCRA storage and disposal permit.		
Seismic risk[b]	0.12 *g*	0.57 *g*	0.05 *g*	0.14 *g*	0.18 *g*	0.17 *g*	0.12 *g*	0.12 *g*	0.08 *g*		
Nearest surface-water feature	Big Lost River Channel 1.6 km (1 mile) northwest. Diversion spread areas (intermittent and seasonal) 1.6 km (1 mile) west.	Walker Lake 5.0 km (3.1 miles) northwest.	Blue River borders site to the east and Indian Creek borders site to the south.	Cheney Reservoir 0.6 km (1 mile) southeast.	Columbia River 10 km (6.2 miles) north. Cold Creek (ephemeral) 4.8 km (3 miles) south.	Upper Three Runs Creek 500 m (1,640 feet) north.	No perennial features within 16 km (10 miles). Ranch house drainage area (intermittent and seasonal) 0.4 km (0.25 miles) southeast.	Big Lost River channel 900 m (2,950 feet) northwest.	Laguna Grande de la Sal, a salt lake, approximately 13 kilometers (8 miles) to the west-southwest.		
Site in 100-year floodplain?	No	No	Yes; flood protection system designed for 500-year flood event.	No	No	No	No	Yes; diversion dam designed for 300-year flood event.	No		
Residential population within 16-km (10-mile) radius[c]	175 (9.8% minority) (18% low-income)	2,583 (23% minority) (15% low-income)	705,513 (36% minority) (13% low-income)	2,823 (14% minority) (11% low-income)	147 (38% minority) (18% low-income)	6,691 (38% minority) (20% low-income)	3,322 (47% minority) (12% low-income)	205 (11% minority) (15% low-income)	550 (44% minority) (6% low-income)	575 (45% minority) (5% low-income)	430 (44% minority) (6% low-income)
Residential population within 3.2-km (2-mile) radius[c]	0	169 (23% minority) (20% low-income)	26,192 (52% minority) (20% low-income)	194 (12% minority) (10% low-income)	0	0	27 (35% minority) (7.8% low-income)	0	36 (45% minority) (5% low-income)	21 (46% minority) (5% low-income)	13 (47% minority) (5% low-income)
Environmental justice considerations within 16-km (10-mile) radius[c]	No minority or low-income census block groups.	1 that is both a minority and low-income census block group (out of 4 blocks).	157 minority only, 5 low-income only, and 88 that are both minority and low-income census block groups (out of 659 blocks).	No minority or low-income census block groups.	2 minority only census block groups and 1 that is both a minority and low-income census block group (out of 4 blocks).	4 minority census block groups and 1 low-income census block group (out of 15 blocks).	2 minority and no low-income census block groups (out of 8 blocks).	No minority or low-income census block groups.	No minority or low-income census block groups.		
Site employment	8,485 (INL)	500–650	2,400	7	9,759 (Hanford)	8,400 (SRS)	150	8,485 (INL)	1,100 (WIPP)		

[a] This factor does not imply that a permit already exists for the storage of DOE mercury; rather, this factor is intended to establish a candidate site's experience operating under other RCRA storage permits. The conditions of any RCRA permit would have to be modified, or in some cases a new application would have to be submitted for approval.

[b] Seismic risk is based on predicted peak acceleration for an earthquake event expected to occur once in 2,500 years. Earthquake-produced ground motion is expressed in units of percent *g* (i.e., force of acceleration relative to that of Earth's gravity). Meteorological risks associated with tornadoes, hurricanes, or floods are bounded by earthquake scenario risks.

[c] Population data have been updated per 2010 census data. The January 2011 *Long-Term Management and Storage of Elemental Mercury Environmental Impact Statement* was based on 2000 census data. See Appendix E.

Note: Various mercury storage locations, many of which are undetermined, would be involved under the No Action Alternative; therefore, these locations are not presented in the above table. Section 2.6 presents a discussion comparing the potential environmental consequences of the No Action Alternative against those of the action alternatives.

Key: BLM=U.S. Bureau of Land Management; DoD=U.S. Department of Defense; DOE=U.S. Department of Energy; GJDS=Grand Junction Disposal Site; Hanford=Hanford Site; INL=Idaho National Laboratory; INTEC=Idaho Nuclear Technology and Engineering Center; KCP=Kansas City Plant; km=kilometers; LWA=Land Withdrawal Act; LWB=land withdrawal boundary; m=meters; MOU=Memorandum of Understanding; RCRA=Resource Conservation and Recovery Act; RWMC=Radioactive Waste Management Complex; SRS=Savannah River Site; WCS=Waste Control Specialists, LLC, site; WIPP=Waste Isolation Pilot Plant.

Table 2–2. Comparison of Action Alternatives – Environmental Consequences

Resource/Site	Alternatives That Use Existing Buildings: INL RWMC	Alternatives That Use Existing Buildings: Hawthorne Army Depot	Alternatives That Use Existing Buildings: KCP	Alternatives That Require New Construction: GJDS	Hanford 200-West Area	SRS E Area	WCS	INL INTEC	WIPP Vicinity: Section 10	WIPP Vicinity: Section 20	WIPP Vicinity: Section 35
Land use and visual resources	New land would not be disturbed nor would any of the proposed existing buildings have to be expanded to accommodate the long-term storage of mercury. Therefore, there would be no impacts on land use or visual resources.			Construction of a new mercury storage facility(ies) would disturb approximately 3.1 hectares (7.6 acres) of land. Because of the low profile of a new storage building, there would be minimal impacts on visual resources.							
Geology and soils	None	May require minor trenching for utility connections.	None	Potentially would disturb and expose up to 3.1 hectares (7.6 acres) of land (i.e., soil) to a depth of approximately 60 centimeters (24 inches) for 6 months. Geologic resource commitments for construction of a new facility(ies) would include approximately 4,755 cubic meters (6,220 cubic yards) of concrete and 3,875 cubic meters (5,070 cubic yards) of crushed stone.							
Air quality	Negligible air emissions would occur for modification of existing buildings. Operation of a long-term mercury storage facility(ies) would not involve the treatment or processing of mercury; therefore, air emissions would be negligible and limited to employee vehicles, trucks, semiannual testing of emergency generators, and venting of residual mercury vapors. Truck and/or rail transport of mercury would result in negligible emissions of criteria and toxic air pollutants.			Minor short-term air quality impacts would occur during construction of a new storage facility(ies), primarily due to dust generation and emissions from heavy equipment. Operation of a long-term mercury storage facility(ies) would not involve the treatment or processing of mercury; therefore, air emissions would be negligible and limited to onsite employee vehicles, trucks, semiannual testing of emergency generators, and venting of residual mercury vapors. Truck and/or rail transport of mercury would result in negligible emissions of criteria and toxic air pollutants.							
	Carbon dioxide would be generated from fuel-burning equipment used in construction of a new facility(ies), if applicable, and from transportation of mercury to the storage facility(ies); however, emissions (maximum of 3,699 metric tons [4,077 tons]) would be negligible compared with the annual worldwide generation of carbon dioxide (estimated at 26.4 billion metric tons [29.1 billion tons]) and would have a negligible effect on the global climate.										
Infrastructure	Negligible; capacity would meet increased demands.	Negligible; capacity would meet increased demands.	Negligible; capacity would meet increased demands.	Moderate; electrical capacity would have to be increased. No public water supply. No rail access.	Negligible; capacity would meet increased demands.	Negligible; capacity would meet increased demands.	Negligible; capacity would meet increased demands.	Negligible; capacity would meet increased demands.	Minor upgrades would be required to provide water and sanitary service to site. Moderate impacts on electrical infrastructure. Negligible impacts on available infrastructure capacities.	Minor upgrades would be required to connect water and sanitary service to existing WIPP infrastructure. Moderate impacts on electrical infrastructure. Negligible impacts on available infrastructure capacities.	Minor upgrades would be required to provide water and sanitary service to site. Moderate impacts on electrical infrastructure. Negligible impacts on available infrastructure capacities.
Occupational and public health and safety[a]											
Normal operations[b]	SL-I consequences and negligible risk to involved workers, noninvolved workers, and members of the public at all sites.										
Facility accidents[b]	Consequences range from SL-I to SL-II with an associated negligible-to-low risk to involved workers and noninvolved workers from both inside and outside spills. Consequences of SL-I with an associated negligible risk to public receptors from inside and outside spills.										
Transportation[a, c]											
Truck kilometers (miles)	2,662,210 (1,654,225)	3,127,892 (1,943,587)	2,230,117 (1,385,734)	2,509,474 (1,559,319)	3,399,774 (2,112,527)	2,707,719 (1,682,503)	2,907,276 (1,806,502)	2,662,210 (1,654,225)	3,007,088 (1,868,523)		
Annual truck accident fatalities[d]	9.2×10^{-4}	1.1×10^{-3}	7.8×10^{-4}	8.7×10^{-4}	1.2×10^{-3}	9.4×10^{-4}	1.0×10^{-3}	9.2×10^{-4}	1.0×10^{-3}		
Truck accident – human health[b]	For spills onto the ground with subsequent evaporation of mercury, the frequency component of the human health risk would be negligible. The risk would also be negligible. Consequences could be in the SL-I, SL-II, SL-III, or SL-IV range. However, SL-III and SL-IV would only be encountered at short distances (< 100 meters [330 feet]). For direct spills of mercury into water, the consequences could be SL-I or SL-II with a negligible-to-low risk (but with a large degree of uncertainty). For truck accidents with fires, acute-inhalation exposures could be in the SL-I, SL-II, or SL-III range, all with corresponding low risks. For deposition directly onto the ground, consequences would be SL-I with negligible risks. For deposition onto the surface of a water body with subsequent human consumption of fish, the frequency side of the risk estimate is always negligible for fish consumption above the SL-I/SL-II threshold at the national average consumption rate and for subsistence fishermen at the average and 95th percentile consumption rates, with negligible risks. However, in severe cases, there is the potential for contaminating water bodies above the SL-I/SL-II threshold (but still with negligible risk) for the 95th percentile subsistence fisherman up 7,000 meters (23,000 feet) downwind.										

Table 2–2. Comparison of Action Alternatives – Environmental Consequences *(continued)*

Resource/Site	Alternatives That Use Existing Buildings			Alternatives That Require New Construction							
									WIPP Vicinity		
	INL RWMC	Hawthorne Army Depot	KCP	GJDS	Hanford 200-West Area	SRS E Area	WCS	INL INTEC	Section 10	Section 20	Section 35
Transportation[a, c] ***(continued)***											
Rail kilometers (miles)	600,162 (372,924)	635,564 (394,922)	403,890 (250,966)	510,579 (317,260)	729,541 (453,317)	461,068 (286,495)	634,260 (394,112)	600,162 (372,924)	685,920 (426,212)		
Annual rail accident fatalities[d]	1.5×10^{-4}	1.6×10^{-4}	1.0×10^{-4}	1.3×10^{-4}	1.9×10^{-4}	1.2×10^{-4}	1.6×10^{-4}	1.5×10^{-4}	1.7×10^{-4}		
Rail accident – human health[b, e]	For spills of mercury onto the ground with subsequent evaporation of mercury, the frequency component of the human health risk would be negligible. The risk would also be negligible. Consequences could be in the SL-I, SL-II, SL-III, or SL-IV range. However, SL-III and SL-IV would only be encountered at short distances (< 100 meters [330 feet]). For direct spills of mercury into water, the consequences could be SL-I or SL-II with a negligible-to-low risk (but with a large degree of uncertainty). For railcar accidents with fires, acute-inhalation exposures could be in the SL-I, SL-II, or SL-III range with low risks. For deposition directly onto the ground, consequences would be SL-I with negligible risks. For deposition onto the surface of a water body with subsequent human consumption of fish, the frequency side of the risk estimate is always negligible for fish consumption at the national average consumption rate and for subsistence fishermen at the average and 95th percentile consumption rates, with negligible risks, with the exception of the dry deposition case, in which there is a low predicted frequency that the 95th percentile subsistence fisherman could be exposed above the SL-I/SL-II threshold. In severe cases, there is the potential for contaminating water bodies above the SL-I/SL-II threshold for the 95th percentile subsistence fisherman up to 10 kilometers (6.2 miles) downwind.										
Ecological impacts[a, b, c]	In the Truck Scenarios with dry deposition, three receptors could potentially be exposed at the SL-II level with a corresponding low risk: sediment-dwelling biota, soil invertebrates, and plants. All other ecological receptors would be exposed at the SL-I level with negligible risk. In the Truck Scenario with rain, only one ecological receptor could potentially be exposed at the SL-IV level: sediment-dwelling biota. The corresponding risk would be moderate. In the same accident scenario, soil invertebrates could be exposed at the SL-III level, with a corresponding low risk. Plants, the American robin, and the river otter could be exposed at the SL-II level, with corresponding low risk. All other ecological receptors would be exposed at the SL-I level with negligible risk. For Railcar Scenarios with dry deposition, sediment-dwelling biota could be exposed at the SL-III level with corresponding low risk; soil invertebrates, plants, and the American robin at the SL-II level with corresponding low risk, and all other ecological receptors at the SL-I level with corresponding negligible risk. For Railcar Scenarios with rain, the frequency of exposure of any ecological receptor is negligible and all risks would be negligible. Exposures within this negligible risk range could be SL-IV (sediment-dwelling biota and soil invertebrates), SL-III (plants), and SL-II (American robin, aquatic biota, and short-tailed shrew). Note that, in all transportation scenarios, aquatic biota, the short-tailed shrew, the great blue heron, and the red-tailed hawk have negligible predicted ecological risk.										
Environmental justice[f]	None	No disproportionately high and adverse impacts. Potential transportation routes are adjacent to identified minority and/or low-income populations; transportation accidents are predicted to pose a negligible-to-low risk to human health.	No disproportionately high and adverse impacts. Potential transportation routes are adjacent to identified minority and/or low-income populations; transportation accidents are predicted to pose a negligible-to-low risk to human health.	None	No disproportionately high and adverse impacts. Potential transportation routes are adjacent to identified minority and/or low-income populations; transportation accidents are predicted to pose a negligible-to-low risk to human health.	No disproportionately high and adverse impacts. Potential transportation routes are adjacent to identified minority populations; transportation accidents are predicted to pose a negligible-to-low risk to human health.	No disproportionately high and adverse impacts. Potential transportation routes are near identified minority populations; transportation accidents are predicted to pose a negligible-to-low risk to human health.	None	None	None	None

[a] Risk is an assessment that is a function of the frequency of an event and the magnitude of its potential impact. See Appendix D, Section D.3.1, of this draft SEIS, for detailed discussion on the qualitative (i.e., negligible, low, moderate, and high) risk assessment.
[b] Consequences are presented by SLs (Severity Levels), with SL-I representing negligible-to-very-low consequences and SL-IV representing the most severe consequences. SLs are defined in Appendix D, Section D.3.1, of this draft SEIS.
[c] The greatest transportation impact under either Truck Scenario 1 or 2 is presented in this table; see Chapter 4 and Appendix D for more details. Truck Scenarios 1 and 2 are defined in Appendix D, Section D.2.2, of this draft SEIS.
[d] Annual fatalities for truck or rail transportation are due to mechanical impacts only and represent the predicted annual average occurrence of an accident involving a fatality over the 40-year analysis period of this environmental impact statement.
[e] Potential transportation impacts by rail to GJDS or WIPP Vicinity Section 10 or 35 would involve intermodal transportation: rail transport to Grand Junction/WIPP, transfer from rail to truck, and truck transport to GJDS/WIPP Vicinity Section 10 or 35.
[f] Population data have been updated per 2010 census data. The January 2011 *Long-Term Management and Storage of Elemental Mercury Environmental Impact Statement* was based on 2000 census data. See Appendix E.

Note: Various mercury storage locations, many of which are undetermined, would be involved under the No Action Alternative; therefore, these locations are not presented in the above table. Section 2.6 presents a discussion comparing the potential environmental consequences of the No Action Alternative against those of the action alternatives.

Key: <=less than; GJDS=Grand Junction Disposal Site; Hanford=Hanford Site; INL=Idaho National Laboratory; INTEC=Idaho Nuclear Technology and Engineering Center; KCP=Kansas City Plant; RWMC=Radioactive Waste Management Complex; SRS=Savannah River Site; WCS=Waste Control Specialists, LLC, site; WIPP=Waste Isolation Pilot Plant.

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2.6.1 Summary of Environmental Consequences

This section summarizes the potential impacts on resources under the draft SEIS alternatives. Detailed descriptions and in-depth discussions of impacts on resources are provided in Chapter 4 of this draft SEIS. This draft SEIS evaluates the impacts on resource areas of the transportation, receipt, and long-term storage of mercury at a designated facility, including construction of the facility. Impacts for the action alternatives other than the WIPP Vicinity reference locations are summarized in the January 2011 *Mercury Storage EIS* Chapter 2, and a detailed discussion is presented in Chapter 4.

As described in Section 2.2.2, a new mercury storage facility(ies) could be built in a modular fashion by constructing sections of the Storage Area on an as-needed basis. The analysis in this EIS assumes that the entire facility (10,000-metric-ton [11,000-ton] capacity) would be constructed at the same time, thereby evaluating the maximum or peak impacts that could reasonably be expected. If the facility(ies) were to be constructed in a modular fashion, impacts would be spread over a longer period and would occur at different times; however, the peak of these impacts would be less.

The No Action Alternative would affect all sources of mercury. Excess mercury that could not be sold would be stored as a commodity to the extent allowed by law. Some mercury would likely be considered waste and would be stored in accordance with law. Such storage would not necessarily occur at the sites identified as potential sources of excess mercury. This storage service might be provided by a commercial waste management company or companies. In brief, such facilities could vary in location, size, natural and human environments, and in the nature of their operations. Therefore, the potential impacts of such storage are speculative. The approximately 1,200 metric tons (1,300 tons) of DOE mercury currently stored in 35,000 of the 3-L flasks at Y–12 would continue to be managed and stored in this location. No new construction would be required at Y–12, nor would any incremental increase in impacts on resource areas occur because storage operations at Y–12 would not change. A discussion on environmental consequences under the No Action Alternative is provided in Chapter 4 of the January 2011 *Mercury Storage EIS*.

On January 1, 2013, the prohibition on the export of mercury went into effect pursuant to the Mercury Export Ban Act of 2008. As of March 1, 2013, five waste management companies have notified DOE of their intent to accumulate and store excess mercury at RCRA-permitted facilities in accordance with Section 5(g)(2)(b) of the Act. The companies and storage locations that have submitted notifications are (1) Chemical Waste Management, Inc., at its facility in Emelle, Alabama; (2) Clean Harbors Environmental Services, Inc., at its facility in Wichita, Kansas; (3) EQ Detroit, Inc., at its facility in Detroit, Michigan; (4) Veolia ES Technical Solutions, L.L.C., at its facility in Port Washington, Wisconsin; and (5) Waste Management Mercury Waste, Inc., at its facility in Union Grove, Wisconsin.[7] All of these companies have certified that they will ship the excess elemental mercury to a DOE-designated facility(ies), when such a facility(ies) is operational and ready to accept the mercury (Clean Harbors 2012; EQ Detroit 2013; Veolia 2013; WM and Chemical 2012).

[7] The listing of companies by name is for informational purposes only and does not imply or suggest an endorsement by DOE. Until such time that DOE has designated a facility(ies) and is ready to accept mercury for long-term management and storage, similar notifications may be received by DOE from other waste management companies.

2.6.1.1 Land Use and Visual Resources

For the WIPP Vicinity reference locations, the required land disturbance for the construction of a mercury storage facility would be approximately 3.1 hectares (7.6 acres). Additionally, the low profile of a long-term mercury storage building, if it were to be constructed, would have minimal impacts on visual resources and would not change the U.S. Bureau of Land Management visual resource management classifications.

As discussed in Chapter 4, Section 4.2.1, and Chapter 5, Section 5.2, land administered by the U.S. Bureau of Land Management at WIPP Vicinity Section 10 or WIPP Vicinity Section 35, both located outside the WIPP LWB, used for construction and operations of a long-term management and storage facility for elemental mercury would be withdrawn from all forms of entry, appropriation, and disposal under the public land laws and reserved for the purposes of operating a mercury storage facility pursuant to the Federal Land Policy and Management Act of 1976. Potash mining in the region surrounding WIPP, including an existing lease for future underground mining operations in Section 10, may influence the ability to site a mercury storage facility due to the potential for increased risk of land subsidence.

Land at WIPP Vicinity Section 20 inside the WIPP LWB used for construction and operations of a long-term management and storage facility for elemental mercury would be subject to the provisions of the WIPP LWA (P.L. 102-579) and may require Federal legislation.

2.6.1.2 Geology, Soils, and Geologic Hazards

Construction of a new storage facility would expose surficial soils for a duration of up to 6 months. These activities would disturb up to 3.1 hectares (7.6 acres) at a depth less than 60 centimeters (24 inches) for the installation of a reinforced-concrete slab and asphalt-covered lots on a compacted gravel base. Some trenching may be required below 60 centimeters (24 inches) for the installation of utilities or concrete footers. Adherence to best management practices for erosion and sediment control would be implemented during periods of construction to mitigate impacts due to soil erosion and loss. Geologic resources would include approximately 4,755 cubic meters (6,220 cubic yards) of concrete and 3,875 cubic meters (5,070 cubic yards) of crushed stone. These resources are commonly available, and the quantities are relatively small for a construction project and would not impact regional supplies. However, small trenches may need to be excavated to connect utilities to the proposed buildings, particularly for the WIPP Vicinity Section 10 and WIPP Vicinity Section 35 candidate sites.

Geologic hazards from earthquakes would potentially have an adverse effect on a mercury storage facility and the surrounding area. The predicted peak ground acceleration from a seismic event with an annual probability of occurrence of once in 2,500 years for the WIPP Vicinity reference locations is 0.08 *g*. A qualitative description of predicted damage for such an event is slight damage to ordinary structures and no damage to properly designed and constructed buildings. The final design for construction of a new facility or modification to existing buildings would take seismic risk into consideration to protect the public, workers, and the environment from potential adverse effects of a significant seismic event. Therefore, facilities built in an area of higher seismic risk could involve additional design and construction considerations than facilities built in an area of lower seismic risk.

2.6.1.3 Water Resources

Ground-disturbing activities performed involving the construction of a new mercury storage facility would be conducted with best management practices in place. Appropriate permits would be obtained and a stormwater pollution prevention plan and soil erosion and sediment controls would be implemented to minimize potential water quality impacts. Construction of a new mercury storage facility would require approximately 1,270,000 liters (336,000 gallons) of water over the 6-month construction period for dust suppression and for potable and sanitary needs.

During operation of a mercury storage facility, best management practices for storage of mercury would be employed to prevent spills and releases of mercury into the environment, including the use of spill trays under mercury containers, spill containment features, and regular inspections in accordance with RCRA regulations. Operation of a mercury storage facility under all action alternatives would require 88,500 liters (23,375 gallons) of water per year for potable and sanitary needs.

2.6.1.4 Meteorology, Air Quality, and Noise

As discussed in Chapter 4, meteorological risks associated with tornadoes, hurricanes, or floods are bounded by earthquake scenario risks. Seismic risks have been previously discussed in Section 2.6.1.2.

Minor short-term air quality impacts would occur under those alternatives involving construction of a new storage facility. These impacts would include a small increase in criteria and toxic air pollutant emissions from construction equipment and earth-disturbing activities in the immediate vicinity of the construction site that would occur only during working hours. Emissions would occur over a 6-month construction period and would not exceed any ambient air quality standard. Air emissions during modification of existing buildings for mercury storage would be negligible.

Operation of a long-term mercury storage facility would not involve the treatment or processing of mercury; therefore, air emissions are projected to be negligible and limited to employee vehicles, trucks, semiannual testing of emergency generators, and the occasional exhausting of air from the Storage Areas. Occasionally, mercury containers would need to be emptied and repackaged in the Handling Area. Repackaging of mercury in new containers would generate some mercury vapors. The Handling Area would be outfitted with a vacuum air exhaust and mercury vapor filter, which would maintain air emissions exhausted to the outside at negligible concentrations during repackaging operations.

Truck and/or rail transport of mercury from various facilities to the DOE long-term mercury storage facility would generate air emissions along routes of transport. The peak year of emissions from transport of mercury is expected to occur in 2013, the first year of facility operation. The frequency of truck and/or rail shipments is expected to decrease over time. Maximum air emissions from transporting the mercury would occur under the Hanford 200-West Area alternative, as evaluated in the January 2011 *Mercury Storage EIS* (DOE 2011); expected emissions are directly proportional to the number of miles required to transport the mercury to the facility. Truck transport to Hanford is predicted to yield the highest concentrations of carbon monoxide, nitrogen dioxide, volatile organic compounds, particulate matter, and carbon dioxide, and rail transport to Hanford is predicted to yield the highest concentrations of sulfur dioxide. As discussed in the January 2011 *Mercury Storage EIS*, transport of mercury would require up to approximately 170,000 truck miles or 56,000 rail miles in its first year of operation under the Hanford 200-West Area alternative.

Carbon dioxide is a compound associated with global climate change. Peak annual carbon dioxide emissions generated from construction of a new facility at one of the WIPP Vicinity reference locations would be approximately 259 metric tons (286 tons). The second highest year of carbon dioxide emissions would be during the first year the mercury is transported by truck to the site, when emissions would be approximately 258 metric tons (285 tons) per year. Transportation by rail would result in less air emissions than for truck transportation. Comparing these values with the 26.4 billion metric tons (29.1 billion tons) of global carbon dioxide emissions estimated to have occurred worldwide from fossil fuel use annually from 2000 through 2005 and U.S. carbon dioxide annual emissions of 5.98 billion metric tons (6.59 billion tons) in 2006 (IPCC 2007), it can be concluded that the addition of carbon dioxide from implementation of the action at any of the WIPP Vicinity reference locations would have a negligible effect on the global climate.

Short-term noise impacts at the WIPP Vicinity reference locations could result from construction of a new mercury storage facility. These impacts would include some increase in traffic to the site and an increase in noise resulting from construction employee vehicles, equipment delivery, and heavy equipment operation. These impacts would occur during the 6-month construction period. Since construction noise would occur during normal working hours and only for a short period of time, the impacts are expected to be negligible. Operational activities associated with the long-term storage of mercury would not result in a measureable increase in noise above background levels. The receipt of mercury shipments by truck or rail during normal working hours would also not result in a significant increase in noise above current vehicular or rail activity.

2.6.1.5 Ecological Resources

Construction of a new facility may impact some areas that have not previously been disturbed, although none of these areas contain critical habitat or protected plant or animal species. Terrestrial habitats present within the WIPP Vicinity reference locations include desert grassland and short-grass prairie ecosystems. None of the alternatives proposed are expected to adversely impact wetlands or aquatic species. No threatened or endangered species are known or expected to occur within areas proposed under any of the alternatives. However, DOE would consult immediately with the U.S. Fish and Wildlife Service, as well as the New Mexico Department of Game and Fish, in the event that a listed species is identified within the proposed mercury storage area. Therefore, construction of a mercury storage facility at any of the WIPP Vicinity reference locations is not expected to adversely affect any ecological resources.

2.6.1.6 Cultural and Paleontological Resources

The land in the vicinity of WIPP has been determined to represent a potentially significant contributor of cultural resources. The majority of the WIPP Vicinity reference locations have not been examined for the presence of cultural resources; however, some surveys have been conducted. There are no known cultural or paleontological resources existing on WIPP Vicinity Section 10 or WIPP Vicinity Section 20. Of the seven cultural resource sites found on WIPP Vicinity Section 35, one is currently recommended as being potentially eligible for listing on the National Register of Historic Places. Also, construction of a new storage facility at any of the WIPP Vicinity reference locations is not expected to have an impact on American Indian resources. If potential historic features are identified during construction, appropriate consultations with the New Mexico State Historic Preservation Officer would be initiated to properly manage the discovery site.

2.6.1.7 Site Infrastructure

Infrastructure impacts could occur if installation of new infrastructure is required where service does not currently exist, if project demands exceed or approach available capacity, or if implementation of the alternative would otherwise disrupt service. Infrastructure resources include roads and railways, electricity, fuel, and water supplies. The frequency of mercury shipments is projected to be very small compared with baseline truck and rail traffic; therefore, existing road and rail systems would be adequate for supporting the transfer of mercury. However, direct rail shipments to WIPP Vicinity Section 10 and WIPP Vicinity Section 35 would not be possible; this mode of transportation would require rail transport to the WIPP facility, transfer of mercury to trucks, and a short truck transport of mercury to the DOE facility in Section 10 or 35.

Construction of a new facility is projected to require 193,000 liters (51,000 gallons) of diesel fuel and 1,270,000 liters (336,000 gallons) of water over a 6-month construction period. Electricity would be supplied by a diesel-fired generator. Water and fuel would be delivered by tanker truck as needed. Therefore, construction of a new facility would have negligible impacts at any of the sites because the existing infrastructure would not be used to supply any of the necessary utility resources.

Annual operation of a mercury storage facility is projected to require 253 megawatt-hours of electricity, 606 liters (160 gallons) of diesel fuel, and 88,500 liters (23,400 gallons) of water. Diesel fuel would be delivered to the site as needed to meet demand and would not impact existing infrastructure. For WIPP Vicinity Section 10 and WIPP Vicinity Section 35, minor infrastructure upgrades would be necessary to provide water and sanitary service. For WIPP Vicinity Section 20, minor infrastructure upgrades would be required to connect water and sanitary systems to existing WIPP infrastructure. In each location, moderate upgrades would be required to provide connections to electrical service. Operation of a mercury storage facility would have negligible impacts on the capacities of available infrastructure.

2.6.1.8 Waste Management

Construction of a new facility is projected to generate approximately 270 cubic meters (355 yards) of nonhazardous solid waste construction debris and 9,850 liters (2,600 gallons) of sanitary liquid waste. These volumes are comparable to a typical construction site and are expected to have negligible impacts on regional facilities.

The operation of a mercury storage facility is expected to generate a total of 910 drums (208 liters [55 gallons] each) of hazardous waste and 2,360,000 liters (623,000 gallons) of sanitary liquid waste over the 40-year period of analysis. On an annual basis, this yields approximately 23 drums of hazardous waste and 58,960 liters (15,575 gallons) of sanitary liquid waste. The hazardous waste, consisting of cleaning rags, personal protective equipment, spill response materials, and mercury vapor filters, would be shipped for offsite treatment and/or disposal in a licensed facility. Since the mercury storage facility would not involve any treatment or processing of mercury, the rate of hazardous waste generation would remain very low. Existing sanitary systems at all of the alternative sites can meet the projected sanitary liquid waste volume.

Therefore, waste management impacts for construction and operation of a mercury storage facility at any WIPP Vicinity reference location would be negligible.

2.6.1.9 Occupational and Public Health and Safety

This section provides a summary of human health consequences and associated risks to workers and members of the public. The impacts are similar for any of the WIPP Vicinity reference locations. The analysis considers various scenarios. Scenarios were developed for the following activities: (1) normal operations, (2) facility accidents, (3) transportation, and (4) intentional destructive acts (IDAs). The respective sections of Chapter 4 discuss human health consequences and associated risk analysis in detail under each of the WIPP Vicinity reference locations. This summary presents the most conservative (i.e., maximum) consequence, and thus risk, to a human receptor that could be expected to occur under certain scenarios. Consequences are presented in terms of severity levels (SLs), with SL-I representing negligible-to-very-low consequences and SL-IV representing the most severe consequences. SLs are defined for various receptor scenarios in Appendix D, Section D.3.1. Overall risk is a function of the frequency at which an event might occur and the probable severity of the event.

Normal Operations

Normal operations for the long-term storage of mercury would not involve any processing or treatment of mercury. Normal operations would involve the receipt and storage of mercury for extended periods of time. Exposures could arise during normal operating conditions from small amounts of mercury vapor accumulating in the Storage Areas. This scenario can best be described as a chronic, slow release of mercury vapor within the storage building resulting from an undetected leaking container or external contamination of a container. Under all alternatives, the consequences to involved workers, noninvolved workers, or members of the public are predicted to be negligible (i.e., SL-I), with negligible associated risks.

Facility Accidents

Facility accidents are exposure scenarios initiated by failure of engineered systems or caused by human error. Accidents could include mercury spills inside or outside the storage building. Of the various scenarios considered, those with the highest probability of occurring would likely be (1) a container or pallet drop during transfer from the transport vehicle to permanent storage (e.g., by forklift), (2) a collapse of storage racks, (3) an earthquake event, or (4) a flood event. The consequences and risks of the flood event are bounded by the earthquake analysis.

The consequences and associated risks to human health receptors would be identical under all action alternatives evaluated and are summarized in Table 2–3.

Table 2–3. Summary of Consequences and Risks from All Onsite Mercury Spill Scenarios

Scenario	Consequence (Risk)
Spills Inside Building	
Involved worker	SL-I to SL-II (Negligible to low)
Noninvolved worker[a]	SL-I (Negligible)
Member of the public	SL-I (Negligible)
Spills Outside Building	
Involved worker	SL-I to SL-II (Negligible to low)
Noninvolved worker[a]	SL-I to SL-II (Negligible to low)
Member of the public	SL-I (Negligible)

[a] A noninvolved worker is nearby (outside the building) but still on site.
Key: SL=severity level.

Transportation

Transportation consequences under all alternatives are a function of the methods of transportation (i.e., truck or rail), the number of miles traveled, and the nature of the accident. The distance between the WIPP Vicinity reference locations (approximately 5.6 kilometers [3.5 miles]) is considered a negligible difference in transportation risk calculations. Table 2–4 presents the number of kilometers that would be traveled and the annual frequency of fatal accidents that are projected to occur.

In addition to fatal accidents due to mechanical impact, exposure to mercury from spills that could result from transportation accidents could impact human health. Table 2–5 summarizes the consequences and associated risk to human health receptors under certain scenarios.

Table 2–4. Transportation Kilometers and Frequency Analysis for Transport Accidents

Mode of Transport	WIPP Vicinity Reference Locations (Sections 10, 20, and 35)	
	Kilometers (miles)	**Annual Frequency of Fatal Accidents[a]**
Truck[b]	3,007,088 (1,868,523)	1.0×10^{-3}
Rail[c]	685,920 (426,212)	1.7×10^{-4}

a Fatality caused by mechanical impact, not exposure to mercury.
b The greatest transportation impact under either Truck Scenario 1 or 2 is presented in this table. Truck Scenarios 1 and 2 are defined in Appendix D, Section D.2.2.
c WIPP Vicinity Sections 10 and 35 do not have direct rail access. Potential transportation impacts by rail would involve intermodal transportation: rail transport to WIPP, transfer from rail to truck, and truck transport to WIPP Vicinity Section 10 or 35.
Key: WIPP=Waste Isolation Pilot Plant.

Table 2–5. Summary of Transportation Consequences and Risks to Human Receptors

Scenario	Truck[a]	Railcar
	Consequence (Risk)	
Spill onto ground	SL-I to SL-IV (Negligible)	SL-I to SL-IV (Negligible)
Spill into water[b]	SL-I to SL-II (Negligible to low)	SL-I to SL-II (Negligible to low)
Spill with fire – inhalation	SL-III (Negligible) or SL-II (Low)	SL-III (Negligible) or SL-II (Low)
Spill with fire – dry deposition onto soil	SL-I (Negligible)	SL-I (Negligible)
Spill with fire – wet deposition onto soil	SL-I (Negligible)	SL-I (Negligible)
Consumption of methylmercury in fish – dry deposition onto water	Potentially above SL-I/SL-II (Negligible)	Potentially above SL-I/SL-II (Negligible to low)
Consumption of methylmercury in fish – wet deposition onto water	Potentially above SL-I/SL-II (Negligible)	Potentially above SL-I/SL-II (Negligible)

a The greatest transportation impact under either Truck Scenario 1 or 2 is presented in this table. Truck Scenarios 1 and 2 are defined in Appendix D, Section D.2.2.
b Due to a large range of uncertainty, estimating the consequences of this scenario is difficult.
Key: SL=severity level.

Intentional Destructive Acts

The most plausible scenario for an IDA in the context of mercury would be the deliberate crash of a gasoline tanker into a truck or railcar carrying mercury with a subsequent fire. Other scenarios involving an attack on a storage facility other than during unloading of a truck or railcar are judged to be less likely because of the distribution of mercury within the facility, security measures, and facility design features that would mitigate the impacts of mercury releases into the environment. Therefore, the IDA analysis summarized below applies to all the action alternatives similarly.

Human exposure pathways from an IDA include atmospheric inhalation and dry or wet deposition. The most severe case for atmospheric exposure pathways would be at the SL-III level and could occur between approximately 100 meters (330 feet) and 5.6 kilometers (3.5 miles) downwind of the release point. The deposition benchmark of 180 milligrams per kilogram in soil would not be exceeded anywhere. However, sufficient mercury could be deposited on lakes such that, in the event of rain, methylmercury might accumulate to potentially hazardous levels in fish up to 10 kilometers (6.2 miles) downwind for national average consumption rates, 20 kilometers (12.4 miles) for the average subsistence fisherman, and 40 kilometers (24.8 miles) for the 95th percentile subsistence fisherman.

2.6.1.10 Ecological Impacts

Consequences and, hence, risks to ecological receptors would be negligible except if there is a fire. The frequency of onsite fires sufficient to cause a release of mercury at any of the storage sites is predicted to be negligible; consequently, the ecological risk would also be negligible. Ecological risk would be evident only in the event of a transportation accident with fire; thus, the ecological risk would be similar under all action alternatives. Table 2–6 presents the ecological risk to various sensitive receptors.

Table 2–6. Summary of Consequences and Risk to Ecological Receptors – Transportation Accident with Pallet Fire

Receptor	Truck[a]		Railcar	
	Deposition Pathway			
	Dry	Wet	Dry	Wet
	Consequence (Risk)			
Sediment-dwelling biota	SL-II (Low)	SL-IV (Moderate)	SL-III (Low)	b (Negligible)
Soil invertebrates	SL-II (Low)	SL-III (Low)	SL-II (Low)	b (Negligible)
Plants	SL-II (Low)	SL-II (Low)	SL-II (Low)	b (Negligible)
American robin	SL-I (Negligible)	SL-II (Low)	SL-II (Low)	b (Negligible)
River otter	SL-I (Negligible)	SL-II (Low)	SL-I (Negligible)	b (Negligible)
Aquatic biota	SL-I (Negligible)	SL-I (Negligible)	SL-I (Negligible)	b (Negligible)
Short-tailed shrew	SL-I (Negligible)	SL-I (Negligible)	SL-I (Negligible)	b (Negligible)
Great blue heron	SL-I (Negligible)	SL-I (Negligible)	SL-I (Negligible)	b (Negligible)
Red-tailed hawk	SL-I (Negligible)	SL-I (Negligible)	SL-I (Negligible)	b (Negligible)

a The greatest transportation impact under either Truck Scenario 1 or 2 is presented in this table. Truck Scenarios 1 and 2 are defined in Appendix D, Section D.2.2.

b The predicted frequency of railcar crashes with pallet fires in the presence of rain is negligible; therefore, the associated risks would be negligible and consequences are not presented in the table.

Key: SL=severity level.

2.6.1.11 Socioeconomics

Construction of a new facility is projected to require the employment of approximately 18 people for approximately 6 months. Operation of the mercury storage facility is estimated to require approximately 8 individuals for routine maintenance and support activities during the first 7 years, when higher volumes of shipments are expected, and then approximately 5 to 6 individuals for the remainder of the analysis period. The projected employment for construction and operations and associated indirect employment would have a negligible impact on socioeconomic conditions (i.e., overall employment and population trends) for the WIPP vicinity region.

During construction of a new storage facility, it is estimated that construction-related transportation would average 45 vehicle trips per day. During operations, the greatest impact would be during the first 2 years, when it is estimated that approximately 11 vehicles a day would be associated with facility employment. At the peak of operations, it is estimated that up to 79 shipments of mercury would be made in a year. The minimal increase in the number of vehicle trips projected during construction or operations of a mercury facility over baseline vehicular traffic would be negligible for any of the WIPP Vicinity reference locations.

2.6.1.12 Environmental Justice

Analysis of census population block groups within a region of influence (ROI), defined as a 16-kilometer (10-mile) radius surrounding a site, did not identify minority or low-income communities near the WIPP Vicinity reference locations. Therefore, no disproportionately high and adverse impacts or risks are expected to occur for any population group, including the minority and low-income population groups near these candidate sites.

Five census blocks are located within 16 kilometers (10 miles) of WIPP Vicinity Section 10. Three census blocks are located within 16 kilometers of WIPP Vicinity Section 20. Three census blocks are located within 16 kilometers of WIPP Vicinity Section 35. None of the census blocks within the ROI for the WIPP Vicinity reference locations contain a high minority or low-income population. Therefore, no disproportionately high and adverse effects on minority or low-income populations are expected.

2.6.2 Summary of Cumulative Impacts

The Council on Environmental Quality regulations implementing the National Environmental Policy Act define cumulative effects as “impacts on the environment which result from the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions” (40 CFR 1508.7). Actions that may contribute to cumulative impacts include on- and offsite projects conducted by government agencies, businesses, or individuals that are within the ROIs of the actions considered in this draft SEIS. The ROIs used in the cumulative impacts analysis were generally assumed to be within a 16-kilometer (10-mile) radius of the WIPP Vicinity reference locations.

Projected impacts on the various resource areas of constructing and operating a mercury storage facility range from none, to negligible, to minor. Those resource areas that were predicted to be impacted in a minor way were evaluated for their potential to contribute to cumulative impacts within the ROI. Where impacts were predicted not to occur or were negligible, cumulative impacts were not analyzed since there would be either no or only a very small incremental increase in impacts on the resources within the ROI. Regardless of the projected level of impact, land disturbance associated with new construction and air quality impacts resulting from mercury emissions were evaluated for their potential to contribute to cumulative impacts within the ROI. Based on the criteria noted above, the analysis included an evaluation of land use, air quality, infrastructure, and ecological resources. It was determined that the potential contribution to cumulative impacts on those resource areas evaluated would be negligible.

Table 2–7 summarizes the potential contributions to cumulative impacts for these resource areas. Chapter 4, Section 4.4, provides a detailed discussion of the cumulative impacts assessment and potential contributing actions that were considered. A discussion of global commons impacts is also provided in Section 4.2.4.

Table 2–7. Summary of Cumulative Impacts Assessment

Alternative	Resource Area	Cumulative Impacts	Contribution of Proposed Action to Cumulative Impacts
WIPP Vicinity Reference Locations (Sections 10, 20, and 35)	Land Use	Rural area; limited development expected within the ROI. GTCC waste disposal facility could require up to 44 hectares (110 acres) if WIPP vicinity is selected; one of the locations being considered is WIPP Vicinity Section 35. A mercury storage facility and GTCC waste disposal facility could be located within the 260-hectare (640-acre) area that comprises Section 35 without interference with operations or compromising the safety and security of these facilities. Also present within the ROI are a number of oil wells and underground potash mines located in the vicinity of WIPP, including an existing potash mine lease on WIPP Vicinity Section 10 and one oil well in WIPP Vicinity Section 35. No substantial cumulative impacts on land use.	Negligible
	Air Quality	No exceedance of air quality standards.	Negligible
	Infrastructure	No substantial cumulative impacts on regional power consumption or impact on existing capacities. A maximum of 79 shipments would be made to the proposed mercury storage facility during the peak year of operations and is not expected to appreciably increase demands on transportation systems near the WIPP Vicinity reference locations.	Negligible
	Ecological Resources	No substantial cumulative impacts on terrestrial resources or loss of habitat due to disturbance of land (see Land Use above).	Negligible

Key: GTCC=greater-than-Class C; ROI=region of influence; WIPP=Waste Isolation Pilot Plant.

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CHAPTER 3
AFFECTED ENVIRONMENT

CHAPTER 3
AFFECTED ENVIRONMENT

Chapter 3 presents a description of the affected environment for the Waste Isolation Pilot Plant (WIPP) Vicinity reference locations considered in this *Draft Long-Term Management and Storage of Elemental Mercury Supplemental Environmental Impact Statement (Draft Mercury Storage SEIS)*, which provides the context for understanding the environmental consequences of the action alternatives described in Chapter 4. Chapter 3 of the January 2011 *Long-Term Management and Storage of Elemental Mercury Environmental Impact Statement (Mercury Storage EIS)* (DOE 2011a) presents a description of the affected environment for the other seven candidate sites being considered for the long-term management and storage of elemental mercury. As discussed in Appendix E, Section E.4, environmental documentation that has become available since publication of the January 2011 *Mercury Storage EIS* has been reviewed, and with the exception of the socioeconomics and environmental justice resource areas, no significant changes to the affected environment as presented in Chapter 3 of the January 2011 *Mercury Storage EIS* were found to be necessary. This *Draft Mercury Storage SEIS* includes updates to the socioeconomics and environmental justice resource areas to incorporate 2010 decennial census information that was not available at the time the January 2011 *Mercury Storage EIS* was published. The updates to the affected environment descriptions for the socioeconomics and environmental justice resource areas are presented in Appendix B and Appendix E of this *Draft Mercury Storage SEIS.* A significant portion of this chapter is based on the affected environment descriptions for the WIPP vicinity as presented in Chapter 4, Section 4.2, and Chapter 11, Section 11.1, of the *Draft Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste* (*Draft GTCC EIS*) (DOE 2011b). Text adopted and incorporated into this supplemental environmental impact statement (SEIS), in part or in whole, from the *Draft GTCC EIS* has been reviewed, updated, or amended as necessary for the specific candidate sites analyzed in this SEIS (i.e., Sections 10, 20, and 35) and to support the impacts analysis for these sites presented in Chapter 4.

3.1 APPROACH TO DEFINING THE AFFECTED ENVIRONMENT

This chapter describes the environment at the Waste Isolation Pilot Plant (WIPP) Vicinity reference locations that could be affected through implementing the alternatives evaluated in this *Draft Long-Term Management and Storage of Elemental Mercury Supplemental Environmental Impact Statement (Draft Mercury Storage SEIS)*. As described in Chapter 2, the WIPP Vicinity reference locations consist of three candidate sites: Section 10 outside the WIPP land withdrawal boundary (LWB); Section 20 inside the WIPP LWB; and Section 35 outside the WIPP LWB (see Figures 3–1 and 3–2). For the WIPP Vicinity reference locations, the affected environment is described for the following resource areas: land use and visual resources; geology, soils, and geologic hazards; water resources; meteorology, air quality, and noise; ecological resources; cultural and paleontological resources; infrastructure; waste management; occupational and public health and safety; socioeconomics; and environmental justice. This supplemental environmental impact statement (SEIS) provides a description of the existing environment of the WIPP site as a whole, as well as that of the WIPP Vicinity reference locations within which the proposed action would take place.

The U.S. Department of Energy (DOE) evaluated the environmental impacts of managing and storing elemental mercury[1] within defined regions of influence (ROIs). These ROIs are specific to the resource area evaluated; encompass geographic areas within which any meaningful impact is expected to occur; and can include the areas within which the proposed action would take place, the sites as a whole, or nearby or distant offsite areas. For example, impacts on historic resources were evaluated at specific facility locations within each site, whereas human health risks to the general public were assessed for an area within a 16-kilometer (10-mile) radius of the facility location. Brief descriptions of the ROIs for each resource area are given in Table 3–1; more specific information on methodology and the definition of ROIs is presented in Appendix B of the January 2011 *Long-Term Management and Storage of Elemental Mercury Environmental Impact Statement (Mercury Storage EIS)*. Appendix F, Table F–1, lists the scientific names of plants and animals used in this chapter, grouped by common name in alphabetical order.

[1] Unless the context indicates otherwise, elemental mercury is referred to hereafter simply as "mercury" in this SEIS.

Table 3–1. General Regions of Influence for the Affected Environment

Environmental Resource Area	Region of Influence
Land use and visual resources	The project location, the site, and nearby offsite areas
Geology, soils, and geologic hazards	The project location, the site, and nearby offsite areas
Water resources	The project location, the site, and adjacent surface-water bodies and groundwater
Meteorology, air quality, and noise	For meteorology and air quality, the site and nearby offsite areas potentially affected by air pollutant emissions; for noise, the project location, the site, and surrounding areas, including transportation corridors where proposed activities might increase noise levels
Ecological resources	The project location, the site, and nearby offsite areas
Cultural and paleontological resources	The project location and adjacent areas
Infrastructure	The project location, the site, and local areas supporting the site
Waste management	The waste management facilities located on the site
Occupational and public health and safety	The site, offsite areas, and the transportation corridors
Socioeconomics	The counties where approximately 90 percent of site employees reside
Environmental justice	The area within 16 kilometers of the site and the area within 3.2 kilometers of the site as a subset of the 16-kilometer area

Note: To convert kilometers to miles, multiply by 0.6214.

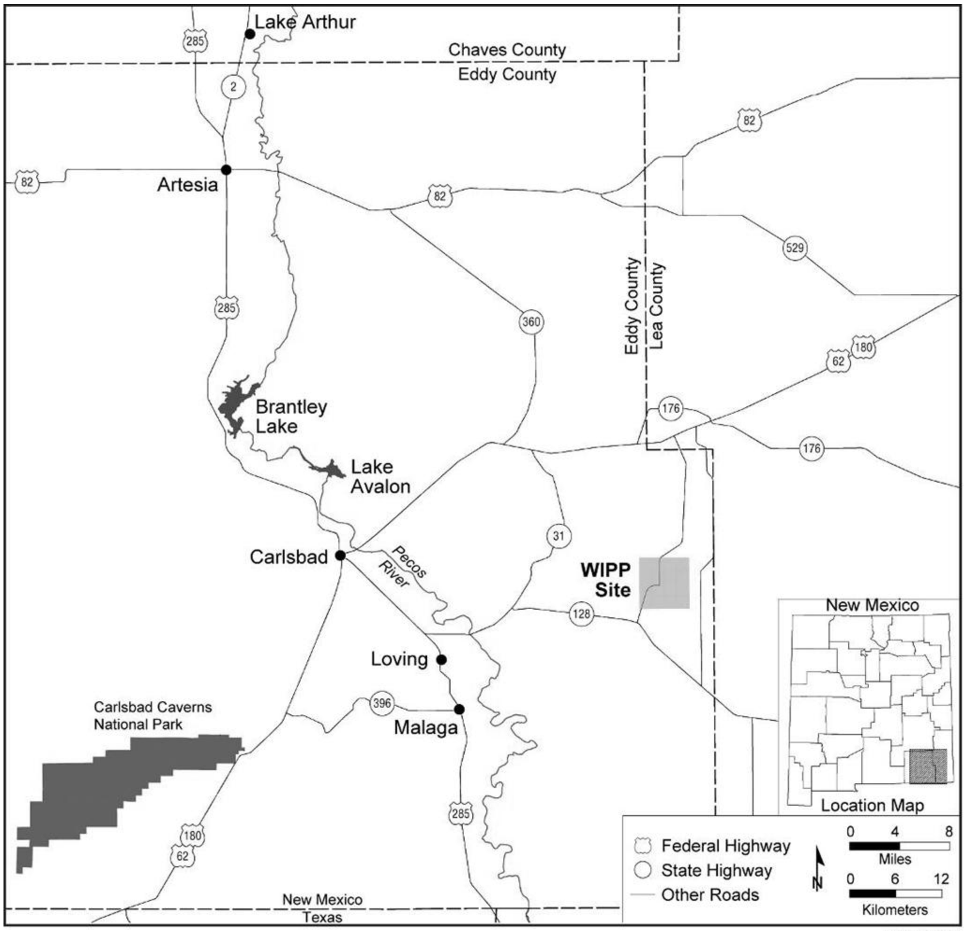
The existing environmental conditions for each resource area were determined from information provided in previous environmental impact statements and environmental studies, other government reports and databases, and relevant laws and regulations.

3.2 WASTE ISOLATION PILOT PLANT SITE AND VICINITY

3.2.1 Land Use and Visual Resources

3.2.1.1 Land Use

WIPP is the Nation's only underground repository for the permanent disposal of defense-generated transuranic (TRU) waste. The WIPP site is located in Eddy County in the Chihuahuan Desert of southeastern New Mexico (see Figure 3–1). The site is about 42 kilometers (26 miles) east of Carlsbad in a region known as Los Medaños, a relatively flat, sparsely inhabited plateau with little surface water. The WIPP site encompasses approximately 41 square kilometers (16 square miles) under the jurisdiction of DOE pursuant to the Waste Isolation Pilot Plant Land Withdrawal Act (WIPP LWA) (P.L. 102-579). The WIPP LWA transferred responsibility of the WIPP withdrawal area from the Secretary of the Interior to the Secretary of Energy. The land is permanently withdrawn from all forms of entry, appropriation, and disposal under the public land laws and is reserved for uses associated with the purposes of WIPP.



Source: DOE 2006a. MPA100826

Figure 3–1. Location of the Waste Isolation Pilot Plant Site in Eddy County, New Mexico

The WIPP site covers 16 sections (each section is 2.6 square kilometers [1 square mile or 640 acres]) of Federal land in Township 22 South, Range 31 East, and is divided into four areas under DOE control (see Figure 3–2). A chain-link fence surrounds the innermost Property Protection Area, which includes all of the surface facilities. Surrounding this inner area is the Exclusive Use Area, which is surrounded by a barbed-wire fence. Enclosing these two areas is the Off-Limits Area, which is unfenced to allow livestock grazing but, like the other two areas, is patrolled and posted against trespassing or other land uses. Beyond the Off-Limits Area, the land is managed under the traditional public land use concept of multiple uses, but mining and drilling are restricted. The boundary of WIPP was set to extend at least 1.6 kilometers (1 mile) beyond any underground development (Sandia 2008). WIPP includes all of the necessary surface and subsurface facilities to manage waste handling and disposal operations.

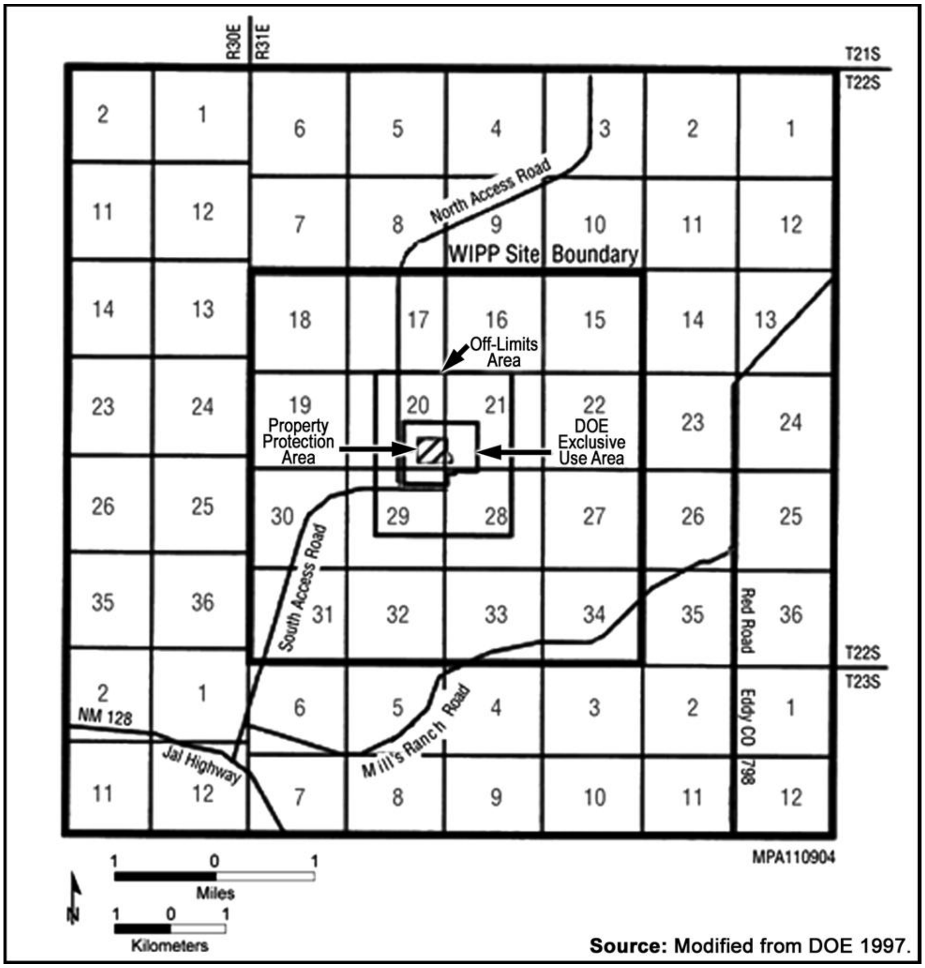


Figure 3–2. Four Property Areas Within the Waste Isolation Pilot Plant Boundary

There are four property areas adopted within the 4,146-hectare (10,240-acre) WIPP site (see Figure 3–2):

- *Property Protection Area*. This is the 14-hectare (35-acre) interior core of the site that is surrounded by a chain-link fence. It is under tight, 24-hour security.

- *Exclusive Use Area*. This 112-hectare (277-acre) area is surrounded by a barbed-wire fence and is restricted for the exclusive use of DOE and its contractors and subcontractors in support of the project. The area is marked with "no trespassing" signs and is patrolled by WIPP security personnel.

- *Off-Limits Area*. This is a 588-hectare (1,454-acre) area where unauthorized entry and introduction of weapons and/or dangerous materials are prohibited. Prohibition signs are posted at consistent intervals along its perimeter. Unless they pose a threat to security, safety, or the environmental quality of the WIPP site, grazing and public thoroughfares can occur in this area. This area is patrolled by WIPP security personnel to prevent unauthorized activities or use.

- *WIPP Site (Land Withdrawal) Boundary*. This 4,146-hectare (10,240-acre) area delineates the perimeter of the WIPP site. The LWB was established to extend at least 1.6 kilometers (1.0 mile) beyond any WIPP underground development.

Except for the facilities within the boundaries of the posted 112-hectare (277-acre) Exclusive Use Area, surface land use remains largely unchanged from its pre-1992 multiple land use designation. Those who wish to conduct activities that might affect lands that are under the jurisdiction of WIPP but outside the Property Protection Area are required by the WIPP Land Management Plan (LMP) to prepare a land use request (DOE 2007). Mining and drilling for reasons other than to support WIPP activities are prohibited within the WIPP site except at two 129-hectare (320-acre) tracts of land within the WIPP LWB that are leased for oil and gas development. These adjoining lease tracts occupy Section 31 in the far southwest corner of the WIPP site (DOE 1993).

Extensive potash mining occurs in the vicinity of WIPP outside of the LWB, particularly to the north, west, and southwest of the WIPP site. Potash leases in the vicinity of WIPP are held by two commercial mining companies: Mosaic Potash Carlsbad, Inc. and Intrepid Potash NW, LLC. In 2010, several potash leases were reassigned to Western Ag-Minerals, Inc. (a wholly owned subsidiary of Mosaic Potash Carlsbad, Inc.) from Yates Petroleum Corporation, which include Township 22 South, Range 31 East, Section 10 for future exploration (Rutley 2012).

Portions of two grazing allotments administered by the U.S. Bureau of Land Management (BLM) occur within the WIPP site boundary (DOE 1993). Nearly 5.2 percent of one 22,493-hectare (55,581-acre) allotment overlaps the WIPP site but does not include areas that are posted "no trespassing." About 9.5 percent of the other 31,393-hectare (77,574-acre) grazing allotment overlaps the remainder of the WIPP site boundary, including the Exclusive Use Area that is posted against trespassing and fenced to prevent grazing (DOE 1993).

The WIPP LMP focuses on management protocols for the following: administration of the plan, environmental compliance, wildlife, cultural resources, grazing, recreation, energy and mineral sources, land and realty, reclamation, security, industrial safety, emergency management, maintenance, and work control (DOE 1993).

Most land in the vicinity of the WIPP site is managed by BLM. Land use in the surrounding area includes livestock grazing, potash mining, oil and gas development, and recreation (e.g., hunting, camping, hiking, off-highway vehicle operation, horseback riding, and bird watching) (DOE 1993, 2007). The dominant land use in the WIPP vicinity is cattle grazing; smaller amounts of land are used for oil and gas extraction and potash mining. There is an existing oil well on WIPP Vicinity Section 35, adjacent to and southeast of the WIPP LWB. There is little privately owned land near WIPP, although two ranches are located within 16 kilometers (10 miles) of the site (DOE 1997). The only agricultural land within 48 kilometers (30 miles) is irrigated farmland along the Pecos River, near the municipalities of Carlsbad and Loving. No dry-land farming takes place near WIPP (DOE 1980).

The region is popular for recreation, providing opportunities for hunting, camping, hiking, and bird watching. The area has a very low population density, with approximately 25 residents at various locations within 16 kilometers (10 miles) of the site. The nearest community is the village of Loving, New Mexico, which is located 29 kilometers (18 miles) west-southwest of WIPP. This community has an estimated population of about 1,300 residents.

3.2.1.2 Visual Resources

BLM is responsible for managing public lands identified for multiple uses. BLM is also responsible for ensuring that the scenic values of these public lands are considered before allowing uses that may have negative visual impacts. BLM accomplishes this through its Visual Resource Management (VRM) system, a system that involves inventorying scenic values and establishing management objectives for those values through the area resource management planning process. VRM classes are based on relative visual ratings of BLM-inventoried lands. Each class describes the different degree of modification allowed to the basic elements of the landscape.

The developed areas at WIPP and in the vicinity of WIPP occur within a BLM VRM Class IV zone. The objective of VRM Class IV is to provide for management activities that require major modifications of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location; minimal disturbance; and repeating the basic landscape elements of color, form, line, and texture.

3.2.2 Geology, Soils, and Geologic Hazards

The geologic resources at the WIPP Vicinity reference locations are described with respect to geology, soils, and geologic hazards. Geologic resources are consolidated or unconsolidated earth material, including ore and aggregate material, fossil fuels, and significant landforms. Soil resources are the loose surface materials of the earth in which plants grow, usually consisting of disintegrated rock, organic matter, and soluble salts. Geologic hazards can include seismic activity, landslides, volcanic eruptions, and erosional processes.

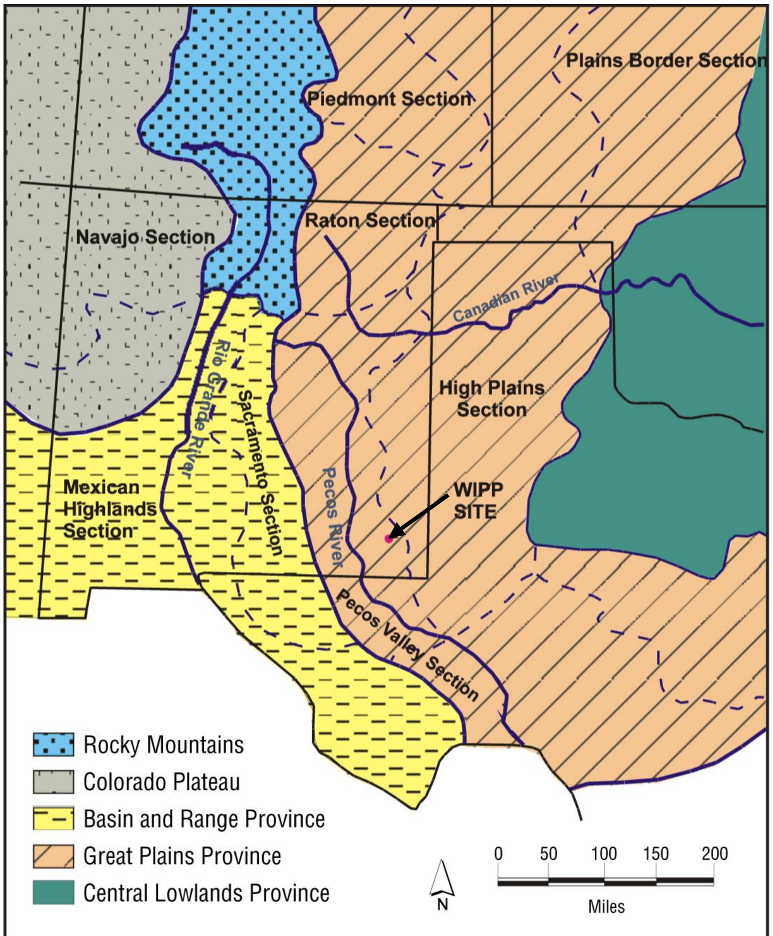
The WIPP Vicinity reference locations occupy three 2.6-square-kilometer (1-square-mile) or 260-hectare (640-acre) parcels: Section 10, which is outside and immediately adjacent to the northeast of the WIPP LWB; Section 20, which is inside the WIPP LWB; and Section 35, which is outside and immediately adjacent to the southeast of the WIPP LWB. Given the close proximity of the WIPP Vicinity reference locations to the WIPP repository site, the regional geologic setting and stratigraphy at the reference locations can be inferred from the extensive data on the WIPP site that are summarized below.

3.2.2.1 Geology

WIPP is located in southeastern New Mexico, in the Pecos Valley Section of the Great Plains physiographic province (see Figure 3–3). The terrain throughout the province varies from plains and lowlands to rugged canyons. In the immediate vicinity of WIPP, numerous small mounds formed by wind-blown sand characterize the land surface. A 410,000- to 510,000-year-old layer enriched in calcium carbonate material, the Mescalero caliche, is typically present beneath the surface layer of sand. The caliche layer overlies a 600,000-year-old volcanic ash layer (DOE 1996a). The Mescalero caliche can be found over large portions of the Pecos River drainage area and is generally considered to be an indicator of surface stability (DOE 1980).

A high plains desert environment characterizes the area. Because of the seasonal nature of the rainfall, most surface drainage is intermittent. The Pecos River, 16 kilometers (10 miles) southwest of the WIPP boundary, is a perennial river and the master drainage for the region. A natural divide lies between the Pecos River and the WIPP site. As a result, the Pecos drainage system does not currently affect the site. Local surface drainage features include Nash Draw and the San Simon Swale.

The topography of the Pecos Valley section ranges from flat plains and lowlands to rugged canyon lands, with elevations of 1,830 meters (6,000 feet) mean sea level (MSL) in the northwest, 1,520 meters (5,000 feet) MSL in the north, 1,220 meters (4,000 feet) MSL in the east, and 610 meters (2,000 feet) MSL in the south. The valley has an uneven rock floor, resulting from differential weathering of limestones, sandstones, shales, and gypsums. The Pecos Valley section is drained mainly by the Pecos River, the only perennial stream in the region. The Pecos drainage system flows to the southeast; its closest point is about 16 kilometers (10 miles) from the WIPP site. The Pecos River Valley shows characteristic lowland topography marked by widespread karst topography, with solution-subsidence features (e.g., sinkholes) resulting from dissolution of Permian rocks from the Ochoan Series (Mercer 1983; Powers et al. 1978).



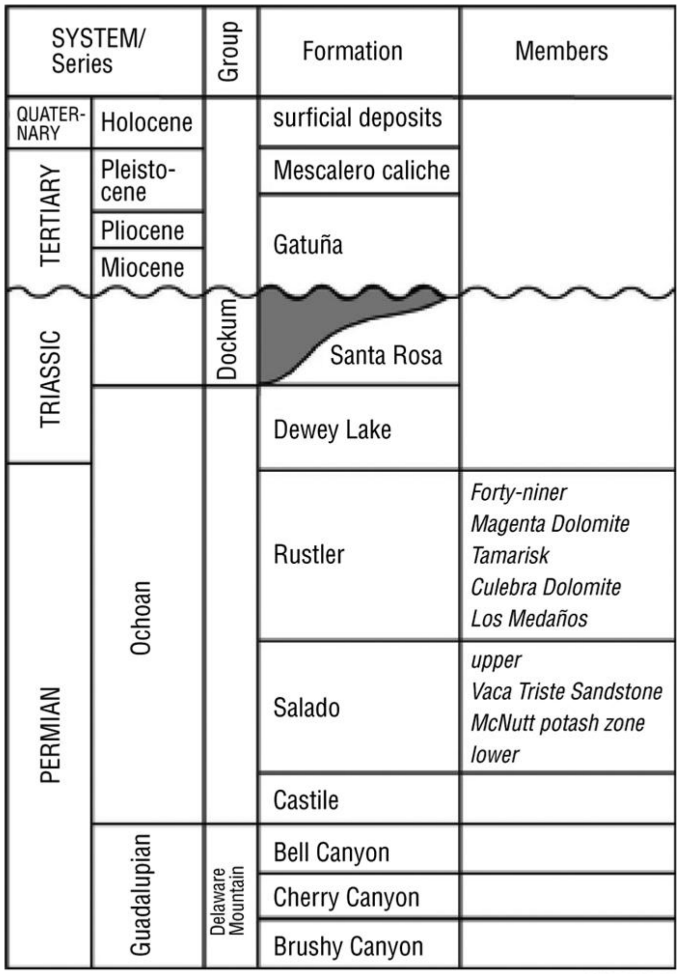
Source: DOE 1997.

Figure 3–3. Location of the Waste Isolation Pilot Plant Site Within the Great Plains Province in Southeastern New Mexico

The land surface of the WIPP site is hummocky, with numerous eolian sand ridges and dunes, and it slopes gently from an elevation of about 1,090 meters (3,570 feet) MSL at its eastern boundary to about 990 meters (3,250 feet) MSL along its western boundary. An extensive layer of hard caliche (the Mescalero caliche) lies between the surficial sand deposits and the underlying Gatuña Formation. It ranges in age from about 510,000 years at its base to 410,000 years at the top (DOE 1997; Powers et al. 1978).

The topography across the WIPP Vicinity reference locations exhibits some broad valley forms, possibly indicating areas of concentrated surface runoff and integrated drainages during prolonged rainfall events. Sand dunes are present, but are likely thinner and more uniform than local dune fields. Calcrete exposures appear as heavily vegetated semicircular features on aerial photos, particularly in a portion of WIPP Vicinity Section 35. These are thought to represent intradune areas that focus water drainage and enhance vegetation growth, causing degradation of the underlying calcrete and creating slight topographic depressions. These surface features, however, have no relationship to dissolution or subsidence of deeper evaporite units.

The WIPP site is located in the northern portion of the Delaware Basin, a structural basin underlying present-day southeastern New Mexico and western Texas that contains a thick sequence of sandstones, shales, carbonates, and evaporites. The WIPP repository is located in the Salado Formation, a massive bedded salt unit of Permian age, ranging from about 350 to 1,160 meters (1,150 to 3,800 feet) below the ground surface near the WIPP site. The WIPP disposal horizon is 655 meters (2,150 feet) below the ground surface. The sediments accumulated during the Permian period represent the thickest portion of the sequence in the northern Delaware Basin and are divided into four series (see Figure 3–4). From oldest to youngest, these series are the Wolfcampian, Leonardian, Guadalupian, and Ochoan. The Ochoan Series consists of extensive evaporite deposits; the series is divided into four formations. From oldest to youngest, these formations are Castile, Salado (the lower part of which contains the WIPP repository), Rustler, and Dewey Lake.



Source: EPA 2006. MPA011014

Figure 3–4. Stratigraphic Column for the Waste Isolation Pilot Plant Site and Surrounding Area

The following sections describe the geologic formations important to understanding the long-term performance of WIPP, starting with the host rock for the WIPP repository (the Salado Formation), the formations below the Salado (the Castile and Bell Canyon Formations), and the formations above the Salado (the Rustler, Dewey Lake, Santa Rosa, and Gatuña Formations).

- **Salado Formation.** The Permian Salado Formation is a massive bedded salt formation that is predominantly halite (sodium chloride) and is thick and laterally extensive. DOE selected the Salado Formation as the site of the WIPP repository for several geologically related reasons (DOE 1980, 1990): (1) the Salado halite units have very low permeability to fluid flow, which impedes groundwater flow into and out of the repository; (2) the Salado is regionally widespread; (3) the Salado includes continuous halite beds without complicated structure; (4) the Salado is deep with little potential for dissolution; (5) the Salado is near enough to the surface that access is reasonable; and (6) the Salado is largely free of mobile groundwater, when compared with existing mines and other potential repository sites.

The Salado Formation ranges in thickness from approximately 540 to 646 meters (1,770 to 2,120 feet). The Salado is composed of four members. From oldest to youngest, they are the Lower Member, the McNutt Potash member, the Vaca Triste Sandstone, and the Upper Member. The WIPP repository is located in the Lower Member and in the thickest part of the Salado Formation.

Although the most common Delaware Basin evaporite mineral is halite, there are less soluble layers or interbeds (dominantly anhydrite, polyhalite, and claystone) and more soluble admixtures (for example, sylvite, glauberite, kainite) within the formation. These other minerals result in chemical and physical properties of the bulk Salado that are different from those of pure halite layers contained within it. In particular, the McNutt is locally explored and mined for potassium-bearing minerals of economic interest. Within the Delaware Basin, a system is used for numbering the more significant sulfate beds within the Salado, designating these beds as marker beds (MBs) from MB100 (near the top of the formation) to MB144 (near the base). The system is generally used within the Carlsbad Potash District, as well as at and around the WIPP site. The repository is located between MB139 and MB138 (see Figure 3–4) while the potash in the McNutt is generally located between MB116 and MB126.

- **Castile Formation.** The Permian Castile Formation directly underlies the Salado Formation and typically consists of three relatively thick anhydrite/carbonate units and two thick halite units in the WIPP area. It is approximately 390 meters (1,280 feet) thick and is present from approximately 810 to 1,200 meters (2,660 to 3,940 feet) below ground surface (bgs) at the site, which is approximately 155 meters (509 feet) below the level of the repository. The more brittle anhydrite units of the Castile are locally fractured, and the fracture zones are relatively permeable and act as zones for accumulation of brine trapped in the Castile since the Permian period (DOE 1997).

- **Bell Canyon Formation.** The Permian Bell Canyon Formation underlies the Castile Formation and is composed of a layered sequence of sandstones, shales, siltstones, and limestones near the WIPP site. It is also the uppermost target of hydrocarbon exploration in the local area. It is approximately 350 meters (1,150 feet) thick and is present from approximately 1,200 to 1,550 meters (3,940 to 5,090 feet) bgs at the site. The top of the Bell Canyon is approximately 545 meters (1,790 feet) below the level of the repository.

- **Rustler Formation.** The upper Permian Rustler Formation lies above the WIPP repository and directly overlies the Salado Formation. It is divided into five members. From the base of the Rustler Formation, these members are the Los Medaños, the Culebra Dolomite, the Tamarisk, the Magenta Dolomite, and the Forty-niner. The Culebra consists of locally argillaceous and arenaceous, well to poorly indurated dolomicrite with numerous cavities (vugs), fractures, and silty zones. The Magenta is a silty, gypsiferous, laminated dolomite. The other three members contain layers of claystone or mudstone sandwiched between layers of anhydrite/gypsum. In the southeast corner of the WIPP site and farther to the east, halite beds are also present in the non-dolomite members of the Rustler Formation. The Rustler Formation is approximately 94 meters (310 feet) thick and is present from approximately 164 to 257 meters (538 to 843 feet) bgs at the WIPP site. The top of the formation dips to the east-northeast across much of the WIPP site (Powers 2009). Its base is approximately 400 meters (1,312 feet) above the level of the repository. The Rustler Formation contains the most extensive water-bearing units in the WIPP site area.

- **Dewey Lake Formation.** The Dewey Lake Formation overlies the Rustler Formation at WIPP and is Permo-Triassic in age. It consists largely of reddish-brown siltstones and claystones, with lesser amounts of very fine to fine sandstone. Sediments are typically cemented with sulfates (gypsum and anhydrite). The formation generally thickens across the WIPP site from west to east to a maximum thickness of more than 183 meters (600 feet) in the eastern part of the Delaware Basin east of the site. At the WIPP site, it is approximately 146 meters (480 feet) thick and occurs from approximately 16 to 162 meters (52 to 532 feet) bgs. The base of the Dewey Lake is approximately 495 meters (1,623 feet) above the level of the repository. The groundwater from the Dewey Lake Formation is primarily used for livestock watering and irrigation (Powers 2009).

- **Santa Rosa Formation.** The Triassic Santa Rosa Formation, the basal formation of the Dockum Group, overlies the Dewey Lake Formation and consists of light reddish-brown sandstones and conglomerates, siltstone, and claystone. The Santa Rosa Formation is several hundred feet thick east of the WIPP site, but it thins to the west. It is about 12 meters (40 feet) thick near the center of the WIPP site and is absent in the western third of the site as a result of erosion. The Santa Rosa is used as a source of groundwater to the east of the WIPP site (DOE 1996a; Powers 2009).

- **Gatuña Formation.** The Miocene-Pleistocene Gatuña Formation overlies the Santa Rosa Formation and is somewhat similar in lithology and color, although the Gatuña is also characterized by a wide range of lithologies (coarse conglomerates to gypsum-bearing claystones). The upper Gatuña contains a 600,000-year-old volcanic ash layer (DOE 1996a). The formation is generally less than 15 meters (50 feet) thick across the WIPP site and occurs at depths of 4.6 to 6.1 meters (15 to 20 feet) bgs. The Gatuña Formation is in turn overlain by the Mescalero caliche and surficial sand deposits (Powers 2009).

- **Mescalero Caliche and Other Surface Deposits.** The Mescalero caliche is a pedogenic carbonate unit that is continuous across the WIPP site, with thicknesses of up to 1.8 meters (6 feet). The unit is exposed in places but may also underlie dune sand (to depths of up to 6.1 meters [20 feet]). The continuity of the Mescalero is disrupted by erosion and solution and by plant growth. Funnel-like features called "flowerpots" can be seen throughout areas where the unit is well-exposed; mesquite and creosote bush root systems are found in some of these features. The presence of the Mescalero caliche indicates general stability across the land surface, since it took about 100,000 years to form and developed about 500,000 years ago (Powers 2009).

  Above the Mescalero is the Berino soil, a thick, reddish, semi-consolidated sand containing little carbonate, ranging in thickness from centimeters (inches) to 0.30 to 0.61 meters (1 to 2 feet). The Berino soil is likely derived from wind-blown material modified by pedogenic processes. It is often found in flowerpots and as a thin soil veneer on the surface of the Mescalero caliche (Powers 2009).

Geologic resources in the vicinity of WIPP include oil and gas and potash. Prior to 1970, most commercially related drilling in the WIPP area targeted shallow oil (1,200 to 1,400 meters [3,940 to 4,590 feet] in depth) in the Bell Canyon Formation. From 1970 to the mid-1980s, most drilling near WIPP focused on gas exploration in the deeper Morrow and Atoka Formations (approximately 4,000 meters [13,100 feet]). During the late 1980s and early 1990s, commercial oil was discovered in the Permian Cherry Canyon and Brushy Canyon Formations, which lie below the Bell Canyon Formation described above. These discoveries were made at locations adjacent to the eastern and northeastern boundary of WIPP, at a depth of approximately 2,100 to 2,400 meters (6,890 to 7,870 feet). These formations are the primary exploration and development targets in the Permian Basin, one of the most actively explored areas in the United States (Broadhead et al. 1995).

Oil and gas exploration drilling activities in the New Mexico portion of the Permian Basin (in which the WIPP site is located) have fluctuated considerably since 1997. As many as 57 rigs were working in the basin in late 1997, but the maximum number dropped to about 15 in 2000. The maximum rig count increased to approximately 65 in 2001, dropped to the low 30s in 2002, and then steadily increased to approximately 60 in 2005. It is assumed that hydrocarbon exploration drilling activities in the region of the WIPP site will continue for the foreseeable future (Crossroads 2005). At present, there are no oil wells located on WIPP Vicinity Section 10 or Section 20; however, one oil well is located on WIPP Vicinity Section 35.

Within an area extending 1 mile from the WIPP LWB, in-place oil reserves are estimated at 35.3 million barrels and in-place gas reserves are estimated at 28,780,000 cubic feet in the Morrow and Atoka Formations and in shallower Bell Canyon and Cherry Canyon Formation reservoirs (Broadhead et al. 1995).

Bedded potash (a mixture of several soluble oxide, sulfate, and chloride compounds containing potassium, used chiefly in fertilizers) was discovered in Eddy County, New Mexico, in 1925. By 1944, New Mexico was the largest domestic potash producer, representing 85 percent of consumption. Development continued through the 1950s and 1960s, reversed in the 1970s, and had declined by the mid-1990s.

Since 1997, potash mining activities in the region of the WIPP site have continued. Approximately 1,500,000 tons of potash were produced in 1997, and production has slowly declined since that time. In 2005, approximately 1,000,000 tons were produced (NMEMNRD 2006).

The majority of actively mined and potential resources of potash ore are found in the 37-meter-thick (120-foot-thick) McNutt Member of the Salado Formation, which is the host for 11 ore zones.

3.2.2.2 Soils

Soils of the region have developed mainly from Quaternary and Permian parent material. Parent material from the Quaternary System is represented by alluvial deposits of major streams, dune sand, and other surface deposits. These are mostly loamy and sandy sediments containing some coarse fragments. Parent material from the Permian System is represented by limestone, dolomite, and gypsum bedrock. Soils of the region have developed in a semiarid, continental climate with abundant sunshine, low relative humidity, erratic and low rainfall, and a wide variation in daily and seasonal temperatures. Subsoil colors are normally light brown to reddish brown but are often mixed with lime accumulations (caliche) that result from limited, erratic rainfall and insufficient leaching.

A soil association is a landscape with a distinctive pattern of soil types (series). It normally consists of one or more major soils and at least one minor soil. There are three soil associations within 8.3 kilometers (5 miles) of the WIPP site: the Kermit-Berino, the Simona-Pajarito, and the Pyote-Maljamar-Kermit. Of these three associations, only the Kermit-Berino soil series has been mapped across the WIPP site by Chugg et al. (1952, Sheet No. 113). These are sandy soils developed on eolian material. The Kermit-Berino soils include active dune areas. The Berino soil has a sandy A horizon; the B horizons include more argillaceous material and weak-to-moderate soil structures. A and B horizons are described as noncalcareous, and the underlying C horizon is commonly caliche. Bachman (1980, p. 44) interpreted the Berino soil as a paleosol that is a remnant B horizon of the underlying Mescalero. Rosholt and McKinney (1980, Table 5) applied uranium-trend methods to samples of the Berino soil from the WIPP site area and interpreted the age of formation of the Berino soil as 330,000 ± 75,000 years.

Generally, the Berino Series, which covers about 50 percent of the site, consists of deep, noncalcareous, yellow-red to red sandy soils that developed from wind-worked material of mixed origin. These soils are described as undulating to hummocky and gently sloping (0 to 3 percent slopes). The soils are the most extensive of the deep, sandy soils in the Eddy County area. Berino soils are subject to continuing wind and water erosion. If the vegetative cover is seriously depleted, the water-erosion potential is slight, but the wind-erosion potential is very high. These soils are particularly sensitive to wind erosion in the months of March, April, and May, when rainfall is minimal and winds are highest.

The Kermit Series consists of deep, light-colored, noncalcareous, excessively drained loose sands, typically yellowish-red fine sand. The surface is undulating to billowy (from 0 to 3 percent slopes) and consists mostly of stabilized sand dunes. Kermit soils are slightly to moderately eroded. Permeability is very high, and, if vegetative cover is removed, the water-erosion potential is slight, but the wind-erosion potential is very high.

The WIPP Vicinity reference locations are situated on Quaternary age alluvium, playa lake deposits, and semi-stabilized and active dune sands. These deposits compose the majority of surface exposures and most of the shallow subsurface sediments in the WIPP site region. Just below these deposits is a fairly continuous mantle of caliche (called the Mescalero). The Mescalero caliche is a well-lithified alluvial deposit of chalky, finely crystalline limestone that is fairly continuous across the WIPP site and can be up to 1.8 meters (6 feet) thick. It thickens and is more indurated to the east of the site. Overlying the Mescalero is the Berino soil, a thick, reddish, semi-consolidated sand containing little carbonate, ranging in thickness from centimeters (inches) to 0.3 to 0.6 meters (1 to 2 feet).

No natural factors within the WIPP Vicinity reference locations that would affect the engineering aspects of slope stability or subsidence have been reported. The presence of the Mescalero caliche is generally considered to be an indicator of surface stability (DOE 1997). Liquefaction of saturated sediments is a potential hazard during or immediately following large earthquakes. Whether soils will liquefy depends on several factors, including the magnitude of the earthquake, peak ground velocity, susceptibility of soils to liquefaction, and depth to groundwater. There are no saturated sediments in the area of the WIPP land withdrawal.

3.2.2.3 Geologic Hazards

No surface displacement or faulting younger than early Permian has been reported, indicating that tectonic movement since then, if any, has not been noteworthy. No mapped Quaternary (last 1.9 million years) or Holocene (last 10,000 years) faults exist closer to the site than the western escarpment of the Guadalupe Mountains, about 100 kilometers (60 miles) to the west-southwest (DOE 1997).

The strongest earthquake on record within 290 kilometers (180 miles) of the site was the Valentine, Texas, earthquake of August 16, 1931 (DOE 1997), with an estimated Richter magnitude of 6.4. A Modified Mercalli Intensity of V was estimated for this earthquake's ground shaking at WIPP. At Intensity V, ground shaking is felt by nearly everyone; a few instances of cracked plaster occur; and unstable objects are overturned. This is the strongest ground-shaking intensity known for the WIPP site.

From November 1974 to August 2006, the largest earthquake within 300 kilometers (184 miles) of the WIPP site occurred on April 14, 1995 (based on a search of the U.S. Geological Survey [USGS] National Earthquake Information Center data). It was located 32 kilometers (20 miles) east-southeast of Alpine, Texas (approximately 240 kilometers [150 miles] south of the site), and was assigned a Richter magnitude of 5.7. It was the largest event within 300 kilometers (184 miles) of the site since the Valentine, Texas, earthquake, and had no effect on any structures at WIPP (Sanford et al. 1995). From 1974 to 2006, recorded earthquakes within a 300-kilometer (184-mile) radius of WIPP have ranged from magnitude 2.3 to 5.7 (USGS 2010).

Earthquake-produced ground motion is expressed in units of percent *g* (force of acceleration relative to that of Earth's gravity). For the purposes of comparing the relative seismic hazard based on predicated earthquake-produced ground motions among the various mercury storage candidate sites evaluated in the January 2011 *Mercury Storage EIS* (DOE 2011a) and this SEIS, the latest probabilistic peak (horizontal) ground acceleration (PGA) data from USGS are used. The PGA values cited are based on a 2 percent probability of exceedance in 50 years. This corresponds to an annual probability (chance) of occurrence of about 1 in 2,500. For the WIPP site, the calculated PGA is approximately 0.08 *g* (USGS 2012).

Potash mining in the vicinity of WIPP outside of the LWB is subterranean and uses both room-and-pillar and modified long wall production techniques. In March 2012, WIPP registered a seismic event associated with a large mine roof fall approximately 8.7 kilometers (5.4 miles) west-southwest of the WIPP facility with an estimated Richter magnitude of 2.9 to 3.2. Although events of this significance are not usually expected, mining in the vicinity of the WIPP site would be expected to cause some gradual subsidence over time relative to the mining techniques used (Rutley 2012).

The nearest potentially active volcanoes are in the Zuni-Bandera volcanic field in northwestern New Mexico. Volcanoes in this area are of the cinder cone (basaltic) type. They have not been active in at least 2,000 years and are considered to be dormant (NMBGMR 2008).

3.2.3 Water Resources

3.2.3.1 Surface Water

There are no natural surface-water bodies within the boundaries of the WIPP site. Widespread eolian (sand dune) deposits that are of Holocene age or older indicate that little surface drainage has developed within and around the site. The nearest significant surface-water body, Laguna Grande de la Sal, is located about 13 kilometers (8 miles) west-southwest of the site in Nash Draw,[2] where there are shallow brine ponds. Small, manmade earthen livestock watering holes (called "tanks") occur around the WIPP site, particularly to the south, but are not hydrologically connected to the formations overlying the WIPP repository. The watering holes are constructed to hold runoff and not allow it to infiltrate. There may be minor leakage through the unsaturated zone beneath them that eventually reaches a Dewey Lake water table. The predominant use of surface water in the region is for livestock watering and irrigation (DOE 1997, 2008a; Powers 2009).

The Pecos River is the only perennial stream in the region (see Figure 3–1). The river flows to the south-southeast and is, at its closest point (the Malaga Bend), about 16 kilometers (10 miles) west of the WIPP site. The WIPP site is within the Pecos River drainage basin, although a natural divide lies between the Pecos River and the WIPP site. As a result, the Pecos drainage system does not currently affect the site. At least 90 percent of the mean annual precipitation at the WIPP site (30 centimeters [12 inches]) is lost by evapotranspiration, although precipitation rates may exceed evapotranspiration during intense thunderstorms that produce runoff and percolation. The average annual streamflow of the Pecos River at Malaga Bend (from 1938 through 2008) was 4.6 cubic meters per second (164.5 cubic feet per second) (USGS 2009). The maximum recorded streamflow (with a monthly mean of 119 cubic meters per second [4,200 cubic feet per second]) occurred in August 1996 at the Malaga Bend; its maximum elevation was 90 meters (300 feet) below the surface elevation of the WIPP site (DOE 1997, 2006; USGS 2009).

Surface-water samples collected along the Pecos River and from various tanks around the WIPP site are routinely analyzed for radionuclides, including uranium, plutonium, americium, potassium-40, cobalt-60, cesium-137, and strontium-90. In 2007, uranium and plutonium concentrations were compared to baseline levels observed between 1985 and 1989. The highest concentrations of uranium-234, uranium-235, and uranium-238 detected in the Pecos River and surrounding tanks were found to fall

[2] Nash Draw is a surface depression, about 32 kilometers (20 miles) long and 8 to 19 kilometers (5 to 12 miles) wide, located about 6 kilometers (3.7 miles) to the west of the WIPP site (Lorenz 2006). The valley is notable for its karst features and for exposures of some of the geologic units underlying the WIPP region.

within the ranges of baseline levels. Plutonium-238, plutonium-239, and plutonium-240 were not detected. Americium-241 was found in water (at 1.14×10^{-3} becquerels per liter) from Tut tank, northwest of the border of the WIPP site, but no baseline data were available for comparison. The only other radionuclide detected in 2007 that exceeded its baseline range was potassium-40, found in a sample from an onsite sewage lagoon at 148 becquerels per liter (the baseline value for potassium-40 was 76 becquerels per liter) (DOE 2008a). Again in 2011, potassium-40 was the only radionuclide found to exceed baseline ranges in a water sample taken from the same onsite sewage lagoon at 235 becquerels per liter. Sewage contains significant potassium from human excretions and potassium-40 makes up 0.012 percent of all naturally occurring potassium. Since potassium-40 was not detected in any other surface-water sample, sewage is the likely source (DOE 2012).

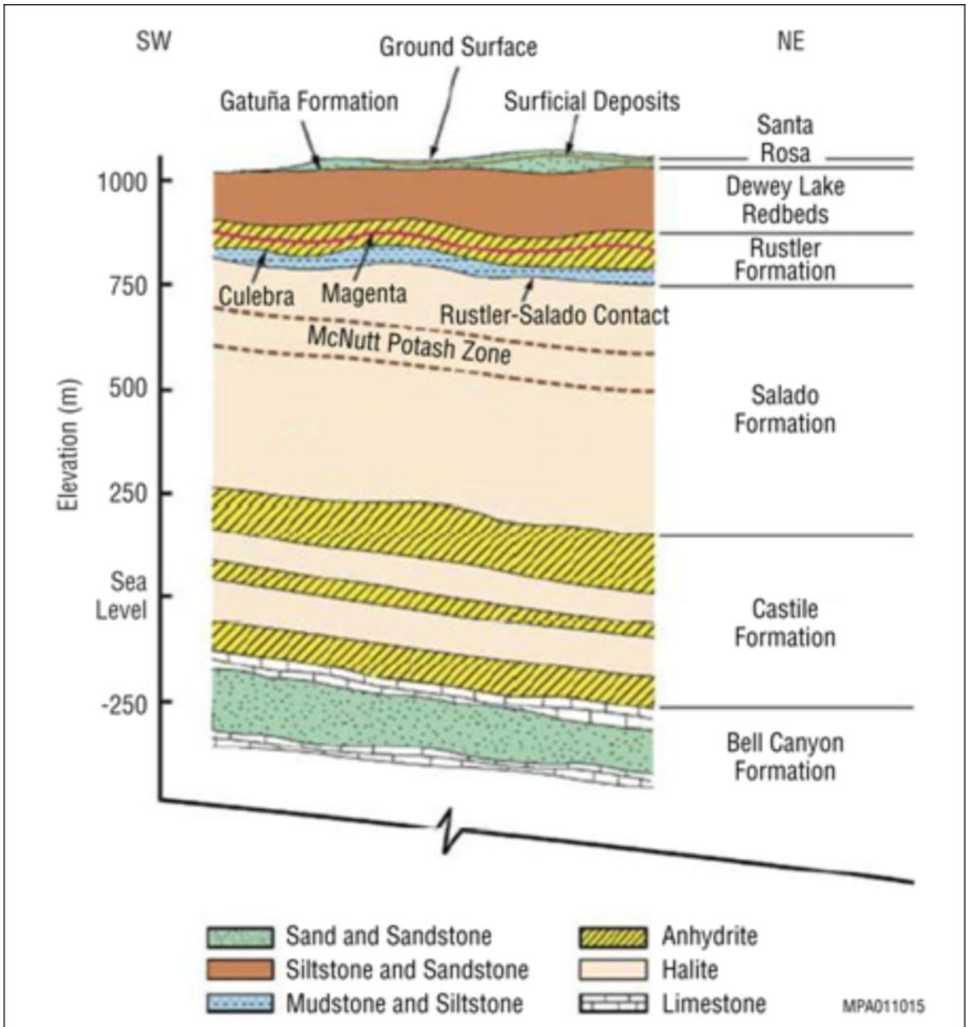
3.2.3.2 Groundwater

Several water-bearing zones have been identified and extensively studied at and near the WIPP site. Limited amounts of potable water are found in the middle Dewey Lake Formation and the overlying Triassic Dockum Group (Santa Rosa Sandstone) in the southern part within the WIPP LWB. Two water-bearing units in the Rustler Formation, the Culebra and Magenta Dolomite Members, produce brackish to saline water at the WIPP site and surrounding locations. Another very-low-transmissivity, saline water-bearing zone occurs along the contact between the Rustler and Salado Formations (DOE 2008a). Mercer (1983) reports no evidence of water in the Gatuña Formation or surficial materials at the WIPP site. Figure 3–5 shows the stratigraphic relationships of these aquifer units.

- **Lower Water-Bearing Horizons (below Salado Formation).** The term "water-bearing horizons" is used in this discussion because nothing below the Salado can properly be termed an aquifer. The Castile Formation is the basal unit of the Ochoan series and represents the oldest of the water-bearing units at the WIPP site. The formation is about 390 meters (1,280 feet) thick. It consists of three thick anhydrite units interbedded with halite and acts as an aquitard between the overlying Salado Formation and the underlying water-bearing sandstones, shales, and limestones of the Bell Canyon Formation (Guadalupian series). No regional groundwater flow system appears to be present in the Castile Formation in the WIPP site area. Fracturing within an anhydrite layer of the upper Castile has created isolated, high-permeability regions (brine reservoirs) that contain brine at higher-than-hydrostatic pressure (DOE 1996b, 1999, 2008a; Popielak et al. 1983).

- **Salado Formation.** The Salado Formation is a regional aquiclude made up of massive halite beds. Estimated hydraulic conductivities range from 10^{-16} to 10^{-11} meters per second for impure halite intervals and from 10^{-13} to 10^{-10} meters per second in anhydrite (Beauheim and Roberts 2002; Roberts et al. 1999). Although the hydraulic conductivity of the Salado Formation is extremely low, it is not dry. Brine content within the Salado is estimated at 1–2 percent by weight, and thin clay seams have been observed to contain up to 25 percent brine by volume (DOE 1999).

  Occurrence of groundwater in the Salado Formation is restricted because halite does not have primary porosity, solution channels, or open fractures. No evidence of circulating water has been found in the unit; however, small trapped pockets of brine (e.g., in MB139, which is an anhydrite rather than a halite) and nonflammable gas have been found. Inflow of trapped brine into the repository excavation has been observed in boreholes and from "weeps," which are localized brine seeps issuing from the surfaces of the repository walls, floors, and roofs. These flows are created when intact rock is disturbed by mining. The volumes of brine observed from these occurrences have been small, and flow into the repository ceased within 3 years of initial observation.



Source: Modified from DOE 2008b.

Figure 3–5. Stratigraphy of Aquifer Units at the Waste Isolation Pilot Plant Site

- **Upper Water-Bearing Horizons.** Directly above the Salado Formation in Nash Draw is a zone of dissolution residue capable of transmitting water. The transmissivity of this interval, referred to as the "Rustler-Salado contact," decreases from Nash Draw eastward to the WIPP site area. Small quantities of brine were found in this zone in WIPP site test holes (DOE 2008a).

  The 95-meter-thick (310-foot-thick) Rustler Formation, which directly overlies the Salado Formation, ranges in depth from 164 to 257 meters (538 to 843 feet) at the WIPP site. There are five members of the Rustler Formation. In ascending order, these members are the Los Medaños Member, Culebra Dolomite Member, Tamarisk Member, Magenta Dolomite Member, and Forty-niner Member. Only the Culebra and Magenta Dolomite Members have enough transmissivity to produce water to wells. The other three members act as aquitards (DOE 1996b).

  The Culebra Dolomite Member of the Rustler Formation is composed predominantly of fractured, microcrystalline dolomite and ranges in thickness from 5.8 to 12.5 meters (19 to 41 feet) in the WIPP site region. It is the first significant water-bearing unit above the Salado Formation at the WIPP site. Regional flow of groundwater in the Culebra Dolomite is generally to the south. Because of its lateral continuity and high transmissivity (as high as 10^{-3} square meters per second [DOE 2008b]), it is considered to be the most likely pathway if contaminants were to be released from the WIPP site in the event of a postulated future human intrusion. Estimates of hydraulic conductivity in the Culebra Dolomite vary widely, but in general, they decrease from 10^{-4} meters per second in Nash Draw to 10^{-14} meters per second east of the WIPP site (DOE 1999). These conductivity variations are believed to be controlled by the relative abundance of pore-filling cements, stress-relief fracturing, and fracturing related to dissolution of the upper Salado Formation rather than by primary depositional features of the unit. Porosities measured in core samples from the Culebra range from 0.03 to 0.30 (Kelley and Saulnier 1990; TerraTek, Inc. 1996). Although the dolomite matrix provides most of the unit's storage capacity, fluid movement occurs mainly through fractures and vugs. Recent studies of the Culebra show that it is a heterogeneous system with anisotropic characteristics, suggesting variability of fracture orientations on a local scale, especially in the WIPP site area (DOE 2008a; Lorenz 2006). These studies support the interpretation that the Culebra Dolomite and other members of the Rustler Formation are unkarsted strata (DOE 2008b; Lorenz 2006).

The Magenta Dolomite Member of the Rustler Formation is above the Culebra Dolomite and is separated from it by the Tamarisk Member. The Magenta is about 8 meters (26 feet) thick and consists of fine-grained gypsiferous dolomite. The Magenta Dolomite is less transmissive (about 10^{-7} square meters per second [DOE 2008b]) than the Culebra Dolomite, having hydraulic conductivities one to two orders of magnitude less than those of the Culebra in most locations (from 10^{-9} to 10^{-3} meters per second). Like those of the Culebra Dolomite, its hydraulic conductivities increase to the west toward Nash Draw. The hydraulic gradient of the Magenta also increases toward the west, ranging from 0.003 to 0.0038 on the east side of the WIPP site to 0.0061 along its west side (DOE 1997, 1999).

The reddish-brown fine sandstone, siltstone, and silty claystone of the Dewey Lake Red Beds Formation overlie the Rustler Formation. The formation is about 150 meters (490 feet) thick at the center of the WIPP site, thinning to the west. The upper portion of the Dewey Lake consists of a fairly thick (up to 80 meters [164 feet]) unsaturated zone. Just below this zone is a saturated zone perched above a cementation change from carbonate (above) to sulfate (below). The saturated zone, which makes up the middle portion of the Dewey Lake, occurs at depths of about 50 to 80 meters (164 to 262 feet). In this zone, water is transmitted through open fractures. Below it, fractures tend to be completely filled with gypsum (DOE 1999, 2008a).

The Santa Rosa Formation thins from being 66 meters (217 feet) thick along the eastern WIPP site boundary to zero near the center of the WIPP site. Anthropogenic water has been found in the formation in the center part of the WIPP site. The Gatuña Formation unconformably overlies the Santa Rosa. It ranges in thickness from about 6 to 9 meters (19 to 31 feet) and consists of silt, sand, and clay, with deposits formed in localized depressions. Saturation in the Gatuña occurs in discontinuous perched zones. This water may also have an anthropogenic source (DOE 1999, 2008a).

Groundwater samples from monitoring wells in the Culebra Member of the Rustler Formation have been characterized as saline to brine, with total dissolved solid concentrations ranging from 4,000 to 360,000 milligrams per liter. Water from the Culebra has been classified as Class III water by U.S. Environmental Protection Agency (EPA) guidelines and is not acceptable for human consumption or for agricultural purposes (DOE 2007; Richey et al. 1985).

Groundwater in the overlying Dewey Lake Formation is of better quality, with an average total dissolved solids value of 3,350 milligrams per liter. This water has been classified as Class II water by EPA guidelines and is suitable for livestock consumption (DOE 2007).

3.2.4 Meteorology, Air Quality, and Noise

3.2.4.1 Meteorology and Air Quality

Located in Eddy County in the Chihuahuan Desert of southeastern New Mexico, the regional climate around the WIPP site is semiarid, characterized by warm temperatures, low precipitation and humidity, and a high rate of evaporation (DOE 1997).

In 2006, about 40 percent of the time, winds blew inclusively from the east-southeast to south-southeast, with the highest winds from the southeast (DOE 2007). Windspeeds categorized as calm (less than 0.5 meters per second [1.1 miles per hour]) occurred less than 0.5 percent in 2006. Winds of 3.71 to 6.30 meters per second (8.30 to 14.1 miles per hour) were the most prevalent, occurring about 36 percent of the time.

For the 1986–2007 period, the annual average temperature at the WIPP site was 17.9 degrees Celsius (°C) (64.3 degrees Fahrenheit [°F]) (WRCC 2008). December was the coldest month, averaging 7.2 °C (44.9 °F) and ranging from –1.3 °C to 15.6 °C (29.6 °F to 60.1 °F), and July was the warmest month, averaging 28.4 °C (83.2 °F) and ranging from 20.6 °C to 36.4 °C (69.1 °F to 97.5 °F). For the same period, the highest temperatures reached 50.0 °C (122 °F) and the lowest reached –17.2 °C (1 °F). Days with a maximum temperature of higher than or equal to 32.2 °C (90 °F) occurred about one-third of the time, while those with a minimum temperature of less than or equal to 0 °C (32 °F) occurred about 20 percent of the time.

Annual precipitation at the WIPP site averages about 33.8 centimeters (13.32 inches) (WRCC 2008). Precipitation is the highest in summer and tapers off markedly in winter. About 60 percent of the precipitation from June through September is in the form of high-intensity, short-duration thunderstorms, sometimes accompanied by hail (DOE 2004a). Rains are brief but occasionally intense and can result in flash flooding in arroyos and along the floodplains. Measurable snow is rare and, if it occurs, remains on the ground for only a short time. Light snow typically occurs from December to January, and the annual average snowfall in the area is about 2.3 centimeters (0.9 inches).

Strong winds are common and can blow from any direction, creating potentially violent windstorms that carry large volumes of dust and sand (DOE 2004a). In late winter and spring, there are strong west winds and dust storms. On rare occasions, a tropical hurricane may cause heavy rain in eastern and central New Mexico as it moves inland from the western part of the Gulf of Mexico, but there is no record of serious wind damage from these storms (WRCC 2008).

Fujita Scale of Tornado Intensities

F0	Gale	18–32 meters per second (m/s) 40–72 miles per hour (mph)
F1	Moderate	33–50 m/s 73–112 mph
F2	Significant	51–70 m/s 113–157 mph
F3	Severe	71–92 m/s 158–206 mph
F4	Devastating	93–116 m/s 207–260 mph
F5	Incredible	117–142 m/s 261–318 mph

Tornadoes in the area surrounding the WIPP site, which is located on the edge of the tornado alley in the central United States, are common but less frequent and destructive than those in the tornado alley. For the period 1950–2008, 512 tornadoes were reported in New Mexico (an average of about 9 tornadoes per year); they occurred mostly at lower elevations in eastern New Mexico near Texas (NCDC 2008). For the same period, a total of 52 tornadoes (an average of about 1 tornado per year) were reported in Eddy County, which includes the WIPP site. However, most tornadoes occurring in Eddy County were relatively weak (i.e., 49 were F0 or F1, and 3 were F2 on the Fujita tornado scale). No deaths and 29 injuries were associated with these tornadoes.

Both the State of New Mexico and the EPA have authority for regulating compliance with portions of the Clean Air Act Amendments. On the basis of an initial 1993 air emissions inventory, the WIPP site is not required to obtain Clean Air Act permits (DOE 2007). WIPP was required to obtain a New Mexico Air Quality Control Regulation 702 operating permit (recodified in 2001 as 20.2.72 *New Mexico Administrative Code* [NMAC], "Construction Permits") for two backup diesel generators at the site in 1993. There have been no activities or modifications to the operating conditions of the diesel generators that would require reporting under the conditions of the permit in 2006.

Annual emissions for major facility sources and total point and area sources for 2002 for criteria pollutants and volatile organic compounds (VOCs) in Eddy County, New Mexico, including the WIPP site, are presented in Table 3–2 (EPA 2008a). Data for 2002 are the most recent emission inventory data available on the EPA website (EPA 2009). Area sources consist of nonpoint and mobile sources. Point sources account for most total sulfur dioxide (SO_2) and nitrogen dioxide (NO_2) emissions in the county; SO_2 is emitted equally from industrial fuel combustion and from petroleum and related industries, and NO_2 is emitted mostly from industrial fuel combustion. For carbon monoxide (CO) and particulate matter with an aerodynamic diameter less than or equal to 10 micrometers (PM_{10}), area sources account for most of total emissions in the county; for VOCs and particulate matter with an aerodynamic diameter less than or equal to 2.5 micrometers ($PM_{2.5}$), emissions from area sources are higher than those from point sources. CO is emitted from on-road sources. PM_{10}/$PM_{2.5}$ are emitted from miscellaneous sources, and VOCs are omitted from many different activities, with the highest contribution coming from petroleum and related industries.

Table 3–2. Annual Emissions of Criteria Pollutants and Volatile Organic Compounds from Selected Major Facilities and Total Point and Area Source Emissions in Eddy County Encompassing the Waste Isolation Pilot Plant Site

Emission Category	Emission Rates (tons per year)[a]					
	SO_2	**NO_2**	**CO**	**VOCs**	**PM_{10}**	**$PM_{2.5}$**
Agave Gas Plant	*2,099*	*2.0*	*0.6*	*20.2*	*0.0*	*0.0*
Artesia Gas Plant	*838*	*919*	*301*	*52.6*	*1.9*	*1.9*
Empire Abo Plant	*0.0*	*29.1*	*1.0*	*2.2*	*1,307*	*1,143*
Indian Basin Gas Plant	*2,040*	*361*	*396*	*60.4*	*2.4*	*2.2*
Navajo Refining Co.–Artesia	*1,975*	*387*	*394*	*1,204*	*187*	*112*
Total point sources	7,515	6,661	5,399	3,444	1,847	1,569
Total area sources	268	1,776	20,326	4,778	25,479	3,175
County total	**7,783**	**8,437**	**25,725**	**8,222**	**27,326**	**4,744**

[a] Data in *italics* are examples of selected major facilities and are not added to yield total.

Note: Emissions for selected major facilities are total point and area sources for 2002.

Key: CO=carbon monoxide; NO_2=nitrogen dioxide; PM_n=particulate matter with an aerodynamic diameter less than or equal to *n* micrometers; SO_2=sulfur dioxide; VOC=volatile organic compound.

Source: EPA 2009.

Among criteria pollutants (SO_2, NO_2, CO, ozone [O_3], PM_{10} and $PM_{2.5}$, and lead), the New Mexico State Ambient Air Quality Standards are identical to the National Ambient Air Quality Standards for NO_2 (EPA 2008b; 20.2.3 NMAC), as shown in Table 3–3. The State of New Mexico has established more stringent standards for SO_2 and CO but has no standards for O_3, particulate matter, or lead. In addition, the state has adopted standards for hydrogen sulfide and total reduced sulfur and has still retained the standard for total suspended particulates, which used to be one of the criteria pollutants but was replaced by PM_{10} in 1987.

Table 3–3. National Ambient Air Quality Standards or New Mexico State Ambient Air Quality Standards and Highest Background Levels Representative of the Waste Isolation Pilot Plant Area, 2003–2007

Criteria Pollutants	Averaging Period	Most Stringent Standard or Guideline[a]	Maximum Waste Isolation Pilot Plant Area Concentration[b, c]
Carbon monoxide	8 hours	8.7 ppm	3.5 ppm (40%) Albuquerque, Bernalillo County (2004)[d]
	1 hour	13.1 ppm	9.6 ppm (73%) Albuquerque, Bernalillo County (2003)[d]
Nitrogen dioxide	Annual	0.05 ppm	0.006 ppm (12%) Artesia, Eddy County (2003)
	1 hour	0.10 ppm[e]	f
Ozone[g]	8 hours	0.075 ppm[e]	0.076 ppm (101%) Carlsbad, Eddy County (2006)
PM_{10}	24 hours	150 μg/m^3[e]	88 μg/m^3 (59%) Hobbs, Lea County (2003)
$PM_{2.5}$	Annual	15.0 μg/m^3[e]	7.3 μg/m^3 (49%) Hobbs, Lea County (2007)
	24 hours	35 μg/m^3[e]	18 μg/m^3 (51%) Hobbs, Lea County (2005)
Sulfur dioxide	Annual	0.02 ppm	0.001 ppm (5.0%) Artesia, Eddy County (2007)
	24 hours	0.10 ppm	0.004 ppm (4.0%) Artesia, Eddy County (2006)
	3 hours	0.50 ppm	0.017 ppm (3.4%) Artesia, Eddy County (2006)
	1 hour	0.075 ppm	f
Lead	Calendar quarter[h]	1.5 μg/m^3[e]	0.03 μg/m^3 (2.0%) Bernalillo County (2003)[d]
	Rolling 3-month	0.15 μg/m^3[e]	f

a The more stringent standard between the National Ambient Air Quality Standards (NAAQS) and the State Ambient Air Quality Standards (SAAQS) is listed when both are available.

b Monitored concentrations are the highest arithmetic mean for calendar-quarter lead; second-highest for 1-hour, 3-hour, and 24-hour sulfur dioxide, 1-hour and 8-hour carbon monoxide, 1-hour ozone, and 24-hour PM_{10}; fourth-highest for 8-hour ozone; 98th percentile for 24-hour $PM_{2.5}$; arithmetic mean for annual sulfur dioxide, nitrogen dioxide, PM_{10}, and $PM_{2.5}$.

c Values in parentheses are monitored concentrations as a percentage of SAAQS or NAAQS.

d These locations with highest observed concentrations in the state of New Mexico are not representative of the Waste Isolation Pilot Plant site but are presented to show that these pollutants are not a concern over the state of New Mexico.

e Values are NAAQS. No SAAQS exists.

f No measurement is available.

g On June 15, 2005, the U.S. Environmental Protection Agency revoked the 1-hour ozone standard for all areas except the 8-hour ozone nonattainment Early Action Compact areas. (Those do not yet have an effective date for their 8-hour designations.) The 1-hour standard will be revoked for these areas 1 year after the effective date of their designation as attainment or nonattainment for the 8-hour ozone standard.

h Used old standard because no data in the new standard format are available.

Key: μg/m^3=micrograms per cubic meter; PM_n=particulate matter with an aerodynamic diameter less than or equal to *n* micrometers; ppm=parts per million.

Note: New Mexico also has ambient standards for total suspended particulates, hydrogen sulfide, and total reduced sulfur, but no ambient values were reported representative of the area.

Source: EPA 2008a, 2009; 20.2.3 *New Mexico Administrative Code*.

The WIPP site is located in Eddy County. Currently, the entire county, including the WIPP site, is designated as being in attainment for all criteria pollutants (40 CFR 81.332). The whole state is designated as an attainment area, except for a small portion in the south-central part of the state, Anthony (adjacent to El Paso, Texas), which is not in attainment for PM_{10}.

Seven classes of EPA-regulated pollutants have been monitored at WIPP since August 1986. Monitoring results indicated that air quality around the WIPP site usually met Federal and state standards, except for occasional exceedances for total suspended particulates during periods of high wind and blowing sands and infrequent exceedances for SO_2 (DOE 1997). After notifying the EPA, on October 30, 1994, DOE terminated onsite monitoring of criteria pollutants at the WIPP site because there was no longer a regulatory requirement to do so. Currently, VOC monitoring is performed to comply with the provisions of the WIPP Hazardous Waste Facility Permit. In 2006, three of the nine target compounds were detected above the method reporting limit (DOE 2007). The most substantial results were at least three orders of magnitude below the lower action level as described by the Hazardous Waste Facility Permit.

To establish representative background concentrations for the WIPP site, nearby urban or suburban measurements were used. The highest concentration levels for SO_2, NO_2, PM_{10}, and $PM_{2.5}$ around the WIPP site are less than or equal to 59 percent of their respective standards in Table 3–3 (EPA 2008b). The highest annual O_3 concentrations reported in 2006 were slightly higher than the standard; however, compliance with the O_3 standard is based on the 3-year average of the fourth highest value reported annually. The annual concentration for 8-hour ozone was 0.066 parts per million (ppm) in 2007, 0.076 ppm in 2006, 0.067 ppm in 2005, 0.065 ppm in 2004, and 0.065 ppm in 2003 (EPA 2012). The highest 3-year average during the 2003–2007 timeframe was 0.070 ppm, which is in compliance with the standard. No measurement data for CO and lead around the WIPP site are available, but those values are expected to be lower. They would be lower for CO because of the distance from urban areas and major highways, and they would be lower for lead because of the distance from industrial processes, such as smelters.

The WIPP site and its vicinity are classified as Prevention of Significant Deterioration (PSD) Class II areas. The nearest Class I area is Carlsbad Caverns National Park, about 61 kilometers (38 miles) west-southwest of WIPP (40 CFR 81.421). Guadalupe Mountains National Park in Texas is about 100 kilometers (62 miles) west-southwest of WIPP (40 CFR 81.429). There are no facilities currently operating at the WIPP site that are subject to PSD regulations.

3.2.4.2 Noise

The State of New Mexico and Eddy County have established no quantitative noise-level regulations.

The major noise sources associated with disposal operations at WIPP include traffic noise from site workforce vehicles, salt haulage vehicles, and waste transport vehicles; from the Waste Handling Building during normal operations; and from infrequent emergency diesel generator testing. The *Waste Isolation Pilot Plant Disposal Phase Final Supplemental Environmental Impact Statement* reported that an overall sound pressure level of 50 decibels A-weighted (dBA) might occur 120 meters (400 feet) away as a result of normal operations (DOE 1997). Because the WIPP facility is more than 2.4 kilometers (1.5 miles) from the fence line, generator noise is inaudible at the fence line and hence at any nearby residence.

The ambient noise level in the WIPP area before construction was 26 to 28 dBA, similar to wilderness natural background noise levels (DOE 1997). For the general area surrounding the WIPP site, the countywide day–night average sound level (L_{dn}) based on population density is estimated to be 33 dBA for Eddy County, typical of the lower end of the range for rural areas (33–47 dBA) (Eldred 1982).

3.2.5 Ecological Resources

3.2.5.1 Terrestrial Resources

The area surrounding the WIPP site is characterized by large, stabilized sand dunes. It is located within a transition area between the northern extension of the Chihuahuan Desert (desert grassland) and the southern Great Plains (short-grass prairie) and shares the vegetative characteristics of both areas (DOE 1980). More than 100 species of plants have been identified within the WIPP LWB (DOE 1993). Numerous species of forbs and perennial grasses are present. The dominant shrubs include shinnery oak *(Quercus havardii)*, mesquite *(Prosopis glandulosa)*, sand sagebrush *(Artemisia filifolia)*, dune yucca *(Yucca campestris)*, and smallhead snakeweed *(Gutierrezia microcephala)* (DOE 1980, 1997). Russian thistle *(Salsola kali)* is a nonnative species that is commonly established in disturbed areas (DOE 1980).

More than 45 mammal species (including 15 bat species) occur within Lea and Eddy Counties, with 39 species occurring in the WIPP site area (DOE 1980). Mule deer *(Odocoileus hemionus)*, pronghorn *(Antilocapra americana)*, and coyote *(Canis latrans)* are among the larger mammals found in the area (DOE 1980, 1997).

More than 120 species of birds have been documented on or near the WIPP site (DOE 1980). Common bird species include the loggerhead shrike *(Lanius ludovicianus)*, pyrrhuloxia *(Cardinalis sinuatus)*, and black-throated sparrow *(Amphispiza bilineata)* (DOE 1997). The availability of nesting sites may limit bird populations in the project area (DOE 1980).

Twenty-three reptile and 10 amphibian species occur in the area (DOE 1980, 1993). Most desert amphibians are generally seen only following spring or summer rains (DOE 1993).

3.2.5.2 Wetlands

No wetlands occur on the WIPP site or in the immediate vicinity of the site.

3.2.5.3 Aquatic Resources

The two-county region lies within the drainage basin of the Pecos River. However, the only permanent aquatic habitats near the WIPP site include earthen watering ponds for livestock (DOE 1997). These manmade livestock watering holes, which are not hydrologically connected to the formations overlying the WIPP site, are located several miles away (DOE 2007). Two salt pile evaporation ponds, a detention basin, and two manmade ponds occur within the developed portions of the WIPP site. However, these ponds do not provide productive aquatic habitats.

3.2.5.4 Threatened and Endangered Species

The endangered, threatened, and other special status species reported from the area of Eddy and Lea Counties, including the WIPP Vicinity reference locations, are listed in Table 3–4. (Special status aquatic species and species that primarily occur near major aquatic habitats are not included because no aquatic habitats in which those species occur are located near the WIPP site.) None of the species listed in Table 3–4 were observed within the WIPP LWB in 1996, and there is no designated critical habitat for federally listed species at the WIPP site (DOE 1997). Critical habitat for the gypsum wild-buckwheat *(Eriogonum gypsophilum)* is over 30 miles (48 kilometers) from the WIPP site. Favorable habitat for the lesser prairie-chicken *(Tympanuchus pallidicinctus)*, a Federal candidate species, does occur within the WIPP LWB and other surrounding areas (DOE 2007). WIPP employees have instituted measures, in consultation with BLM, to protect the lesser prairie-chicken and its habitat. They include the establishment of periods during which offsite field activities may not be performed during the species' breeding season (DOE 2007).

Table 3–4. Federally and State-Listed Species Potentially Occurring at the Waste Isolation Pilot Plant Site

Common Name	Scientific Name	Federal Status	State Status
Plants			
Glass Mountain coral-root	*Hexalectris nitida*		Endangered
Guadalupe jewelflower	*Streptanthus sparsiflorus*		Species of Concern
Gypsum wild-buckwheat	*Eriogonum gypsophilum*	Threatened	Endangered
Hershey's cliff daisy	*Chaetopappa hersheyi*		Species of Concern
Kuenzler hedgehog cactus	*Echinocereus fendleri* var. *kuenzleri*	Endangered	Endangered
Lee's pincushion cactus	*Escobaria sneedii* var. *leei*	Threatened	Endangered
Sneed pincushion cactus	*Coryphantha sneedii* var. *sneedii*	Threatened	Endangered
Wright's water-willow	*Justicia wrightii*		Species of Concern
Birds			
American peregrine falcon	*Falco peregrinus anatum*		Threatened
Arctic peregrine falcon	*Falco peregrinus tundrius*		Threatened
Baird's sparrow	*Ammodramus bairdi*		Threatened
Least tern (interior population)	*Sterna antillarum athalassos*	Endangered	Endangered
Lesser prairie-chicken	*Tympanuchus pallidicinctus*	Candidate	
Southwestern willow flycatcher	*Empidonax trallii extimus*	Endangered	Endangered
Sprague's pipit	*Anthus spragueii*	Candidate	
Mammals			
Black-footed ferret	*Mustela nigripes*	Endangered	

Source: BISON 2012; NMRPTC 2012; USFWS 2012.

3.2.6 Cultural and Paleontological Resources

Roughly 1,370 hectares (3,380 acres) of the 4,140 hectares (10,240 acres) managed by WIPP have been surveyed for cultural resources. The surveys identified approximately 60 archaeological sites and 90 isolated finds (DOE 2002a). The largest survey was done in 1987 by Mariah and Associates. The 1987 survey examined portions of 45 sections surrounding the WIPP facility (DOE 2002b).

3.2.6.1 Prehistoric Resources

People have been living in the desert southwest for more than 10,000 years. Prehistoric people tended to live nomadic lifestyles, collecting resources from different areas at different times of the year (DOE 2002b). Most prehistoric archaeological sites in the WIPP area represent short-term use. In the mid-1500s, the Jumano and Apachean people used the area. They collected goods seasonally and traded with nearby Puebloan people. The Spanish were the first Europeans to cross what would become southeastern New Mexico. In historic times, the region was only lightly populated because of a lack of resources. Some ranching took place on the WIPP property during the 1940s and 1950s. Evidence of these activities is still visible in some locations.

WIPP Vicinity Section 10 is located on BLM-managed land just to the northeast of the WIPP LWB, WIPP Vicinity Section 20 is in the WIPP LWB, and WIPP Vicinity Section 35 is located on BLM-managed land just to the southeast of the WIPP LWB. The majority of Section 10, Section 20, and Section 35, all within Township 22 South, Range 31 East, have not been examined for the presence of cultural resources. However, some cultural resource surveys have been undertaken in anticipation of development. No archaeological sites have been found in WIPP Vicinity Section 10 or Section 20. Seven archaeological sites have been identified within WIPP Vicinity Section 35. Of the seven resources identified, one is currently recommended as being potentially eligible for listing on the National Register of Historic Places. Another site has been very heavily impacted by past activities and no longer requires consideration. Most of the discovered resources appear to be the remains of camps that show evidence of food preparation.

A review of cultural resource information for the region revealed that the Maroon Cliffs Archaeological District is located northwest of WIPP. It is the closest archaeological district to the reference locations. The 4,770-hectare (11,780-acre) district contains evidence of habitation ranging from the Archaic period (5000 B.C.) to the Jornada Mogollon period (A.D. 900 to 1450) (BLM 1988). Pit houses have been reported among the archaeological sites documented at this location. The district includes a wide variety of topographic features. The district is located roughly 11 kilometers (7 miles) northwest of the project area.

From about 10,000 B.C. to the late 1800s, southeastern New Mexico was inhabited by aboriginal hunters and gatherers who subsisted on various wild plants and animals. In the late 1800s, the region was settled by ranchers and farmers. Known archaeological sites in the vicinity of WIPP are primarily the remains of prehistoric camps and short-term settlements. These areas are generally marked by hearth features, scattered burned rock, flaked stone projectile points, cutting and scraping tools, pottery fragments, and ground stone implements. Locations generally represent short-term, seasonal occupations by small, nomadic groups of hunters and gatherers who used the plants and animals in the dune lands east of the Pecos River. In a few cases, sites with evidence of structures have been reported, probably associated with occupations of several weeks to months.

3.2.6.2 Historic Resources

Historic remains or features (more than 50 years old) are rare but have occasionally been identified. These include features and debris related to agricultural ranching in the twentieth century, including fences that may still be in use. The majority of historic sites identified to date include elements that could contribute to their eligibility for listing in the National Register of Historic Places.

With few exceptions, cultural resources known or anticipated in the area covered by the WIPP LWB are significant; they must be identified, recorded, assessed through an inventory, and considered in any plan of development for the area. When compared with most other portions of southeastern New Mexico, the locations (and nature) of cultural resources within the WIPP LWB can be described relatively well on the basis of an intensive inventory of portions of the area, limited excavation, and other investigative work on some sites.

Several surveys have been completed in the WIPP LWB, and 59 archaeological sites and 91 isolated occurrences (single artifact or only a few artifacts, or isolated features that can be fully recorded in the field) have been identified to date. The sites and isolates identified are almost exclusively prehistoric. Only one site with both prehistoric and historic components was noted. Approximately 37 percent of the area within the WIPP LWB has been inventoried for cultural resources. Extrapolating the current number of resources located to date to the rest of the (unsurveyed) area indicates that about 99 additional sites and 153 isolates could be present at the site. The land within the WIPP LWB appears to represent a potentially significant contributor of cultural resources and should be regarded as such when land management decisions are made (DOE 2002b).

3.2.6.3 American Indian Resources

There are no known American Indian sacred sites or burials in the WIPP Vicinity reference locations.

3.2.6.4 Paleontological Resources

Paleontological resources are the physical remains, impressions, or traces of plants or animals from a former geological age that may be sources of information on paleoenvironments and the evolutionary development of plants and animals. No paleontological resources have been identified in the WIPP Vicinity reference locations.

3.2.7 Site Infrastructure

3.2.7.1 Ground Transportation

The WIPP site can be reached by rail or highway. Rail access to WIPP is provided by a rail line connecting with a spur of the Burlington Northern Santa Fe (BNSF) Railroad near the Mosaic Potash Nash Draw Mine, 9.6 kilometers (6 miles) southwest of the site. This section of rail, which was constructed under the auspices of Right-of-Way Reservation NM 55699, granted on September 27, 1983, is approximately 8 kilometers (5 miles) in length. The rail line includes an adjacent service road. Both the railroad and service road were constructed on an easement width of 46 meters (150 feet).

The WIPP site can also be accessed by the North and South Access Roads constructed for the WIPP project. The North Access Road, also known as Louis Whitlock Road, is approximately 21 kilometers (13 miles) in length, with an easement width of 37 meters (120 feet). Use of this road is restricted to DOE personnel, agents, and contractors of DOE on official business related to the WIPP project or to BLM personnel, permittees, licensees, or lessees. Signs are placed and maintained at the turnout of U.S. Route 62/180 stating the restrictions on access. Persons desiring access to Texas State Route 128 can use Lea County Line Road immediately to the east. The South Access Road, also known as WIPP Road, is approximately 6.4 kilometers (4 miles) in length, with an easement width of 43 meters (140 feet). Multiple-use access for the South Access Road will be allowed unless it is determined that access by industry or the general public represents a significant safety risk to WIPP personnel or to the public. Upon determination, general access of the South Access Road may be restricted at the boundary of the 580-hectare (1,450-acre) Off-Limits Area in accordance with DOE Manual 470.4-2, *Physical Protection*. Average daily traffic on the access roads is estimated to be 800 vehicles on the North Access Road and 400 vehicles on the South Access Road (NMED 2007).

3.2.7.2 Electricity

Electricity is supplied to the WIPP area by Xcel Energy. Xcel owns a substation on the WIPP land withdrawal area located just to the east of the Property Protection Area, and owns the 115-kilovolt transmission lines to the substation. The peak load use is estimated to be 4 megawatts, with an available peak load capacity of 20 megawatts.

3.2.7.3 Fuel

WIPP utilizes gasoline and diesel as fuel for mobile equipment, the site emergency generators, and the diesel fire pump upon failure of the electric-powered fire pump. WIPP has attempted to partner with private industry for bio-fuels for both gasoline and diesel. WIPP has not been successful in obtaining bio-fuels or bio-fuel blends due to lack of availability. Fuel consumption in fiscal year 2011 was 73,615 liters (19,447 gallons).

3.2.7.4 Water

The WIPP site water supply is categorized as a nontransient, noncommunity system for reporting and testing requirements. Water service for the WIPP facility is furnished by the City of Carlsbad from a city-owned waterline that originates at the Double Eagle South Well Field 31 miles (50 kilometers) north of the facility. The volume capacity of the waterline is such that it meets all water requirements for the operation of the WIPP facility. As specified in a bill of sale transferring this waterline from DOE to the City of Carlsbad in June 2009, Carlsbad will provide up to 25 million liters per year (6.6 million gallons per year) of water to the WIPP facility free of charge for the next 100 years. Annual water use at the WIPP site is approximately 15 million liters per year (4 million gallons per year).

The City of Carlsbad is serviced by two separate well fields: Sheep's Draw and Double Eagle. Approximately 98 percent of Carlsbad's water is supplied by groundwater pumped from nine wells located 11 kilometers (7 miles) southwest of Carlsbad in an area called Sheep's Draw in the foothills of the Guadalupe Mountains. The other 2 percent comes from the Double Eagle water system. The Double Eagle well system is located near Maljamar, New Mexico. It serves the Ridgecrest Subdivision, Connie Road, Blackfoot Road, Hobbs Highway Industrial Park Area, Brantley Lake State Park, and the WIPP site. In 2007, the city of Carlsbad's water supply system pumped 9.5 billion liters (2.5 billion gallons) of water (Carlsbad 2008a).

The Double Eagle system that supplies water to the WIPP site has 29 wells in two well fields (north and south). Twelve of the wells are operational in the north well field; two are operational in the south well field. The south well field is the main source of water for the WIPP site and a handful of other users. Double Eagle water is withdrawn from the Ogallala Aquifer (Carlsbad 2008a, 2008b). The Double Eagle system has a total capacity of approximately 9.5 billion liters per year (2.5 billion gallons per year). Existing storage facilities include a 11.4-million-liter (3-million-gallon) reservoir, a 1.6-million-liter (0.42-million-gallon) reservoir, and a 3.8-million-liter (1-million-gallon) reservoir. A 7.6-million-liter (2-million-gallon) reservoir has also been added to the south well field.

3.2.8 Waste Management

WIPP is the Nation's only underground repository for the permanent disposal of defense-generated TRU waste. WIPP holds a Hazardous Waste Facility Permit under the Resource Conservation and Recovery Act from the State of New Mexico for TRU-mixed waste storage and disposal. In addition, the WIPP facility is a large-quantity generator of hazardous waste, generating about 10,800 kilograms (23,700 pounds) of hazardous waste in 2011.

Site-generated nonhazardous solid waste that is not recycled is shipped off site and disposed of at the Eddy County Sandpoint Landfill, the nearest municipal solid waste landfill to the site. In 2011, WIPP generated 98 metric tons (108 tons) of solid waste. WIPP has an onsite construction and demolition debris landfill for site-generated construction and demolition (C&D) wastes. Disposal in the onsite C&D landfill is limited to 23 metric tons (25 tons) per day. In 2011, WIPP generated about 64 metric tons (70 tons) of C&D waste.

Support structures at the WIPP facility used to manage waste generated from facility operations include a sewage treatment system. The sewage treatment system at WIPP is a zero-discharge facility consisting of two primary settling lagoons, two polishing lagoons, a chlorination system, and four evaporation basins. The sewage treatment system is designed to dispose of domestic sewage and site-generated brine waters from observation well pumping and from underground dewatering activities at WIPP (Sandia 2008). The existing sewage treatment system for WIPP site operations is located approximately one-half mile from the site and is designed and permitted for 87,000 liters (23,000 gallons) per day. In 2011, approximately 12 million liters (3.1 million gallons) were managed in the sewage treatment system, or on average, 31,650 liters (8,360 gallons) per day.

3.2.8.1 Waste Minimization

An active Pollution Prevention Program has been in place at WIPP since the 1990s with recycling as a key component of the program. As a result, WIPP has long recycled the waste streams that can be recycled within its regional infrastructure. These include a narrow scope of nonhazardous, C&D,

hazardous, universal, and New Mexico special waste streams. Nonhazardous wastes that are recycled are paper, plastics, cardboard, and aluminum cans. C&D wastes that are recycled are metals and, during fiscal year 2011, asphalt. Other wastes recycled or recovered include circuit boards, used oil, used antifreeze, and batteries. Computers and electronics are either donated for reuse or sent to UNICOR for recycling. WIPP also encourages its onsite subcontractors to recycle.

3.2.9 Occupational and Public Health and Safety

This section summarizes the environmental health risks arising from the effects of exposures to hazardous chemicals and ionizing radiation during normal operations, facility accidents, and transportation activities.

3.2.9.1 Normal Operations

The following discussion is based on current operations at WIPP and is assumed to be applicable to all three WIPP Vicinity reference locations. According to the *Waste Isolation Pilot Plant Annual Site Environmental Report for 2010* (DOE 2011c), WIPP continues to have no reportable, unauthorized contaminant (both ionizing radiation and hazardous chemicals) releases.

3.2.9.1.1 Exposure to Ionizing Radiation

The dose limit for WIPP operations is given in Title 40 of the *Code of Federal Regulations* (CFR) Part 191, Subpart A, and requires that the combined annual dose equivalent to any member of the general public in the vicinity of the site not exceed 25 millirem per year to the whole body and 75 millirem per year to any critical organ. Potential radiation exposures of the offsite general public can occur as a result of three pathways: (1) air transport, (2) water ingestion, and (3) ingestion of game animals. Of these three pathways, only the air pathway is considered to be credible. Elevated concentrations of radionuclides have not been detected in groundwater or game animals in the site vicinity.

In 2011, the whole body dose to the highest-exposed individual from airborne releases was estimated to be less than 1.75×10^{-5} millirem per year (DOE 2012). This individual was assumed to reside 7.5 kilometers (4.6 miles) west-northwest of the site. A hypothetical individual residing at the site fence line in the northwest sector was estimated to receive a whole body dose of less than 1.29×10^{-3} millirem per year (DOE 2012). These values are well below the dose limit of 100 millirem per year from all exposure pathways set by DOE to protect the general public from the operation of its facilities.

In 2011, the collective dose to the population living within 80 kilometers (50 miles) of WIPP was calculated to be 2.67×10^{-5} person-rem per year (DOE 2012). If this dose were distributed uniformly to all individuals living within 80 kilometers (50 miles) of the site – a total of 92,599 people – the average dose to each person would be about 2.88×10^{-7} millirem per year (DOE 2012). This is an extremely small fraction of the average dose of 620 millirem per year to members of the general public from exposure to natural background and manmade sources of radiation (NCRP 2009).

Before operations started at WIPP for receipt and disposal of TRU waste, estimates were developed for the doses that could be expected to occur to workers (Bradley et al. 1993). The doses for each worker during normal contact-handled (CH) waste handling operations at WIPP were estimated to be as follows: waste handlers would receive 0.70 rem per year; radiation control technicians, 0.60 rem per year; and an average individual, 0.68 rem per year. The estimated annual doses to these three categories of workers for handling all TRU (CH and remote-handled [RH]) waste are given as 0.79 rem per year, 0.87 rem per year, and 0.81 rem per year, respectively. The average individual represents the dose associated with the range of activities at WIPP and is thus a composite (or average) worker. The waste acceptance criteria for WIPP limit the contact dose rate to 200 millirem per hour for CH wastes and 1,000 rem per hour for RH wastes. The project has a self-imposed limit of 1 rem per year for worker exposure at WIPP, which is lower than the occupational exposure limit of 5 rem per year given in 10 CFR 835.

Data on actual operations at WIPP indicate that workers are receiving very low doses from external gamma radiation (Jierree 2009; McCauslin 2010). The total annual worker dose commitment for the years 1999 through 2009 was 12.4 person-rem (or an average of about 1.1 person-rem per year) and ranged from a low of 0.331 person-rem per year to a maximum of 2.298 person-rem per year. Of the more than 1,100 workers who were monitored for radiation exposure in 2009, 68 had reportable doses. Most of the individuals who had reportable doses were waste handlers and radiological control technicians.

The proposed mercury storage facility(ies) would contain no radioactive materials and thus would not alter the current exposure of members of the public or workers to ionizing radiation.

3.2.9.1.2 Exposure to Hazardous Chemicals

Polychlorinated biphenyls (PCBs) are a class of compounds regulated by the Toxic Substances Control Act. The PCB storage and disposal regulations are listed in the applicable subparts of 40 CFR Part 761, "Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions."

WIPP handles TRU waste[3] containing PCBs. On May 15, 2003, EPA Region VI approved the disposal of waste containing PCBs at the WIPP facility. PCBs exist in DOE's TRU waste as mixtures of synthetic organic chemicals with physical properties ranging from oily liquids to waxy solids. The WIPP facility began receiving PCB-contaminated waste on February 5, 2005. The EPA renewed the disposal authority on April 30, 2008. The required PCB annual report, containing information on PCB waste received and disposed of at the WIPP facility in 2011, was submitted to EPA Region VI on July 13, 2012. Exposure of workers and the public to PCBs has been and remains minimal (DOE 2004b).

In addition, WIPP monitors VOCs. The nine compounds monitored are 1,1,1-trichloroethane, 1,1,2,2-tetrachloroethane, 1,1-dichloroethylene, 1,2-dichloroethane, carbon tetrachloride, chlorobenzene, chloroform, methylene chloride, and toluene. The running annual average for repository VOC sample results remained below the concentrations of concern as listed in the WIPP permit (DOE 2011c).

3.2.9.2 Facility Accidents

According to the *Waste Isolation Pilot Plant Annual Site Environmental Report for 2010* (DOE 2011c), WIPP continued to have no reportable, unauthorized contaminant releases. There is no record of accidental fires, explosions, ionizing radiation releases, or hazardous chemical releases.

3.2.9.3 Transportation

The principal business of WIPP is to receive and dispose of TRU waste. To that end, shipping containers for TRU waste are brought onto the site by truck. In the first 10 years of WIPP operations, there were a total of eight traffic accidents involving WIPP trucks (DOE 2009), with no injuries or fatalities.

For the *Supplement Analysis for the Waste Isolation Pilot Plant Site-Wide Operations* (DOE 2009), DOE estimated the routine exposures of the populations along the transportation routes to WIPP to ionizing radiation and concluded that the estimated mean number of latent cancer fatalities (LCFs) over the entire shipping campaign would be 0.23. Occupational exposures would amount to 0.29 LCFs over the same period of time. There is no routine exposure to hazardous chemicals because these are inside the shipping container. DOE (2009) also reports on analyses of hypothetical severe accidents. Bounding analysis of worst-case severe accidents predicts a mean number of LCFs of 0.1, and bounding individual probabilities

[3] TRU waste is waste that contains alpha particle-emitting radionuclides with atomic numbers greater than uranium (92) and half-lives greater than 20 years, in concentrations greater than 100 nanocuries per gram of waste.

of an LCF of about 2.3×10^{-7}. Bounding analyses of worst-case releases of VOCs show that no human health effects would be expected from such scenarios.

3.2.10 Socioeconomics

Socioeconomic variables at WIPP are associated with community growth and development within the WIPP ROI that could potentially be affected, directly or indirectly, by project-related changes. Included are economic characteristics, the region's demography, housing, and local transportation.

WIPP is located in southeastern New Mexico, approximately 32 kilometers (20 miles) east of Carlsbad. The majority of people employed at WIPP reside in two counties: Eddy and Lea. Therefore, these two counties are identified as the ROI in this socioeconomics analysis. Approximately 1,100 persons are employed at WIPP (DOE 2011b:4-35).

3.2.10.1 Regional Economic Characteristics

From 2000 to 2011, the labor force of the ROI increased by approximately 27 percent to 58,157. During this period, the unemployment rate of the ROI decreased from 5.5 percent to 4.9 percent. The unemployment rate in the ROI peaked during 2010 at 6.5 percent. By July 2012, the unemployment rate of the ROI was 4.5 percent, which was lower than the unemployment rate for New Mexico (7.4 percent) (BLS 2012).

3.2.10.2 Demographic and Housing Characteristics

In 2010, the population of the two-county ROI was 118,556. From 2000 to 2010, the ROI population grew by approximately 11 percent, compared with 13 percent growth throughout the State of New Mexico. The percentage of the ROI population under the age of 18 was approximately 28 percent; Women ages 18 to 39 composed approximately 28 percent of the population (Census 2011a). Young children and pregnant women are considered to be among the most vulnerable populations to mercury poisoning. There were 47,504 housing units in the ROI in 2010, 64 percent of which were owner-occupied, 26 percent were renter-occupied, and 10 percent were vacant (Census 2011b, 2011c).

3.2.10.3 Local Transportation

As discussed in Section 3.2.7.1, the WIPP site can be reached by rail or highway. Rail access to WIPP is provided by a rail line connecting with a spur of the BNSF Railroad near the Mosaic Potash Nash Draw Mine, 9.6 kilometers (6 miles) southwest of the site. The WIPP site can also be accessed by the North and South Access Roads constructed for the WIPP project. The North Access Road is restricted to DOE personnel, agents, and contractors of DOE on official business related to the WIPP project or to BLM personnel, permittees, licensees, or lessees. Multiple-use access for the South Access Road will be allowed unless it is determined that access by industry or the general public represents a significant safety risk to WIPP personnel or to the public. Traffic in the vicinity of WIPP has experienced temporary increases in volume at various times due to oil production activities.

3.2.11 Environmental Justice

Under Executive Order 12898, DOE is responsible for identifying and addressing any disproportionately high and adverse impacts on minority and low-income populations. Minority persons are those who identify themselves as American Indian or Alaska Native, Asian, Black or African American, Hispanic or Latino (of any race), Native Hawaiian or other Pacific Islander, or multiracial (CEQ 1997). Persons who report that their income is less than the Federal poverty threshold are designated as low-income.

A 16-kilometer (10-mile) radius was chosen as the ROI for this analysis to provide a reasonable estimate of the potentially affected population surrounding the facility(ies). An additional ROI of those residing within an approximately 3.2-kilometer (2-mile) radius of each candidate site was used as a subset of the 16-kilometer (10-mile) ROI to guard against inadvertently diluting represented minority and low-income populations most likely to experience any potentially adverse impacts associated with mercury storage.

The 16-kilometer (10-mile) radius surrounding the candidate storage locations at WIPP encompasses parts of two counties in New Mexico: Eddy and Lea. Figure 3–6 shows populations residing in the two-county area, as reported in the 2000 and 2010 censuses (Census 2001a, 2011d). In this figure, lightly shaded bars show populations in 2000 and the darker bars show those in 2010. From 2000 to 2010, the population of Eddy and Lea Counties increased by approximately 11 percent to 118,556. Over this period, the total minority population increased by approximately 32 percent to 62,600 and the low-income population decreased by approximately 13 percent to 17,540 (Census 2001a, 2001b, 2011d, 2011e).

Demographic data from the 2010 census show that the total minority population residing in the two-county area composed approximately 53 percent of the total population. The White Hispanic population residing in the two-county area composed approximately 55 percent of the county's total minority population, while those self-identified as "some other race" (meaning those who provided write-in entries such as Mexican, Puerto Rican, or Cuban) composed approximately 31 percent of the county's total minority population. Persons who declared that they are of Hispanic or Latino origin are included in the "total Hispanic" population, regardless of race. They composed approximately 48 percent of the total population and approximately 91 percent of the total minority population residing in Eddy and Lea Counties in 2010.

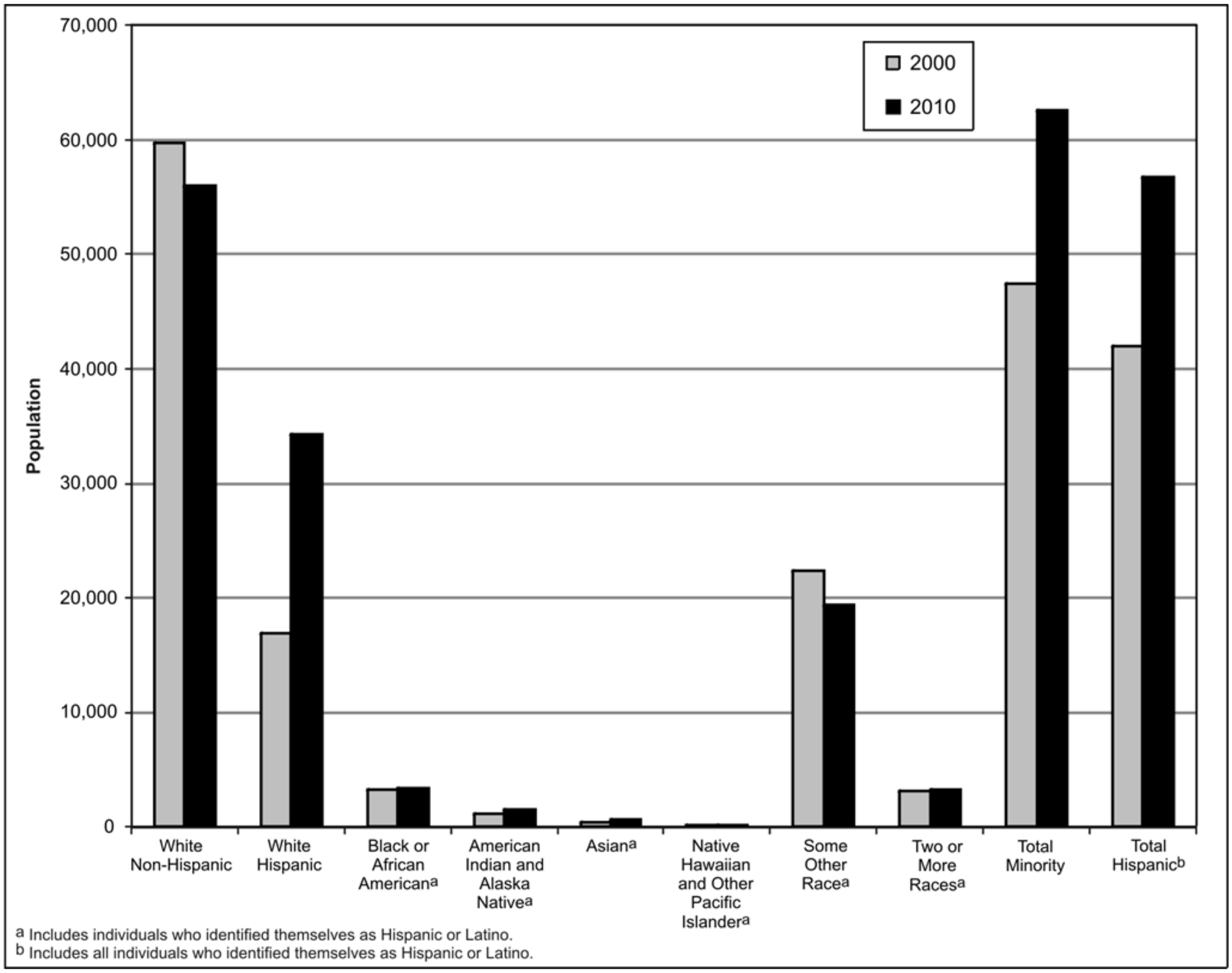


Figure 3–6. Populations Residing in the Two-County Area Surrounding the Waste Isolation Pilot Plant in 2000 and 2010

3.2.11.1 WIPP Vicinity Section 10

In 2010, 550 people lived within 16 kilometers (10 miles) of WIPP Vicinity Section 10. This area included an estimated 44 percent minority and 6 percent low-income population. By comparison, Eddy and Lea Counties included a 53 percent minority and 16 percent low-income population, and New Mexico included a 60 percent minority and 18 percent low-income population. There are five census block groups located within the 16-kilometer (10-mile) radius surrounding Section 10, none of which contained a minority or low-income population. As described in Appendix B, Section B.11.1, of the January 2011 *Mercury Storage EIS* and as updated in Appendix B, Section B.3, of this SEIS, minority and low-income populations or communities are identified by comparing block-group data to the surrounding state- and county-level data to determine if the minority or low-income population percentage is meaningfully greater than that of the general population. Figure 3–7 shows the cumulative populations living at a given distance from Section 10. It is estimated that approximately 36 people reside within approximately 3.2 kilometers (2 miles) of Section 10, consisting of a 45 percent minority population and a 5 percent low-income population (Census 2011d, 2011e).

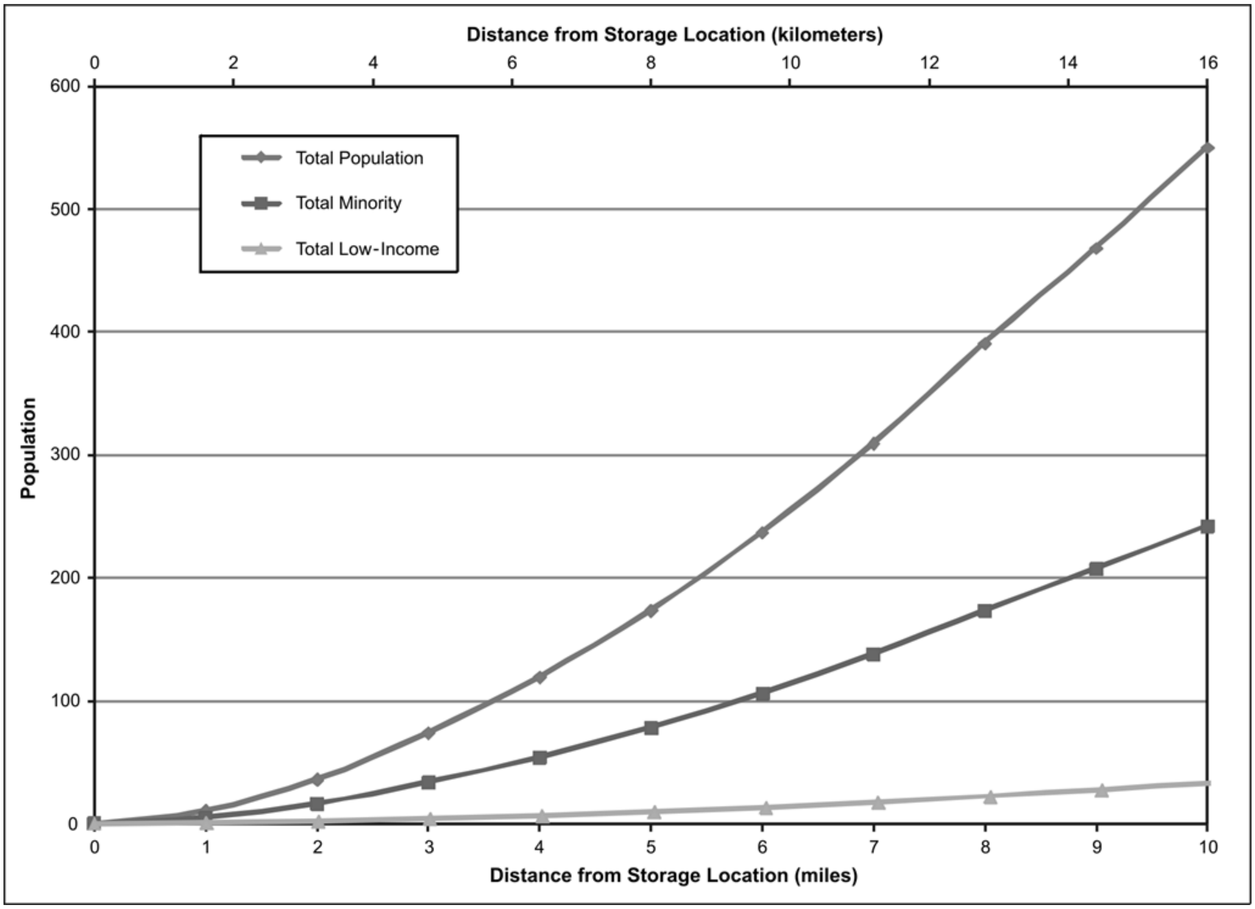


Figure 3–7. Populations Residing Within 16 Kilometers (10 miles) of the Storage Location at Waste Isolation Pilot Plant Vicinity Section 10

3.2.11.2 WIPP Vicinity Section 20

In 2010, 575 people lived within 16 kilometers (10 miles) of WIPP Vicinity Section 20. This area included an estimated 45 percent minority and 5 percent low-income population. By comparison, Eddy and Lea Counties included a 53 percent minority and 16 percent low-income population, and New Mexico included a 60 percent minority and 18 percent low-income population. There are three census block groups located within the 16-kilometer (10-mile) radius surrounding Section 20, none of which contained a minority or low-income population. Figure 3–8 shows the cumulative populations living at a given distance from Section 20. It is estimated that approximately 21 people reside within approximately 3.2 kilometers (2 miles) of Section 20, consisting of a 46 percent minority population and a 5 percent low-income population (Census 2011d, 2011e).

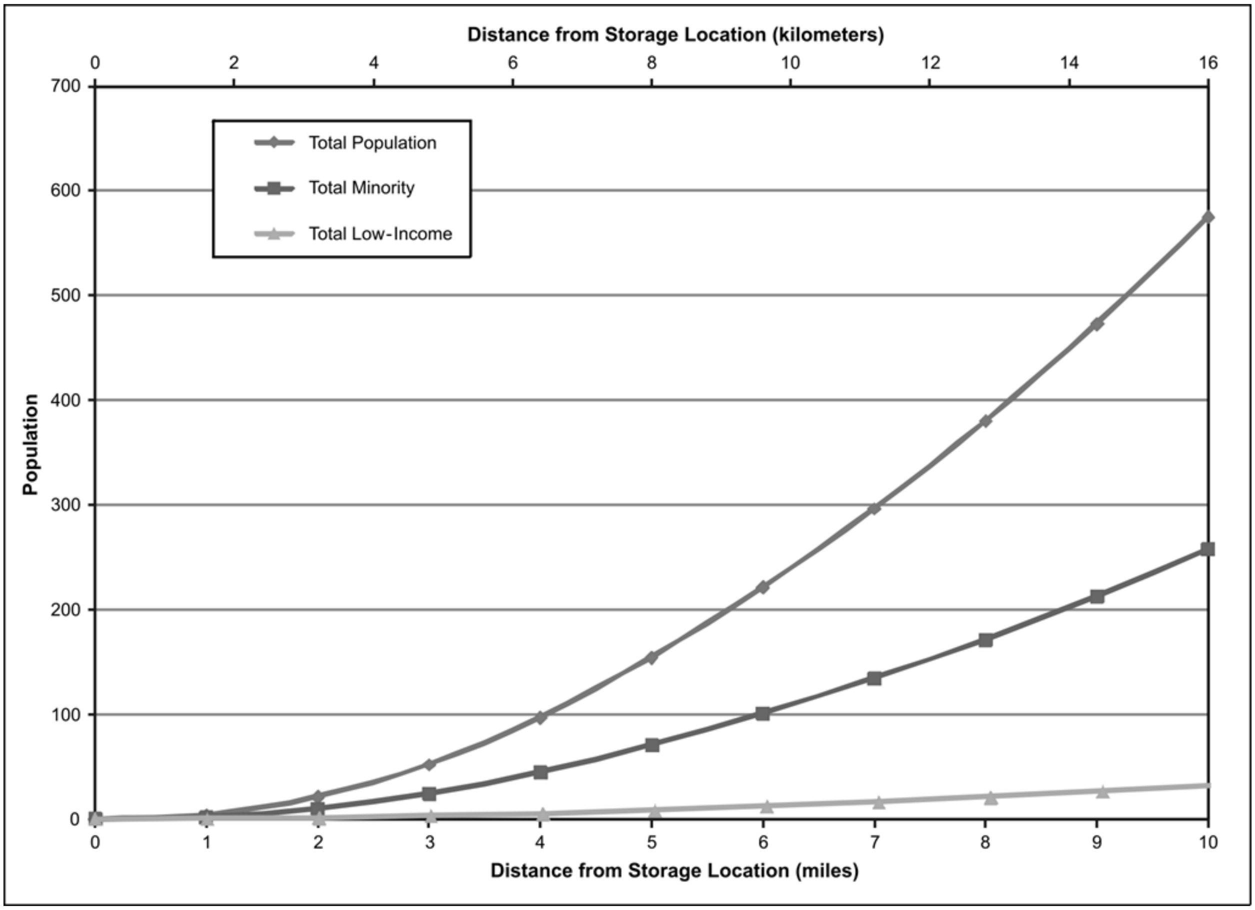


Figure 3–8. Populations Residing Within 16 Kilometers (10 miles) of the Storage Location at Waste Isolation Pilot Plant Vicinity Section 20

3.2.11.3 WIPP Vicinity Section 35

In 2010, 430 people lived within 16 kilometers (10 miles) of WIPP Vicinity Section 35. This area included an estimated 44 percent minority and 6 percent low-income population. By comparison, Eddy and Lea Counties included a 53 percent minority and 16 percent low-income population, and New Mexico included a 60 percent minority and 18 percent low-income population. There are three census block groups located within the 16-kilometer radius surrounding Section 35, none of which contained a minority or low-income population. Figure 3–9 shows the cumulative populations living at a given distance from Section 35. The total population living within 16 kilometers of Section 35 is primarily concentrated to the north and northwest along the outskirts of Carlsbad. The distribution of the total minority and low-income populations is similar to that of the total population. It is estimated that approximately 13 people reside within approximately 3.2 kilometers (2 miles) of Section 35, consisting of a 47 percent minority population and a 5 percent low-income population (Census 2011d, 2011e).

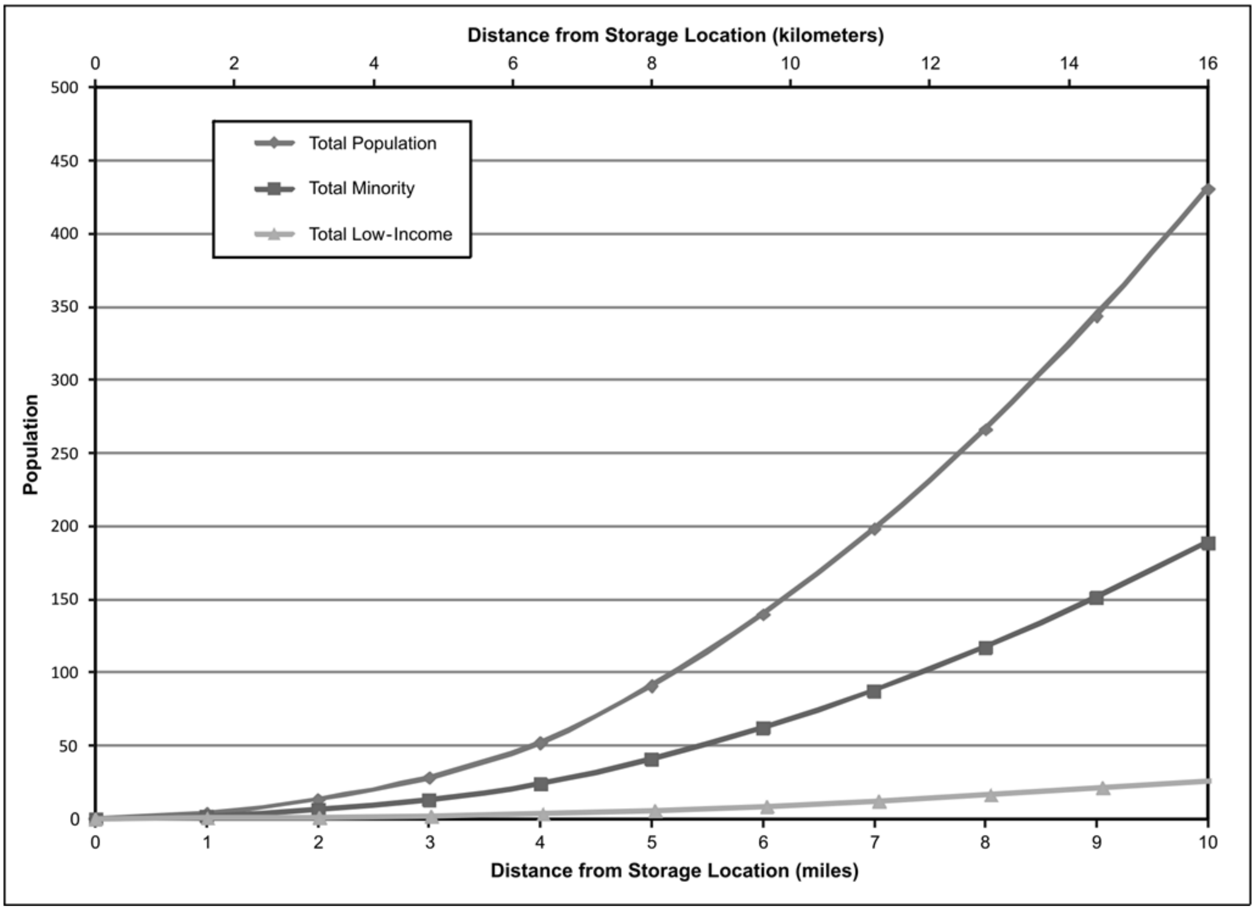


Figure 3–9. Populations Residing Within 16 Kilometers (10 miles) of the Storage Location at Waste Isolation Pilot Plant Vicinity Section 35

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CHAPTER 4
ENVIRONMENTAL CONSEQUENCES

CHAPTER 4
ENVIRONMENTAL CONSEQUENCES

Chapter 4 presents the potential impacts on the human environment of implementing the alternative locations that are being considered in this *Draft Long-Term Management and Storage of Elemental Mercury Supplemental Environmental Impact Statement (Draft Mercury Storage SEIS)*. Seven candidate sites were evaluated as alternatives for long-term mercury storage in the January 2011 *Long-Term Management and Storage of Elemental Mercury Environmental Impact Statement (Mercury Storage EIS)* (DOE 2011a), and a discussion of the impacts associated with these candidate sites can be found in Chapter 4 of the January 2011 *Mercury Storage EIS*. The analyses presented in the January 2011 *Mercury Storage EIS* remain valid and are incorporated into this *Draft Mercury Storage SEIS* with two exceptions: (1) the occupational and public health and safety analysis; and (2) the socioeconomics and environmental justice analysis. This *Draft Mercury Storage SEIS* includes updates to the occupational and public health and safety analysis resulting from changes to the definition of severity levels (i.e., magnitude of impacts) for acute-inhalation exposures to the public under certain accident scenarios. This *Draft Mercury Storage SEIS* also includes updates to the socioeconomics and environmental justice analyses to incorporate 2010 decennial census information that was not available at the time the January 2011 *Mercury Storage EIS* was published. The updates to the analyses are presented in Appendix B and Appendix E of this *Draft Mercury Storage SEIS.* A No Action Alternative was also evaluated in the January 2011 *Mercury Storage EIS*, which includes the impacts of continued storage of elemental mercury in the absence of a facility(ies) designated by the U.S. Department of Energy. Potential impacts associated with each Waste Isolation Pilot Plant Vicinity reference location are discussed in Section 4.2. Activities and impacts associated with closure of a mercury storage facility(ies) are presented in Section 4.3. Cumulative impacts, mitigation measures, and resource commitments are presented in Sections 4.4, 4.5, and 4.6, respectively.

4.1 INTRODUCTION

This chapter describes the potential environmental and human health impacts associated with implementation of the three Waste Isolation Pilot Plant (WIPP) Vicinity reference locations considered in this *Draft Long-Term Management and Storage of Elemental Mercury Supplemental Environmental Impact Statement (Draft Mercury Storage SEIS)*. As presented in Chapter 1, the U.S. Department of Energy's (DOE's) proposed action is to select a suitable location(s) for the long-term management and storage of elemental mercury[1] generated in the United States.

A detailed description of the WIPP Vicinity reference locations is provided in Chapter 2, Section 2.3. A summary comparison of the projected environmental effects among all alternatives analyzed in this draft SEIS and in the January 2011 *Long-Term Management and Storage of Elemental Mercury Environmental Impact Statement (Mercury Storage EIS)* is presented in Chapter 2, Section 2.6. Site-specific information for the WIPP Vicinity reference locations for each of the environmental disciplines and resource areas considered is presented in Chapter 3; this information provides the basis for this environmental consequences analysis. Specifically, the environmental impact analyses performed consider all disciplines where the potential exists for effects on the natural and human environment, including consideration of resource conditions that could affect the implementation of alternatives, as follows:

- Land use and visual resources
- Geology, soils, and geologic hazards
- Water resources
- Meteorology, air quality, and noise
- Ecological resources
- Cultural and paleontological resources
- Site infrastructure
- Waste management
- Occupational and public health and safety

[1] Unless the context indicates otherwise, elemental mercury is referred to hereafter simply as "mercury" in this supplemental environmental impact statement.

- Ecological risk
- Socioeconomics
- Environmental justice

These disciplines were analyzed in a manner commensurate with the importance of the issue or the relative expected level of impact under a specific alternative—the sliding-scale assessment approach (DOE 2004:1, 2).

Although the Mercury Export Ban Act of 2008 (P.L. 110-414) contemplates indefinite storage, DOE has used a 40-year period of analysis for the purposes of evaluating potential environmental impacts associated with long-term storage. This 40-year timeframe corresponds to the planning projection for receipt into storage of up to 10,000 metric tons (11,000 tons) of elemental mercury, as described in Chapter 2, Section 2.1. A 40-year period of analysis is consistent with the timeframe used in previous analyses by the Defense Logistics Agency (DLA 2004:1-1) and the U.S. Environmental Protection Agency (EPA) (EPA 1997a–e). These are estimates with a degree of uncertainty; therefore, it is possible that more or less than 10,000 metric tons of mercury could eventually require storage for a period longer or shorter than 40 years. There currently is no approved method of treating high-purity elemental mercury for disposal. It is not known when such a treatment method might become available. The new mercury storage facility(ies) could be constructed in a modular fashion to accommodate storage of mercury on an as-needed basis (see Chapter 2, Sections 2.2.2). The ability to build the storage facility(ies) in a modular fashion would also ensure that the facility(ies) is sized correctly for the amount of mercury that would eventually require storage. As a conservative assumption, the impact analyses presented in this chapter evaluate the construction and operation of a new, full-size mercury storage facility with 13,950 square meters (150,000 square feet) of storage space, which is necessary to accommodate the projected volume of elemental mercury over the 40-year period of analysis. Additional National Environmental Policy Act (NEPA) analysis would be required to expand the facility(ies) to accept more than 10,000 metric tons of mercury or extend its operations beyond the 40-year period of analysis. Closure of the storage facility(ies) would occur at the end of storage activities, as discussed in Section 4.3.

The results of the environmental impacts analysis performed for the alternatives evaluated in the January 2011 *Mercury Storage EIS* and this draft SEIS were calculated using appropriate computer models and by applying projected facility construction and operations parameters, as appropriate. Appendix B describes the general impact assessment methods employed for each discipline and presents the region of influence (ROI) for each resource area evaluated. Appendix C presents data that were used to support the analysis of impacts from construction and operation of a mercury storage facility(ies) at each of the alternative locations analyzed in this draft SEIS. Finally, Appendix D includes overviews of input data and analysis assumptions, and mercury toxicity and approach to evaluating risk from normal operations, facility accidents, and transportation. Additional detail for these subject areas can also be found in Appendices B, C, and D of the January 2011 *Mercury Storage EIS*.

4.2 WASTE ISOLATION PILOT PLANT SITE

Under this alternative, elemental mercury would be stored at one of three WIPP Vicinity reference locations, as described in Chapter 2, Section 2.3. WIPP is the Nation's only underground repository for the permanent disposal of defense-generated transuranic waste. The WIPP site is located in Eddy County in the Chihuahuan Desert of southeastern New Mexico (see Chapter 3, Figure 3–1). The site is about 42 kilometers (26 miles) east of Carlsbad in a region known as Los Medaños, a relatively flat, sparsely inhabited plateau with little surface water. The WIPP site encompasses approximately 41 square kilometers (16 square miles) under the jurisdiction of DOE pursuant to the Waste Isolation Pilot Plant Land Withdrawal Act (LWA) (P.L. 102-579). Under this alternative, a new mercury storage facility would be constructed at or in the vicinity of the WIPP site. The new mercury storage facility would be similar to that proposed at some of the other candidate sites previously analyzed in the January 2011

Mercury Storage EIS. Many of the impacts on resource areas are similar for all of the WIPP Vicinity reference locations; however, differences in potential impacts among the three locations are identified, where appropriate.

4.2.1 Land Use and Visual Resources

4.2.1.1 WIPP Vicinity Section 10

Minor impacts on land use and visual resources are expected from construction and operation of a new mercury storage building at WIPP Vicinity Section 10. Construction of this new facility would require the disturbance of approximately 3.1 hectares (7.6 acres) for building construction and laydown areas (see Chapter 2, Section 2.2.2). The proposed mercury storage facility would be located on relatively undisturbed land in Section 10 adjacent to and north of the WIPP land withdrawal boundary (LWB). The mercury storage facility would be located outside of the WIPP LWB. The completed facility boundary would similarly encompass approximately 3.1 hectares (7.6 acres) within its fenced perimeter. The footprint of the mercury storage building would occupy approximately 1.6 hectares (3.9 acres) of this area. Mercury storage operations in this area would be compatible with current WIPP waste management and storage operations. Pursuant to the Federal Land Policy and Management Act of 1976, this land would be withdrawn from all forms of entry, appropriation, and disposal under the public land laws and reserved for the purposes of operating a mercury storage facility. DOE would prepare a land management plan, as appropriate, and provide opportunities for the public and for Federal, state, and local agencies to participate in the land use planning. Potash mining in the region surrounding WIPP, including an existing lease for future underground mining operations in Section 10, may influence the ability to site a mercury storage facility due to the potential for increased risk of land subsidence. Since the mercury storage facility would occupy approximately 1 percent of the 260 hectares (640 acres) that comprise Section 10, it is expected that there would be negligible impacts on livestock grazing activities. Future land use activities that would be permitted within or immediately adjacent to the mercury storage facility would be limited to those that would not jeopardize the integrity of the facility, create a security risk, or create a worker or public safety risk. The low profile of the new building would have a negligible impact on the overall viewshed of this area from offsite vantage points. Therefore, mercury storage operations would not result in a change to U.S. Bureau of Land Management visual resource management classifications.

4.2.1.2 WIPP Vicinity Section 20

Minor impacts on land use and visual resources are expected from construction and operation of a new mercury storage building at WIPP Vicinity Section 20. The proposed mercury storage facility would be located on relatively undisturbed land to the west of WIPP directly across North Access Road. The mercury storage facility would be located within the WIPP LWB. Impacts would be similar to those described above for WIPP Vicinity Section 10; however, visual impacts would be less noticeable due to the proximity to other structures associated with WIPP. Use of WIPP Vicinity Section 20 would need to be considered against requirements described in the WIPP LWA. Use of WIPP Vicinity Section 20 for construction and operation of a facility for the long-term management and storage of elemental mercury would alter the current land use and could require Federal legislation.

4.2.1.3 WIPP Vicinity Section 35

Minor impacts on land use and visual resources are expected from construction and operation of a new mercury storage building at WIPP Vicinity Section 35. The proposed mercury storage facility would be located on relatively undisturbed land in Section 35 adjacent to and east of the WIPP LWB. The mercury storage facility would be located outside of the WIPP LWB. Impacts would be similar to those described above for WIPP Vicinity Section 10; however, Section 35 is not currently under an existing lease for potash mining. One oil well exists within Section 35. Use of WIPP Vicinity Section 35 would require this land to be withdrawn from all forms of entry, appropriation, and disposal under the public land laws and reserved for the purposes of operating a mercury storage facility. Use of WIPP Vicinity Section 35 for construction and operation of a facility for the long-term management and storage of elemental mercury would alter the current land use.

4.2.2 Geology, Soils, and Geologic Hazards

4.2.2.1 WIPP Vicinity Section 10

4.2.2.1.1 Geology and Soils

Construction of a new mercury storage facility under this alternative is expected to temporarily disturb no more than about 3.1 hectares (7.6 acres) of land at WIPP. The depth of excavation required would be less than about 0.6 meters (2 feet), as the new facility would be constructed on a reinforced-concrete slab atop a gravel base. Additional trenching may be necessary to install foundation footings or connect the new mercury storage facility to regional utility infrastructure; trenches could be about 0.6 meters (2 feet) wide by 1.2 meters (4 feet) deep. Geologic resources would be required to support the construction effort, including approximately 4,760 cubic meters (6,200 cubic yards) of concrete and 3,900 cubic meters (5,100 cubic yards) of gravel (see Appendix C, Table C–2). These resources would be procured from local and/or regional commercial vendors.

Although soils cleared for construction would briefly be subject to wind and water erosion, adherence to standard best management practices for soil erosion and sediment control (e.g., use of sediment fencing, staked hay bales, mulching and geotextile matting) during facility construction would serve to minimize soil erosion and loss.

At WIPP, the Mescalero caliche could present site development limitations due to the presence of this calcium carbonate cemented unit (see Chapter 3, Section 3.2.2). However, due to the limited depth of excavation and the limited thickness of the caliche layer, it should not present substantial constraints for construction. A site survey and geotechnical study would be conducted to confirm site geologic and hydrogeologic characteristics for facility siting and engineering purposes. This would include an analysis to assess the potential for subsurface dissolution features and land subsidence. Location of the building footprint and adherence to best management practices would serve to minimize construction impacts.

During operations, previously disturbed areas would not be subject to long-term soil erosion, as the areas within the footprint of the completed mercury storage facility would be engineered to minimize soil erosion or would be returned to natural conditions. There would be no additional impact on geology and soils from operations.

4.2.2.1.2 Geologic Hazards

Hazards from large-scale geologic conditions, such as earthquakes, and other site geologic conditions with the potential to affect WIPP are summarized in Chapter 3, Section 3.2.2.3. Site geologic conditions would be unlikely to affect the mercury storage facility over the 40-year period of analysis.

The WIPP region is considered to be an area of low-to-moderate seismicity. Earthquakes have historically produced ground motion effects equivalent to Modified Mercalli Intensity V in the vicinity of the site (see the January 2011 *Mercury Storage EIS:* Appendix B, Table B–4). As described in Chapter 3, Section 3.2.2.3, Section 10 is located about 100 kilometers (60 miles) from the closest potentially active fault. In addition, the predicted peak ground acceleration at the site from an earthquake with an annual probability of occurrence of 1 in 2,500 is 0.08 *g*. Ground motion in this range could cause slight damage to ordinary structures, but is not expected to affect modern structures designed and constructed to withstand the assessed hazard. DOE applies the seismic engineering provisions from the latest building codes as the minimum standard for the design, construction, and upgrade of its facilities. As further described in the January 2011 *Mercury Storage EIS*, Appendix B, Section B.3.2, DOE Order 420.1B and its companion guide (DOE Guide 420.1-2) require that facilities be designed, constructed, and operated so that the public, workers, and environment are protected from adverse impacts of natural phenomena hazards, including earthquakes. Thus, the mercury storage facility would be sited and designed to address the risk from geologic hazards, and the predicted ground motion would be unlikely to cause a breach in mercury containers from structural failure. An analysis of potential environmental consequences resulting from an earthquake-induced accident is described in Section 4.2.9.1.2.

Potash mining in the region surrounding WIPP, including an existing lease for future underground mining operations in Section 10, may influence the ability to site a mercury storage facility due to the potential for increased risk of land subsidence.

4.2.2.2 WIPP Vicinity Section 20

As described in Chapter 3, Section 3.2.2, the geology, soils and geologic hazards of Sections 10 and 20 are similar. Therefore, the environmental impacts of construction and operation of a mercury storage facility at Section 20 would be similar to that described in Section 4.2.2.1 for Section 10.

4.2.2.3 WIPP Vicinity Section 35

As described in Chapter 3, Section 3.2.2, the geology, soils and geologic hazards of Sections 10 and 35 are similar. Therefore, the environmental impacts of construction and operation of a mercury storage facility at Section 35 would be similar to that described in Section 4.2.2.1 for Section 10.

4.2.3 Water Resources

4.2.3.1 WIPP Vicinity Section 10

4.2.3.1.1 Surface Water

Facility construction activities at the WIPP site are not anticipated to have direct impacts on surface-water features that are within or adjacent to the site boundary. The WIPP site has no natural surface-water bodies within the site boundary, and the nearest significant surface-water bodies, Laguna Grande de la Sal and the Pecos River, are located 13 kilometers (8 miles) west-southwest and 16 kilometers (10 miles) west of the site, respectively. As discussed in Chapter 3, Section 3.2.3.1, the topography in the vicinity of the WIPP site exhibits some broad valley forms, potentially indicative of areas of concentrated surface runoff and integrated drainages during prolonged rainfall events. In general, the Pecos River drainage system drains to the southeast. The WIPP site is within the Pecos River drainage basin; however, a drainage divide occurs between the Pecos River and the WIPP site.

Section 10 is not located within or adjacent to the 100- or 500-year floodplains of the Pecos River. DOE Order 420.1B and its companion guide (DOE Guide 420.1-2) require that DOE facilities be designed, constructed, upgraded as necessary, and operated to protect the public, workers, and the environment from natural phenomena hazards, including flooding, and specifically that DOE facilities adhere to the flood design and evaluation criteria specified in DOE Standards 1020-2002 and 1023-95. Additional surveys and a site-specific flood hazard analysis would be conducted, as necessary, as part of the site selection and design process for a new mercury storage facility.

During facility construction, adherence to best management practices for soil erosion and sediment control, such as the use of sediment fencing, hay bales, mulching, geotextile matting, and rapid reseeding would minimize soil erosion and loss. Additionally, spill prevention and waste management practices would be utilized to minimize suspended sediment, the transport of other deleterious materials, and potential water quality impacts. WIPP does not have an existing National Pollutant Discharge Elimination System permit or construction stormwater discharge permit. Regulatory notification to either EPA or the authorized state regulatory compliance division of the intent to provide long-term storage and management of elemental mercury would be required for WIPP. Communication and coordination with all applicable regulatory agencies, including site-specific discussions and facility-specific permitting requirements (application for new permits or modification to existing permits), will be required for the long-term management and storage of elemental mercury.

Design, construction, and operation of the proposed mercury facility would incorporate structural controls and practices to prevent the release of elemental mercury and to prevent any spills or other releases. Structural elements include containment and other engineering features, including the use of spill trays, sloped floors, and floors constructed to be impervious to liquid mercury releases, as further described in Appendix C, Section C.2.1, of the January 2011 *Mercury Storage EIS* (DOE 2011a). Facility operations would also be conducted in accordance with an integrated contingency plan and spill prevention, control, and countermeasures plan, or equivalent plans as mandated by facilities permitted under the Resource Conservation and Recovery Act (RCRA) (40 CFR 264.50 et seq.) In the event that abnormal operating conditions occur, and there is a release of elemental mercury, the structural controls and practices will prevent contamination from reaching the soil or other surfaces where it could be transferred to surface waters or groundwater.

It is conservatively estimated that construction activities for a new mercury storage facility would require approximately 1,270,000 liters (336,000 gallons) of water over a 6-month construction period. This volume would primarily be required for dust control and soil compaction. For the proposed facility in Section 10, it is anticipated that water would be trucked to the construction site and stored in a temporary storage tank that would be sufficient to supply this volume. There would be no diversion of nearby surface water or onsite groundwater during the construction phase. During operations, water use would generally be limited to that required to serve the potable and sanitary needs of the storage facility workforce. Total annual consumption is estimated to be about 88,500 liters (23,375 gallons). There would be no direct discharge of effluents to either surface water or groundwater from storage facility operations and no impact on water quality. Only nonhazardous sanitary wastewater (sewage) would be generated and managed via a separate nonhazardous sanitary liquid waste storage and treatment or septic system that would be installed.

4.2.3.1.2 Groundwater

As described in Chapter 3, Section 3.2.3.2, there are no known natural groundwater features within Section 10 that would affect the engineering aspects of slope stability or subsidence. The Gatuña Formation, which unconformably overlies the Santa Rosa, is also known to have saturated zones occurring in discontinuous perched zones that may be due to an anthropogenic source (DOE 1999a, 2008). Facility construction is not expected to have any impact on groundwater hydrology due to the depth of the excavation. Excavation for preparing the site and laying the foundation is not expected to exceed a depth of 0.6 meters (2 feet), with the exception of small trenches, which could be approximately 1.2 meters (4 feet) deep, for connecting the utilities or installing concrete footers. In the event that perched groundwater was encountered by trenching to depths of no greater than 1.2 meters (4 feet), excavations may have to be dewatered and the groundwater contained for testing and treatment, if found contaminated, prior to discharge. Because the facility would be designed and operated to prevent any spills from reaching the ground, there would be no impact on groundwater from routine operations.

4.2.3.2 WIPP Vicinity Section 20

Surface-water impacts would be consistent with those addressed in Section 4.2.3.1 for Section 10. However, it is anticipated that any water needed for the construction of the proposed facility in Section 20 would be obtained from the existing WIPP supply system instead of being trucked in to the site as described for Section 10. It is conservatively estimated that construction activities for a new mercury storage facility would require approximately 1,270,000 liters (336,000 gallons) of water over a 6-month construction period.

Groundwater impacts would be consistent with those addressed above for Section 10. As described in Chapter 3, Section 3.2.3.2, there are no known natural groundwater features within Section 20 that would affect the engineering aspects of slope stability or subsidence. However, anthropogenic water has been found near the center part of WIPP in the Santa Rosa Formation, which is also near Section 20. Facility construction is not expected to have any impact on groundwater hydrology due to the depth of the excavation. Because the facility would be designed and operated to prevent any spills from reaching the ground, there would be no impact on groundwater from routine operations.

4.2.3.3 WIPP Vicinity Section 35

Surface-water impacts would be consistent with those addressed in Section 4.2.3.1 for Section 10. It is anticipated that any water needed for the construction of the proposed facility in Section 35 would be trucked in to the site as described for Section 10.

Groundwater impacts would be consistent with those addressed above for Sections 10 and 20. Facility construction is not expected to have any impact on groundwater hydrology due to the depth of the excavation. Because the facility would be designed and operated to prevent any spills from reaching the ground, there would be no impact on groundwater from routine operations.

4.2.4 Meteorology, Air Quality, and Noise

4.2.4.1 WIPP Vicinity Section 10

4.2.4.1.1 Meteorology

Meteorological events can result in damage to buildings such as mercury storage warehouses. The frequency and consequences of such events were considered in selecting the accident events evaluated in Chapter 4, Section 4.9.9.2, of the January 2011 *Mercury Storage EIS* (DOE 2011a). As previously stated, DOE Order 420.1B and its companion guide (DOE Guide 420.1-2) require that facilities be designed, constructed, and operated so that the public, workers, and the environment are protected from adverse impacts of natural phenomena hazards, including meteorological events. RCRA-permitted facilities, such as the proposed mercury storage facility, must also meet applicable design, construction, and operation requirements under Title 40 of the *Code of Federal Regulations* (CFR), Section 264.31, and applicable state RCRA requirements to prevent the release of stored wastes. As the WIPP region is susceptible to regular occurrence of high winds, the new mercury storage facility at Section 10 would be designed and constructed to withstand potential high winds and tornadoes and other meteorological events.

4.2.4.1.2 Air Quality

Minor short-term air quality impacts would result from construction of a mercury storage building within Section 10. These impacts would include an increase in criteria and toxic air pollutant concentrations from construction equipment emissions (see Appendix C, Section C.2.3). These emissions would occur over a 6-month construction period and are not expected to result in exceedance of air quality standards.

Emissions from operations of the new mercury storage facility would be very small, consisting of emissions from employee vehicles, trucks or trains, semiannual testing of emergency generators, and possibly mercury vapor from any spills or from mercury containers. No localized emissions from space heating are anticipated associated with mercury storage facility operations, as electric heating is anticipated for areas requiring climate control. Compliance with the conformity regulations is discussed in Appendix B, Section B.5.1.2, of the January 2011 *Mercury Storage EIS* (DOE 2011a).

Exposures to mercury vapor could arise during normal operating conditions from small amounts of elemental mercury vapor escaping from storage containers or residual contamination. Mercury vapor transported downwind could then be inhaled by noninvolved workers (those outside the storage facility) or nearby offsite individuals. Section 4.2.9.1 presents a conservative analysis that shows that for a long-term, undetected slow leak inside the proposed mercury storage facility, the predicted long-term average concentration in the building wake never exceeds about 20 nanograms per cubic meter for new construction within Section 10. The EPA threshold for chronic exposure to airborne mercury is 300 nanograms per cubic meter, so slow releases of mercury would have a negligible effect on noninvolved workers and the public, with a corresponding negligible risk.

Minor short-term air quality impacts would result from an increase in truck or rail activity while mercury is moved to any of the WIPP Vicinity reference locations for long-term management and storage. Truck and rail transport are discussed in more detail in Section 4.2.9.1.3. Estimated emissions from truck and rail transportation are presented in Tables 4–1 and 4–2. Over the 40-year period of analysis, the estimated number of truck or rail shipments would diminish over time and resulting emissions would decrease.

Annual carbon dioxide emissions would be highest during construction. The second highest year of carbon dioxide emissions would be during the first 2 years of operations, when the mercury is delivered to the site. Emissions during these first 2 years of operations would be approximately 258 metric tons (285 tons) per year, which would be more than rail emissions. As similarly noted in Chapter 4, Section 4.3.4.2, of the January 2011 *Mercury Storage EIS*, such emissions would minimally add to global and U.S. annual emissions of carbon dioxide. Global climate change is further discussed in Section 4.11.4.2 of the January 2011 *Mercury Storage EIS*.

Table 4–1. Air Pollutant Emissions from Transportation of Elemental Mercury by Truck to All WIPP Vicinity Reference Locations

Pollutant	Truck Emissions by Pollutant (metric tons)						
Site	Carbon Monoxide	Nitrogen Dioxide	Volatile Organic Compounds	$PM_{2.5}$	PM_{10}	Sulfur Dioxide	Carbon Dioxide
WIPP Vicinity Section 10, 20, or 35	2.56	9.53	0.51	0.204	0.257	0.0159	1,700

Note: Emissions are based on truck mileage and emission factors calculated using the U.S. Environmental Protection Agency's mobile source emission factor model, Mobile6 (EPA 2003); to convert metric tons to tons, multiply by 1.1023. Values represent total emissions over 40 years.

Key: PM_n=particulate matter with an aerodynamic diameter less than or equal to *n* micrometers; WIPP=Waste Isolation Pilot Plant.

Table 4–2. Air Pollutant Emissions from Transportation of Elemental Mercury by Rail to All WIPP Vicinity Reference Locations

Pollutant	Locomotive Emissions by Pollutant (metric tons)						
Site	Carbon Monoxide	Nitrogen Dioxide	Volatile Organic Compounds	$PM_{2.5}$	PM_{10}	Sulfur Dioxide	Carbon Dioxide
WIPP Vicinity Section 10, 20, or 35[a]	2.1	12.4	0.69	0.36	0.371	0.247	806

[a] Transportation by rail to Section 10 or 35 would involve intermodal transportation: rail to WIPP, then truck from WIPP to the Section 10 or 35 location. The additional emissions from transportation by truck from WIPP to the Section 10 or 35 location (approximately 300 miles per year) are negligible.

Note: Emissions are based on locomotive fuel usage and the U.S. Environmental Protection Agency emission factors for locomotives (EPA 2009); to convert metric tons to tons, multiply by 1.1023. Values represent total emissions over 40 years.

Key: PM_n=particulate matter with an aerodynamic diameter less than or equal to *n* micrometers; WIPP=Waste Isolation Pilot Plant.

4.2.4.1.3 Noise

Short-term noise impacts near WIPP Vicinity Section 10 could result from construction of a new mercury storage facility. These impacts would include some increase in traffic to the site and an increase in noise resulting from construction employee vehicles, equipment delivery, and heavy equipment operation. These impacts would occur during the 6-month construction period. Since the nearest residence is located more than 5 kilometers (3 miles) from the site, the increase in noise levels at this location from construction equipment is expected to be negligible. The estimated average noise level during the daytime (8-hour equivalent sound level) from four items of construction equipment operating at this distance is estimated to be 17 decibels A-weighted (dBA), which is well below background sound levels. The increase in traffic noise levels along Texas State Route 128 from construction activity is expected to be less than 1 dBA since the increase in traffic resulting from construction would be much less than the existing traffic on State Route 128.

Short-term noise impacts could occur along State Route 128 as a result of increased truck activity during the period that elemental mercury is transported to the site. The resulting increase in day-night average noise levels along State Route 128 is expected to be less than 1 dBA. As such, the change in truck traffic is not expected to result in a change in noise levels along this route or other shipping routes that would be noticeable to the public or result in an increase in annoyance. If the mercury is shipped by rail instead of by truck, some additional rail activity from placing railcars at the site could result in some increase in noise levels near the site.

Operation of a new mercury storage facility at WIPP Vicinity Section 10 is expected to have a negligible impact on noise levels around the site since the noise sources associated with mercury storage would be limited to a few employee vehicles, occasional delivery trucks, and semiannual testing of the emergency generator.

4.2.4.2 WIPP Vicinity Section 20

Meteorological impacts on a facility at WIPP Vicinity Section 20 would be similar to those on a facility at WIPP Vicinity Section 10, discussed in Section 4.2.4.1.1.

Air quality impacts from construction and operation of a facility at WIPP Vicinity Section 20 would be similar to those from a facility at WIPP Vicinity Section 10, discussed in Section 4.2.4.1.2. Emissions from truck and rail shipments are presented in Tables 4–1 and 4–2.

Noise impacts from construction and operation of a facility at WIPP Vicinity Section 20 would be similar to those from a facility at WIPP Vicinity Section 10, discussed in Section 4.2.4.1.3.

4.2.4.3 WIPP Vicinity Section 35

Meteorological impacts on a facility at WIPP Vicinity Section 35 would be similar to those on a facility at WIPP Vicinity Section 10, discussed in Section 4.2.4.1.1.

Air quality impacts from construction and operation of a facility at WIPP Vicinity Section 35 would be similar to those from a facility at WIPP Vicinity Section 10, discussed in Section 4.2.4.1.2. Emissions from truck and rail shipments are presented in Tables 4–1 and 4–2.

Noise impacts from construction and operation of a facility at WIPP Vicinity Section 35 would be similar to those from a facility at WIPP Vicinity Section 10, discussed in Section 4.2.4.1.3.

4.2.5 Ecological Resources

Anticipated impacts on ecological resources include the permanent disturbance of 3.1 hectares (7.6 acres) of land needed for the construction and operation of the proposed mercury storage facility. Following the decommissioning phase, it is assumed that the land disturbed by the construction and operation of the facility would eventually return to its original vegetative state through succession. Disturbed habitat types within the required footprint include mainly desert grassland and short-grass prairie. Although Section 10 and Section 20 are relatively undisturbed when compared to the developed center of WIPP (the area inside of the Property Protection Area boundary and vicinity), Section 10 is farther from the developed center of the WIPP site.

4.2.5.1 WIPP Vicinity Section 10

4.2.5.1.1 Terrestrial Resources

Terrestrial habitats present within Section 10 include desert grassland and short-grass prairie ecosystems. A total of 3.1 hectares (7.6 acres) of land within these ecosystems would be permanently disturbed for the construction and operation of the proposed mercury storage facility.

4.2.5.1.2 Wetlands and Aquatic Resources

No wetlands or aquatic resources exist within Section 10; thus, no impacts on wetlands or aquatic habitats are anticipated.

4.2.5.1.3 Threatened and Endangered Species

Although no threatened or endangered species have been observed at WIPP during historical surveys and no federally designated critical habitat exists on site, DOE would nonetheless consult immediately with the U.S. Fish and Wildlife Service, as well as the New Mexico Department of Game and Fish, for guidance on how to proceed in the event that a listed species is identified within the proposed mercury storage area. In addition, DOE has instituted measures, in consultation with the U.S. Bureau of Land Management, to protect the lesser prairie-chicken and its habitat at WIPP. These measures would be adhered to during the construction and operation phases of the project and include the establishment of periods during which offsite field activities may not be performed during the species' breeding season (DOE 2011b).

4.2.5.2 WIPP Vicinity Section 20

Existing conditions at Section 20 are similar to those within Section 10, and impacts on ecological resources within Section 20, including terrestrial resources, wetlands and aquatic resources, and threatened and endangered species, would be similar to those described for Section 10 in Section 4.2.5.1. The same precautions and measures discussed in Section 4.2.5.1.3 regarding protection of these resources would be adopted and adhered to in the event that the mercury storage facility is constructed in Section 20.

4.2.5.3 WIPP Vicinity Section 35

Existing conditions at Section 35 are similar to those within Section 10, and impacts on ecological resources within Section 35, including terrestrial resources, wetlands and aquatic resources, and threatened and endangered species, would be similar to those described for Section 10 in Section 4.2.5.1. The same precautions and measures discussed in Section 4.2.5.1.3 regarding protection of these resources would be adopted and adhered to in the event that the mercury storage facility is constructed in Section 35.

4.2.6 Cultural and Paleontological Resources

DOE initiated consultation with the New Mexico State Historic Preservation Division, State Historic Preservation Officer (SHPO) to support the analysis in this section (see Chapter 5, Section 5.4.2, and Appendix I). In its August 31, 2012, response to DOE, the State Historic Preservation Division agreed with DOE on the need for preconstruction surveys and construction monitoring, where applicable (see Appendix I). If one of the WIPP Vicinity reference locations is selected for a mercury storage facility, procedures would be developed in consultation with the SHPO to properly manage any inadvertent discoveries of resources and to perform required consultations. Inadvertent discoveries of such resources would be handled in accordance with 36 CFR 800.11 (for historic properties) or 43 CFR 10.4 (for American Indian human remains, funerary objects, sacred objects, or objects of cultural patrimony), as appropriate.

4.2.6.1 WIPP Vicinity Section 10

4.2.6.1.1 Prehistoric Resources

No impacts on prehistoric resources are expected from construction or operation of a new mercury storage facility at Section 10. The closest archaeological district is located roughly 11 kilometers (7 miles) northwest of the project area. The land within the WIPP LWB has been determined to represent a potentially significant contributor of cultural resources and DOE direction includes regarding it as such when land management decisions are made (DOE 2002a). Although Section 10 is not within the WIPP LWB, due to its proximity, it is anticipated that resources of cultural significance might be encountered. If any resources are discovered during construction, DOE would follow the procedures established with the SHPO to ensure they were handled in accordance with 36 CFR 800.11 or 43 CFR 10.4, as appropriate.

4.2.6.1.2 Historic Resources

No impacts on historic resources are expected from construction or operation of a new mercury storage facility at Section 10. However, only roughly 1,370 hectares (3,380 acres) of the 4,140 hectares (10,240 acres) managed by WIPP have been surveyed for cultural resources. If the mercury storage facility is constructed on undisturbed land within Section 10 and historic resources are discovered, DOE would work with the New Mexico SHPO to properly manage the discovery site and to perform required consultations, as described in Section 4.2.6.

4.2.6.1.3 American Indian Resources

There would be no impact on American Indian resources as none have been identified or are likely to occur on the site.

4.2.6.1.4 Paleontological Resources

There would be no impact on unique paleontological resources as none have been identified or are likely to occur on the site.

4.2.6.2 WIPP Vicinity Section 20

As described in Chapter 3, Section 3.2.6, the cultural and paleontological resources of WIPP Vicinity Sections 10 and 20 are similar. Therefore, the environmental impacts of construction and operation of a mercury storage facility at Section 20 would be similar to those described in Section 4.2.6.1 for Section 10.

The majority of Section 20 has not been examined for the presence of cultural resources; however, no archaeological sites have been located from the cultural resources surveys that have been conducted within the section (see Chapter 3, Section 3.2.6.1).

Historic remains or features (more than 50 years old) are rare but have occasionally been identified within Section 20 (see Chapter 3, Section 3.2.6.2). With few exceptions, cultural resources known or anticipated in the area covered by the WIPP LWB are significant; they must be identified, recorded, assessed through an inventory, and considered in any plan of development for the area. Fifty-nine archaeological sites and 91 isolated occurrences have been identified to date. The sites and isolates identified are almost exclusively prehistoric. Only one site with both prehistoric and historic components was noted. The land within the WIPP LWB has been determined to represent a potentially significant contributor of cultural resources, and DOE direction includes regarding it as such when land management decisions are made (DOE 2002a). If the mercury storage facility is constructed within Section 20 and prehistoric or historic resources are discovered, DOE would work with the New Mexico SHPO to properly manage the discovery site and to perform required consultations, as described in Section 4.2.6.

4.2.6.3 WIPP Vicinity Section 35

As described in Chapter 3, Section 3.2.6, the cultural and paleontological resources of WIPP Vicinity Sections 10 and 35 are similar. Therefore, the environmental impacts of construction and operation of a mercury storage facility at Section 35 would be similar to those described in Section 4.2.6.1 for Section 10.

The WIPP Vicinity reference location in Section 35 is located on BLM-managed land just to the southeast of the WIPP LWB. The majority of Section 35 has not been examined for the presence of cultural resources; however, some cultural resource surveys were undertaken, and archaeological sites were found (see Chapter 3, Section 3.2.6.1). Currently there are seven known cultural resources located in Section 35. Of the seven resources, only one, 54373, is currently recommended as being potentially eligible for listing on the National Register of Historic Places. The land in the vicinity of WIPP has been determined to represent a potentially significant contributor of cultural resources, and DOE direction includes regarding it as such when land management decisions are made (DOE 2002a). If the mercury storage facility is constructed within Section 35 and prehistoric or historic resources are discovered, DOE would work with the New Mexico SHPO to properly manage the discovery site and to perform required consultations, as described in Section 4.2.6.

4.2.7 Site Infrastructure

Infrastructure requirements for a new mercury storage facility, presented below, can be found in Appendix C.

4.2.7.1 WIPP Vicinity Section 10

4.2.7.1.1 Ground Transportation

Construction and operation of a new mercury storage facility outside the LWB in Section 10 are not expected to appreciably increase demands on the road system leading to the site. Projected traffic volumes and the number of shipments associated with mercury storage operations are presented in Section 4.2.11.

4.2.7.1.2 Electricity, Fuel, and Water

To support construction, electric power would likely be supplied via a diesel-fired generator. Diesel fuel would also be required to operate construction equipment. Total diesel fuel demand for construction is estimated at 193,000 liters (51,000 gallons) over the 6-month construction timeframe. Liquid fuels are not considered to be limiting resources as they would be provided by local or regional suppliers and delivered to the point of use as needed. Raw water would be required for dust control, soil compaction, and other construction uses; some potable water would also be required for sanitary uses by the construction workforce. Raw water would likely be delivered to the site via a refillable water truck. Construction is projected to require approximately 1,230,000 liters (325,000 gallons) of raw water and about 40,900 liters (10,800 gallons) of potable water, for a total of 1,270,000 liters (336,000 gallons).

On an annualized basis, utility demands for mercury storage facility operations would be relatively small compared with construction. Electricity requirements would total 253 megawatt-hours annually for facility lighting, ventilation, and heating. A new service connection to the Xcel Energy powerline would need to be established that is separate from the electrical substation that supports WIPP operations, leading to a moderate impact on electrical infrastructure.

An estimated 606 liters (160 gallons) of diesel fuel would be consumed annually for operation of an emergency onsite generator used to support a mercury storage facility. Compared to the 73,615 liters (19,447 gallons) of gasoline and diesel fuel used at WIPP for mobile vehicles and emergency generators, the projected fuel requirements for emergency generator operations at a mercury storage facility would be negligible and would be supplied from local vendors.

Water use would be limited to that required to support the potable and sanitary needs of the facility workforce and would total about 88,500 liters (23,400 gallons) per year. Potable water would either be trucked to the site and stored for use or would be made available through a tie-in to a nearby public water supply main.

4.2.7.2 WIPP Vicinity Section 20

4.2.7.2.1 Ground Transportation

Construction and operation of a new mercury storage facility inside the LWB in Section 20 are not expected to appreciably increase demands on the road system leading to the site. Projected traffic volumes and the number of shipments associated with mercury storage operations are presented in Section 4.2.11.

4.2.7.2.2 Electricity, Fuel, and Water

Demands for electricity, fuel, and water would be similar to those described for WIPP Vicinity Section 10 as discussed above in Section 4.2.7.1.2; however, delivery of these services for operation of the storage facility may be different. Most infrastructure tie-ins could be made directly to WIPP's existing infrastructure. The electrical distribution infrastructure would need to be upgraded to provide adequate electricity for mercury storage facility operations, leading to a moderate impact on electrical infrastructure. Access to potable water would be made available through tie-in to the existing water supply at WIPP.

4.2.7.3 WIPP Vicinity Section 35

4.2.7.3.1 Ground Transportation

Construction and operation of a new mercury storage facility outside the LWB in Section 35 are not expected to appreciably increase demands on the road system leading to the site. Projected traffic volumes and the number of shipments associated with mercury storage operations are presented in Section 4.2.11.

4.2.7.3.2 Electricity, Fuel, and Water

Demands for electricity, fuel, and water would be similar to those described for WIPP Vicinity Section 10 as discussed above in Section 4.2.7.1.2.

4.2.8 Waste Management

4.2.8.1 WIPP Vicinity Section 10

Waste generation associated with the proposed construction and operation of the RCRA-permitted mercury storage facility outside the WIPP LWB in Section 10 would have a negligible impact on the site considering the relatively small volumes of hazardous and nonhazardous waste projected to be generated.

Construction of the proposed mercury storage facility is estimated to generate 270 cubic meters (355 cubic yards) of nonhazardous solid waste (construction debris) and approximately 9,850 liters (2,600 gallons) of nonhazardous sanitary liquid waste. Construction debris may be disposed of in the permitted WIPP site construction and demolition landfill provided it does not exceed the daily limit on disposal; otherwise, this waste would be transported off site for disposal at the Eddy County Sandpoint Landfill. Sanitary solid waste would be shipped to the Eddy County Sandpoint Landfill. Portable toilet facilities, serviced by a local or regional contractor, would be used to serve the nonhazardous sanitary liquid waste needs of the construction workforce.

It is estimated that 910 55-gallon (208-liter) drums of hazardous waste would be generated over the 40-year period of analysis for mercury storage facility operations. This generation volume equates to an average annual generation rate of 23 55-gallon drums, or approximately 5 cubic meters (6.5 cubic yards) (approximately 1 metric ton [1.1 tons or 2,200 pounds] by weight) of hazardous waste. This waste would primarily consist of cleaning rags used during facility maintenance activities, personal protective equipment (PPE) used during monitoring activities, materials used during spill response activities, and mercury vapor filters used in the Handling Area. In comparison, operations at WIPP currently generate approximately 53.5 cubic meters (70 cubic yards) of hazardous waste. The estimated yearly generation rate of mercury-contaminated waste generated by mercury storage facility operations would be a relatively small volume compared with most facilities that manage hazardous waste. As necessary, mercury-contaminated waste would be disposed of off site using licensed hazardous waste disposal contractors.

New mercury storage facility operations would also generate an estimated 2,360,000 liters (623,000 gallons) of nonhazardous liquid sanitary waste over the 40-year period of analysis, or 58,960 liters (15,575 gallons) annually, or approximately 161.5 liters (43 gallons) per day. In comparison, 31,649 liters (8,361 gallons) per day of nonhazardous sanitary waste were generated by WIPP operations in 2011. Since the new mercury storage facility would be located outside the LWB, a separate nonhazardous sanitary liquid waste storage and treatment or septic system would be installed.

4.2.8.2 WIPP Vicinity Section 20

Waste generation associated with the proposed construction and operation of the mercury storage facility inside the WIPP LWB in Section 20 would have a negligible impact on the site considering the relatively small volumes of hazardous and nonhazardous waste projected to be generated. The amounts of waste generated during construction and operation would be similar to those described for WIPP Vicinity Section 10 discussed above in Section 4.2.8.1.

As stated above for WIPP Vicinity Section 10, operation of a new mercury storage facility would generate an estimated 2,360,000 liters (623,000 gallons) of nonhazardous liquid sanitary waste over the 40-year period of analysis or 58,960 liters (15,575 gallons) annually, or approximately 161.5 liters (43 gallons) per day. By comparison, 31,649 liters (8,361 gallons) per day of nonhazardous sanitary waste was generated by WIPP operations in 2011. WIPP's sanitary disposal system is designed for 87,000 liters (23,000 gallons) per day, or almost 32 million liters (8.4 million gallons) annually (DOE 2010: 28). Liquid sanitary waste generation from mercury storage facility operations, therefore, would have less than a 1 percent impact on WIPP's sanitary liquid waste system.

4.2.8.3 WIPP Vicinity Section 35

Waste generation associated with the proposed construction and operation of the mercury storage facility inside the WIPP LWB in Section 35 would have a negligible impact on the site considering the relatively small volumes of hazardous and nonhazardous waste projected to be generated. The amounts of waste generated during construction and operation would be similar to those described for WIPP Vicinity Section 10 discussed above in Section 4.2.8.1.

4.2.9 Occupational and Public Health and Safety

Descriptions of the assumptions, data, and methods of analysis are summarized in Appendix D of this draft SEIS. Additional detail is provided in Appendix D of the January 2011 *Mercury Storage EIS* (DOE 2011a), as updated in Appendices B and E of this draft SEIS.[2] Many of the analytical considerations and many of the results are the same for all three WIPP Vicinity Sections 10, 20, and 35, as well as the alternative sites analyzed in the January 2011 *Mercury Storage EIS*. Therefore, the reader is frequently referred to Appendix D of this draft SEIS and Appendix D of the January 2011 *Mercury Storage EIS* (as updated in Appendix E, Section E.2, of this draft SEIS), where appropriate, to avoid excessive repetition. Details or results specific to the WIPP Vicinity reference locations are discussed in the appropriate sections on occupational and public health and safety.

4.2.9.1 WIPP Vicinity Section 10

4.2.9.1.1 Normal Operations

Normal operations are discussed in Appendix D, Section D.4.1, of the January 2011 *Mercury Storage EIS*. The considerations there are common to all of the proposed storage sites. Consequences to the involved worker are predicted to be negligible because involved workers would never be exposed to airborne concentrations of mercury vapor above the American Conference of Governmental Industrial Hygienists' 8-hour time-weighted average/threshold limit value of 0.025 milligrams per cubic meter of mercury vapor. This corresponds to keeping exposures to the involved worker in the Severity Level (SL)-I (negligible) range.[3] This would be achieved by adherence to good operating practices, in particular attention to ventilation, inspection, monitoring, and use of PPE, as described in the *U.S. Department of Energy Interim Guidance on Packaging, Transportation, Receipt, Management, and Long-Term Storage of Elemental Mercury (Interim Guidance)* (DOE 2009). As discussed in the *Interim Guidance*, the design, installation, and operation of ventilation systems would be in accordance with the American Society of Heating, Refrigerating, and Air-Conditioning Engineers standards. Therefore, the risks to involved workers would be negligible during normal operations.

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[2] Since publication of the January 2011 *Mercury Storage EIS*, DOE has published new criteria for assessing the severity of exposure to mercury vapor. This has resulted in changes to the definition of severity levels (i.e., magnitude of impacts) for assessing acute-inhalation exposures to the public under certain accident scenarios. Appendix B and Appendix E of this draft SEIS update parts of Chapter 4 and Appendix D of the January 2011 *Mercury Storage EIS*. The impact analyses for the WIPP Vicinity reference locations discussed in this draft SEIS have incorporated the revised criteria.

[3] For definitions of SLs for various types of exposures, see Appendix D, Section D.3.1, of this SEIS. For a discussion of how risk is assessed, see Appendix D, Section D.2, of this draft SEIS and Appendix D, Section D.1.1, of the January 2011 *Mercury Storage EIS* (as updated in Appendix E, Section E.2 of this draft SEIS).

For people outside the building during normal operations (noninvolved workers[4] and members of the public), a chronic, long-term release is bounded by consideration of a full spill tray under a pallet of 3-liter flasks that remains undetected indefinitely (a highly conservative assumption given the expected inspection and monitoring activities within the storage building). The steady state release from this source of mercury vapor is assumed to leak from the building and to be mixed into its turbulent building wake. The January 2011 *Mercury Storage EIS* Appendix D, Section D.4.1.2, shows that the predicted long-term average concentration in the building wake for new construction is about 2.0×10^{-5} milligrams per cubic meter. This value is well below EPA's chronic-inhalation-exposure reference concentration of 3.0×10^{-4} milligrams per cubic meter. Hence, consequences would be in the SL-I range, and the risk to both noninvolved workers and the public would be negligible.

4.2.9.1.2 Facility Accidents

The analysis of potential accidents at the WIPP Vicinity reference locations differs very little from that at the other sites considered in the January 2011 *Mercury Storage EIS*. There is no difference for accidents initiated by engineering failure or human error. There are small differences in the analysis of some of the external events, but these do not make any significant difference to the analysis of accident risks at the WIPP Vicinity reference locations.

Engineering Failures and Human Errors

Appendix D, Section D.2.4, of the January 2011 *Mercury Storage EIS* contains detailed considerations of the likelihood of occurrence of candidate facility (onsite) accident scenarios initiated by failures of engineered systems or human errors. These considerations remain unchanged for potential accidents occurring at the WIPP Vicinity reference locations.

External Events

Appendix D, Section D.2.5, of the January 2011 *Mercury Storage EIS* describes candidate external events and their likelihood of occurrence. External events that were considered are listed below:

- Wildfires
- Earthquakes
- High winds or tornadoes
- Floods
- Lightning
- Snow loads
- Aircraft crashes
- Vehicle crashes
- Nearby facility fires or explosions

Each event is considered in terms of its likelihood of occurrence and its potential impact in terms of a mercury release from the flasks and 1-metric-ton (1-MT) storage containers. The potential frequency and magnitude of these events can vary significantly between the candidate sites due to the wide spectrum of climate, topography, seismology, and collocated site facilities that exist at each location. However, the analyses of wildfires, floods, lightning, snow loads, vehicle crashes, and nearby facility fire or explosions remain the same, with the only differences being in seismic events, high winds or tornadoes, and aircraft crashes.

[4] It is recognized that there may be no noninvolved workers immediately adjacent to a storage facility in Section 10 or 35, which is outside the WIPP LWB. However, for the sake of conservatism, it is assumed that there could be workers near the storage facility engaged in operations other than those related to the handling of mercury.

Earthquakes

Earthquake-produced ground motion is expressed in units of percent *g* (force of acceleration relative to that of Earth's gravity). The latest probabilistic peak ground acceleration (PGA) data from the U.S. Geological Survey are used to assess seismic hazard among the various mercury storage candidate sites. The PGA values cited are based on a 2 percent frequency of exceedance in 50 years. This corresponds to an annual frequency (chance) of occurrence of about 1 in 2,500 years or 4×10^{-4} per year. For all three potential sites at WIPP, this acceleration is 0.08 *g* (USGS 2012). At any of the WIPP Vicinity reference locations, the new facility would be designed to withstand this acceleration. This frequency is moderate (Frequency Level [FL]-III), as it is at all of the other candidate sites.

The PGA value varies at the other sites considered in the January 2011 *Mercury Storage EIS*, from 0.05 *g* at the Kansas City Plant to 0.57 *g* at the Hawthorne Army Depot. However, the buildings at each site are designed to withstand these design-basis earthquakes, with the result that the frequency of an earthquake severe enough to damage the storage building is the same at all of the sites, FL-III. The subsequent consequence analysis also is unchanged from that at other sites with new buildings, with the result that predicted risk from seismic events is little to no different in the vicinity of WIPP than it is at the other sites.

For an earthquake accident in this draft SEIS, it is conservatively assumed that all flasks would release their entire contents of mercury with no retention of any of the mercury within the flasks. In addition, it is conservatively assumed that the earthquake would cause the building roof to collapse and that the roof would then fall onto and breach all 1-MT mercury storage containers. As a result, a pool of mercury within the storage building would become the source of release to the environment. The following two alternative earthquake scenarios are considered:

- The building remains sufficiently intact so that the spill can still be regarded as occurring inside the building, and the building still generates a turbulent building wake (see Appendix D, Section D.7.2.1, of the January 2011 *Mercury Storage EIS*).

- The building collapses and the spilled pool of mercury is, for all intents and purposes, in the open air.

No attempt was made to assess the relative conditional probabilities of these two scenarios, i.e., they are both assigned a moderate (FL-III) frequency.

The possibility that there could be a fire subsequent to the earthquake remains. In some environmental impact statements, a seismic event that then causes a fire is only considered when there is a natural gas main, hydrogen, propane, or solvents in the building (e.g., DOE 1999b:E-5.4; 2001:D-82, D-83). In one document, the presence of a natural gas pipeline within a building that could be ruptured by an earthquake and cause a subsequent fire was not analyzed because the earthquake-induced damage to the building would result in a dilution of the released natural gas to below its flammability limit (DOE 2002b:C-11). Since a new facility would be constructed at WIPP with the sole purpose of storing mercury, the building would have no fuel pipelines or stored fuels. The frequency of an earthquake with subsequent fire would be negligible.

Tornadoes

In Appendix D, Table D–6, of the January 2011 *Mercury Storage EIS*, data are presented on tornado occurrence frequency and severity, using the Fujita or "F" Scale, for the seven sites considered for mercury storage and the Y–12 National Security Complex (Y–12). Tornadoes of severity F1 and F0 are not expected to cause storage building damage sufficient to result in any significant mercury release to the environment. Many well-constructed buildings would survive an F2 tornado without serious damage to the roof or walls. However, for the purposes of the present analysis, it is conservatively assumed that an F2 tornado would cause the building to collapse and release the contents of all flasks and 1-MT storage vessels – the same source term as for an earthquake.

In the vicinity of WIPP, the historical frequency of occurrence of tornadoes of F2 severity or greater is 1.08 per year, including a frequency of 0.06 per year of tornadoes of severity F3 (Tornadohistoryproject 2012). Using this frequency of occurrence of F2 or greater tornadoes, and the same methodology that was used in the January 2011 *Mercury Storage EIS* Appendix D, the predicted frequency of a damaging tornado strike on a new storage facility at any of the WIPP Vicinity reference locations is 8.78×10^{-8} per year (just under 1 chance in 10 million per year). This is a negligible frequency. Since the source term is conservatively assumed to be the same as for an earthquake, which, as noted above, has a moderate frequency (F-III), tornado risks are bounded by earthquake risks.

Other High Winds

The WIPP Vicinity reference locations are not located in an area prone to hurricanes. Therefore, the frequency of high straight-line winds that would be as damaging as a tornado of F2 or greater severity is negligible.

Aircraft Crashes

There is an existing study of aircraft crashes at WIPP (DOE 2011b). This shows that the predicted frequency of occurrence of an aircraft crash anywhere on the WIPP site is 9.5×10^{-7} per year (just under 1 chance in 1 million per year). This is a negligible frequency. This is because there are no airports close to WIPP – the nearest are at Cavern City (44.3 kilometers [27.5 miles], commercial aircraft), Lea County Regional (64.2 kilometers [39.9 miles], general aviation), JAL (66 kilometers [41 miles], general aviation), and Zip Franklin Memorial (73.7 kilometers [45.8 miles], general aviation).[5] The frequency of a crash into a specific building would be even lower.

Summary of Candidate Onsite Scenarios

Table 4–3 summarizes the results of the analysis of onsite scenarios. These results are the same for all potential storage sites and do not provide a means of discriminating between them.

Table 4–4 lists the accident scenarios that remain for consequence analysis after eliminating those with negligible (FL-I) frequency from Table 4–3. These accident scenarios are the same for all candidate storage sites.

The frequencies of all of the scenarios in Table 4–4 are low (FL-II) or moderate (FL-III). Combining this with a consequence in the SL-I to SL-II range gives a risk in the negligible-to-low range for the involved worker in a mercury storage building at any of the WIPP Vicinity reference locations.

[5] This information was obtained from www.airnav.com, accessed on August 16, 2012. Commercial airports handle a range of aircraft up to and including large passenger and cargo aircraft. General aviation airports, which include air taxi, handle small aircraft.

Table 4–3. Summary of Candidate Onsite Accident Scenarios and Their Likelihood of Occurrence

Hazard	Activity	Postulated Scenario	Frequency of Release[a]	Evaluated Further	Comments[a]
Kinetic	Onsite material handling	Single flask is dropped during handling, resulting in breach.	Moderate (FL-III)	Yes	Consolidation of partially filled pallets could lead to a relatively large number of handling events per year. Could only occur inside building.
Kinetic	Onsite material handling	Single pallet is dropped during transfer to storage racks, resulting in breach.	Moderate (FL-III)	Yes	Assumes pallet dropped from 3.7 meters (12 feet) and all 49 flasks breached. Conservatively assumed that could occur outside the building as well as inside.
Kinetic	Onsite material handling	Triple-pallet collapse.	Moderate (FL-III)	Yes	Requires failure of storage rack. Could only occur inside building.
Kinetic	Onsite material handling	Single 1-MT container drop.	Moderate (FL-III)	Yes	Could occur inside or outside building. Assumes container dropped from a height of less than 1.5 meters (5 feet).
Fire	Onsite storage	Building fire involving multiple flasks or 1-MT containers.	Negligible (FL-I)	No	Limited ignition sources, electric forklift,[b] controls on flammable materials, reliable fire protection system, building constructed of nonflammable materials.
Fire/ explosion nearby	All activities	Fire/explosion at nearby building impacts mercury containers.	Negligible (FL-I)	No	No other facilities containing explosives or potentially flammable materials close enough to impact storage building.
Wildfire	All activities	Wildfire consumes storage building.	Negligible (FL-I)	No	Although wildfires are common, fire monitoring, prevention and suppression systems greatly reduce the likelihood of mercury release.
Earthquake	All activities	Earthquake results in building damage and causes pallets and/or flasks to fall and spill.	Moderate (FL-III)	Yes	Requires an earthquake and failure of flasks or 1-MT containers. Two alternatives considered: building remains recognizably intact or building collapses completely.[c]
Flood	All activities	Storage building floods, causing failure of 3-L flasks or 1-MT containers.	Moderate (FL-III)	Yes	Requires failure of flasks or 1-MT containers. Bounded by earthquake scenario.

Table 4–3. Summary of Candidate Onsite Accident Scenarios and Their Likelihood of Occurrence *(continued)*

Hazard	Activity	Postulated Scenario	Frequency of Release[a]	Evaluated Further	Comments[a]
Weather	All activities	High winds or tornadoes result in roof failure and cause pallets and/or flasks to fall.	Low (FL-II) or negligible (FL-I) (tornadoes); negligible (FL-I) (high winds)	Yes	Requires failure of flasks or 1-MT containers. Bounded by earthquake scenario.
Weather	All activities	Lightning strike causes small building fire involving limited number of mercury containers.	Negligible (FL-I)	No	Lightning strike as initiator of building fire not considered credible. Assumes building lightning protected as required by building codes.
Weather	All activities	Snow load causes roof collapse, resulting in mercury containers' falling.	Negligible (FL-I)	No	Assumes building designed to requirements of building codes.
Surface transportation	Onsite storage	Vehicle or train crashes into building, resulting in mercury container breach.	Negligible (FL-I)	No	Slow vehicle speeds in vicinity of building.
Aircraft crash	All activities	Aircraft crashes into building, resulting in fire, mercury container breach.	Negligible (FL-I)	No	Limited target area given type of aircraft, flight vectors, and size of storage area within building.

[a] For justification of frequency assignments and comments, see Appendix D, Sections D.2.4 and D.2.5, of the January 2011 *Mercury Storage EIS* (DOE 2011a).

[b] The *Final Mercury Management Environmental Impact Statement* (DLA 2004) determined that the frequency of a forklift fuel fire was negligible to low; the use of an electric forklift reduces this frequency to negligible. See Appendix D, Section D.2.4.5, of the January 2011 *Mercury Storage EIS*.

[c] No effort is made to split the moderate frequency between earthquake with building collapse and earthquake without building collapse (i.e., conservatively, the frequency of occurrence of both scenarios is moderate).

Key: 1-MT=1-metric-ton; 3-L=3-liter; DOE=U.S. Department of Energy; FL=frequency level.

Table 4–4. Summary of Types of Accidents Considered in Onsite Spill Analysis

Accident Scenario	Could Occur Indoors?	Could Occur Outdoors?
Single-flask spill	Yes	No[a]
Single-pallet spill	Yes	Yes
Triple-pallet spill	Yes	No[b]
1-metric-ton container spill	Yes	Yes
Earthquake spill[c]	Yes[d]	Yes[e]

[a] Mercury flasks are transported and stored in pallets in a 7- by 7-flask configuration. Flasks may be removed from a pallet if they are leaking or if flasks from partially filled or smaller pallets are consolidated.

[b] Triple-pallet collapse could only occur when the pallets are inside on the storage racks.

[c] This scenario also encompasses the risk from tornadoes, high winds, and floods.

[d] Earthquake leaves building relatively intact.

[e] Earthquake causes building collapse.

Under all of the scenarios in Table 4–4, both indoors and outdoors (except the earthquake with building collapse), the evaporating mercury would mix into the building wake. Appendix D, Section D.4.2.3, of the January 2011 *Mercury Storage EIS* (as updated in Appendix E, Section E.2, of this draft SEIS) shows that, for new construction, the predicted concentrations in the wake are all in the SL-I range, even taking into consideration the revised Protective Action Criterion 1 of 0.15 milligrams per cubic meter. Therefore, the risks to the noninvolved worker and the public from all of these scenarios at the WIPP Vicinity reference locations would be negligible.

For the specific case of an earthquake with building collapse, the spilled mercury would evaporate as if in the open air. Appendix D, Section D.7.1.2, of the January 2011 *Mercury Storage EIS* describes how the release rate is calculated in these circumstances. For a new building, that release rate in Atmospheric Stability Class D with a windspeed *u* of 4.5 meters per second would be 8.45×10^{-4} kilograms per second. Equations 7–2 and 7–3 in Appendix D of the January 2011 *Mercury Storage EIS* show that the evaporation rate for other windspeeds *u* is proportional to $(u/4.5)^{0.8}$. These release rates were input into a ground-level Gaussian dispersion model, which calculated downwind concentrations in six Atmospheric Stability Classes A–F, each with four discrete windspeeds, 1.5, 4.5, 6.5, and 8.5 meters per second, i.e., 24 weather conditions in all.[6] The maximum predicted distances to consequence SL-II, SL-III, and SL-IV are shown Appendix E, Table E–2. The maximum downwind distance from new construction to which a concentration could exceed SL-IV would be less than 100 meters (330 feet); SL-III could be exceeded to a distance of about 200 meters (660 feet); and SL-II could be exceeded to a distance of about 790 meters (2,600 feet). There are similar results for existing buildings.

In the vicinity of Section 10, the nearest structures are oil wells, with the closest being at a distance of 500 meters (1,600 feet), while the closest storage/transfer facility is at a distance of 1,200 meters (3,850 feet). Oil wells are rarely visited. Therefore, the storage/transfer facility is assumed to be the nearest facility at which there might be a member of the public during an earthquake with building collapse. That person would never see concentrations at the SL-II, SL-III, or SL-IV level. The maximum concentration might be in the SL-I range. This corresponds to negligible risk. Section 20 is inside the WIPP LWB and is 2,000 meters (6,400 feet) from the closest site boundary, so the risk to the public is negligible for this site also.

Table 4–5 summarizes the calculated risks for all of the hypothetical accidental releases considered for a new storage facility constructed on WIPP Vicinity Section 10.

[6] These 24 weather conditions are representative of the full range of weather conditions that can occur at each of the potential storage locations, including the WIPP Vicinity reference locations.

Table 4–5. Summary of Risks of All Onsite Elemental Mercury Spill Scenarios – All WIPP Vicinity Reference Locations

Scenario	Frequency	Consequence[a]	Risk
Spills Inside Building[b]			
Involved worker	FL-II – FL-III	SL-I – SL-II	N–L for all inside spills
Noninvolved worker	FL-II – FL-III	SL-II	N for all inside spills
Member of the public	FL-II – FL-III	SL-II	N for all inside spills
Spills Outside Building			
Involved worker	FL-II – FL-III	SL-I – SL-II	N–L for outside earthquake spill; N for all other outside spills
Noninvolved worker	FL-II – FL-III	SL-I – SL-II	
Member of the public			
1-metric-ton container spill	FL-II	SL-I	N
Single-pallet spill	FL-III	SL-I	N
Earthquake with building collapse[c]	FL-III	SL-I	N

[a] For definitions of severity levels, see Appendix D, Section D.3.1.

[b] The inside spill scenarios considered are single flask, single pallet, triple pallet, 1-metric-ton container, full spill tray under a pallet, and earthquake with intact building walls.

[c] This scenario encompasses the risk from floods, high winds, and tornadoes.

Key: FL=frequency level; L=low; N=negligible; SL=severity level.

4.2.9.1.3 Transportation

This subsection considers transportation by road or rail. The potential truck routes considered are conventional commercial routes that have no hazardous material restrictions. The potential domestic truck and rail routes considered and their estimated mileage were obtained using DOE's TRAGIS [Transportation Routing Analysis Geographic Information System] (Johnson and Michelhaugh 2003). Origination and destination points in TRAGIS are defined by nodes; therefore, the closest TRAGIS node to a given site was used for a particular origination or destination point. Details of the assumptions about the transportation analysis are given in Appendix D, Section D.2.2.

These assumptions, together with estimated mileage of potential truck routes determined using DOE's TRAGIS and known historical frequencies of crashes of various types, can be combined to produce estimates of the frequency at which crashes might occur anywhere along the routes traveled by mercury trucks or railcars. Frequencies estimated for five types of consequences are shown in Table 4–6:

- Crash with spill of elemental mercury onto the ground without fire
- Crash with spill of elemental mercury into water
- Crash with fire in dry weather conditions (without rain) (to analyze the effects of dry deposition)
- Crash with fire in wet weather conditions (with rain) (to analyze the effects of wet deposition)
- Crash with death caused by mechanical impact

The frequency of accidents with fire in wet weather was obtained from the frequency of accidents in dry weather by multiplying by the fraction of the time it rains each year. For the WIPP site, hourly data were available from an onsite meteorological station over a period of 5 years from 2007–2011. The number of hours for which there was rainfall over the 5 years was counted and then divided by the total number of hours in 5 years (43,800) to give the probability of rain in the vicinity of WIPP, which is 0.015.

Table 4–6. Frequency Analysis of Truck and Railcar Accidents – All WIPP Vicinity Reference Locations

Scenario	Truck Miles	Frequency of Accidents (per year)	Frequency of Accidents with Spills (per year)	Frequency of Accidents with Fires in Dry Weather (per year)	Frequency of Accidents with Fires in Wet Weather (per year)	Frequency of Accidents with Death[a] (per year)
Truck – Scenario 1[b]	1,046,223	1.2×10^{-2}	2.1×10^{-3}	1.7×10^{-4}	5.4×10^{-6}	5.9×10^{-4}
	–	High – FL-IV	Moderate – FL-III	Moderate – FL-III	Low – FL-II	Moderate – FL-III
Truck – Scenario 2[b]	1,868,523	1.8×10^{-2}	3.7×10^{-3}	3.0×10^{-4}	9.6×10^{-6}	1.0×10^{-3}
	–	High – FL-IV	Moderate – FL-III	Moderate – FL-III	Low – FL-II	Moderate – FL-III
Railcar[c]	426,212	2.6×10^{-3}	1.2×10^{-5}	2.8×10^{-5}	8.9×10^{-7}	1.7×10^{-4}
	–	Moderate – FL-III	Low – FL-II	Low – FL-II	Negligible – FL-I	Moderate – FL-III

[a] Fatality caused by mechanical impact, not by exposure to mercury.

[b] Truck Scenarios 1 and 2 are defined in Appendix D, Section D.2.2.

[c] Transportation by rail to Section 10 or 35 would involve intermodal transportation: rail to WIPP, then truck from WIPP to the Section 10 or 35 location. The risk associated with additional truck miles to Section 10 or 35 (approximately 300 miles per year) is negligible.

Note: To convert miles to kilometers, multiply by 1.60934.

Key: FL=frequency level.

For comparison, the comparable figures for the other potential storage sites ranged from 0.016 at the Hawthorne Army Depot to 0.056 at the Savannah River Site, with an average of 0.032 (see Appendix D, Table D–16, in the January 2011 *Mercury Storage EIS*). Since, for any given site, the transportation routes run through many different parts of the United States, this average was chosen as the multiplier to estimate the frequency of crashes with fire during rain starting with the frequency of crashes with fire in dry weather. Considering all potential candidate sites, including the WIPP Vicinity reference locations, the average reduces slightly to 0.030. However, for consistency with the January 2011 *Mercury Storage EIS*, the multiplicative factor is left at a slightly conservative 0.032. Thus, in Table 4–6, the frequency of accidents with fires in wet weather is obtained from the frequency of accidents with fires in dry weather multiplied by 0.032.

The frequencies shown in Table 4–6 are for an accident anywhere along any of the transportation routes taken to WIPP over a 40-year period of analysis. The frequency of accidents with spills or accidents with fires in dry weather would be moderate under both Truck Scenarios and low under the Railcar Scenario. The frequency of crashes with fires in wet weather would be low under both Truck Scenarios and negligible under the Railcar Scenario. The frequency of accidents with death caused by mechanical impact would be moderate under all scenarios.

As noted, the above frequencies are for an accident anywhere along any of the transportation routes taken to WIPP over a 40-year period of analysis. A crash that occurs in the last mile of the trip was used to estimate the frequency of an onsite crash in the vicinity of the storage building. The frequency of such accidents with spills would be low under both Truck Scenarios and negligible under the Railcar Scenario. The frequency of crashes with fires or death would be negligible under all scenarios.

4.2.9.1.3.1 Transportation Accident with Spill of Elemental Mercury onto the Ground

For exposures occurring via evaporation from a spill of elemental mercury with no fire during a transportation accident, the fraction of the mercury being carried by the truck or railcar that would be spilled is highly uncertain. It is extremely unlikely that all 3-liter flasks or all 1-MT (1.1-ton) containers would be breached. However, to be conservative, it is assumed that such a catastrophic release could take place. The largest amount of mercury that can be carried in a truck or railcar is that contained in 54 1-MT containers. Assuming that all of this mercury is spilled and spreads until the pool is at its capillary depth of 0.36 centimeters (0.14 inches) (so conservative as to be essentially inconceivable in an outdoor spill),[7] the predicted rate of evaporation in a windspeed *u* of 4.5 meters per second would be 7.35×10^{-5} kilograms per second, with the evaporation rates for different windspeeds *u* being scaled by the factor $(u/4.5)^{0.8}$ (see Appendix D, Section D.7.1.2, of the January 2011 *Mercury Storage EIS*).

Running these rates of release through the Gaussian model of atmospheric dispersion and ranging over all possible combinations of atmospheric stability class and windspeed, the predicted maximum distances to the airborne toxic benchmarks are as follows: SL-IV, less than 100 meters (330 feet); SL-III, less than 100 meters (330 feet);[8] and SL-II, about 230 meters (750 feet). As a result, a specific individual could not be exposed to concentrations that are greater than SL-I if he or she lives more than 230 meters (750 feet) from a crash. Conservatively, assuming that the individual lives immediately adjacent to the road, that specific individual could only be exposed above SL-I if the crash occurs along a 460-meter (1,500-foot) stretch of road (230 meters [750 feet] on each side). This is a small fraction of any of the routes (for example, the average length of a truck trip to the WIPP Vicinity reference locations is approximately 2,400 kilometers [1,500 miles]). The frequency of occurrence of a truck crash with spill on the truck routes to WIPP is 0.0037 per year; see Table 4–6 (Truck Scenario 2). The product of the fraction of the route and the frequency of occurrence is about 7.0×10^{-7} per year, a negligible (FL-I) frequency. Under Truck Scenario 1 and the Railcar Scenario, similar reasoning shows that the corresponding frequencies would also be negligible (FL-I). Therefore, the individual risk to a member of the public from transportation spills onto the ground without fire en route to WIPP would be negligible under all transportation scenarios.

4.2.9.1.3.2 Transportation Accident with Spill of Elemental Mercury Directly into Water

The consequences of the spillage of elemental mercury into a water body are discussed in Appendix D, Section D.5.4.2, of the January 2011 *Mercury Storage EIS*. In summary:

- The available understanding of the behavior of elemental mercury spilled into a river or other water body is subject to great uncertainty so that an estimate of the consequences to humans (and ecological receptors) is not possible.
- Should such a spillage occur, it appears that the processes that convert elemental mercury into forms that are potentially hazardous to humans (inorganic compounds of mercury and methylmercury) are slow and would generally allow ample time for cleanup.
- If the spillage occurs onto the banks of a river or water body, but not directly into it, transportation to the water body would be slow, again allowing ample time for cleanup.

The foregoing observations might break down if there is spillage into a fast-flowing river.

The overall conclusion is that a direct spillage of mercury into a body of water could be of concern if it is not cleaned up, but that there is generally adequate time for such cleanup. Hence, the consequences to humans could be managed so that they are negligible or low. Given this assumption and the fact that the frequency of crashes with spills during transportation to the WIPP Vicinity reference locations is no more than moderate (and this is an upper bound on the frequency of spills directly into water), the risk would be negligible or low for all transportation routes. However, because of the above-mentioned uncertainty

[7] Surface tension is what prevents the mercury pool from spreading any further. However, the mercury will only spread until the pool is at its capillary depth of 0.36 centimeters (0.14 inches) if the surface is perfectly smooth. If the surface is rough, the mercury will pool in hollows and depressions and the effective surface area for evaporation will be less than it would be for a smooth surface. See Appendix D, Section D.7.1.4, of the January 2011 *Mercury Storage EIS*.

[8] The predicted distance for SL-IV is in fact different from and less than that for SL-III. However, both distances are less than 100 meters (330 feet). Since the atmospheric dispersion model is not valid at distances from the source less than 100 meters (330 feet), both distances are written as "less than 100 meters (330 feet)."

about fast-flowing rivers, this observation should be tempered by noting that the uncertainty regarding this prediction of risk is very large.

Table 4–7 summarizes the risks arising from spillages of elemental mercury during transportation to WIPP.

Table 4–7. Summary of Transportation Risks to Human Receptors, Spills of Elemental Mercury onto the Ground or into Water – All WIPP Vicinity Reference Locations

	Truck Scenario 1[a]	Truck Scenario 2[a]	Railcar Scenario
Spill onto the Ground			
Frequency[b]	FL-I	FL-I	FL-I
Consequence	SL-II	SL-II	SL-II
Risk	*Negligible*	*Negligible*	*Negligible*
Spill into Water			
Frequency[c]	FL-III	FL-III	FL-II
Consequence	SL-I – SL-II	SL-I – SL-II	SL-I – SL-II
Risk[d]	*Negligible to low*	*Negligible to low*	*Negligible to low*

[a] Truck Scenarios 1 and 2 are defined in Appendix D, Section D.2.2.

[b] Frequency at which spill occurs close enough to a specific individual to cause Acute Exposure Guideline Level 2 to be exceeded.

[c] Frequencies of railcar or truck crashes with spills from Table 4–6.

[d] These estimates of risk are subject to large uncertainty.

Key: FL=frequency level; SL=severity level.

4.2.9.1.3.3 Transportation Accident with Fire

For wooden pallets of 49 3-liter flasks, the material of combustion is the wood of the crate.[9] It is assumed that the amount of wood in a truck or railcar full of 1-MT containers is bounded by the amount of wood in a truck or railcar full of pallets. Either the crash itself or the heat of the fire would rupture an indeterminate number of flasks or 1-MT containers. The mercury is assumed to spread out over the bed of the truck or railcar, with the burning wood standing in or near the pool and causing evaporation by radiative heat transfer. The maximum extent of the pool area that could potentially be affected by radiative heat transfer is limited to the size of the bed of the truck or railcar, regardless of the number of flasks or 1-MT containers that might be ruptured. It is believed that this is a conservative scenario—more than likely the mercury would run out of the damaged truck or railcar so that the optimum configuration of burning materials and the pool (i.e., optimum for radiative heat transfer to the pool) is unlikely to occur or the number of ruptured containers would be far less than that required to fill the bed of the truck or railcar. Essentially, the mercury would reach its boiling point and evaporate at that temperature (at a rate controlled by the windspeed over the surface) until all the available fuel has burned.

Appendix D, Section D.7.4.1, of the January 2011 *Mercury Storage EIS* shows that the calculated rate of evaporation for a truck pallet fire is 1.3 kilograms per second and for a railcar pallet fire is 1.6 kilograms per second, with corresponding durations of release of 762 and 1,308 seconds, respectively, with a windspeed of 4.5 meters per second. The corresponding rates with a windspeed of 1.5 meters per second are 0.55 and 0.68 kilograms per second, respectively. Appendix D, Section D.7.4.1, of the January 2011 *Mercury Storage EIS* also considers how high the plume, containing products of combustion, mercury vapor, and entrained air, would rise. The analysis shows that 100 meters (330 feet) is realistic or

[9] The *Interim Guidance* (DOE 2009) envisages that 3-liter flasks or 1-MT containers may be transported in either wooden or metal pallets. In this draft SEIS, the assumption is that the pallets are made of wood because this gives a conservatively high estimate of the heat that might be available to evaporate mercury.

conservative for all conditions of atmospheric stability class and windspeed for the Truck and Railcar Scenarios. The plume is therefore assumed to rise to a height of 100 meters immediately above the source of release, at which point it defines the input for the Gaussian dispersion model. Using standard plume rise models, the initial radius of the plume at this height is taken to be about $0.6\Delta h$, where Δh is the height of plume rise.

Mercury released during a fire is converted into the divalent inorganic mercury form. Conservatively, it is assumed that 20 percent of it is converted into the divalent form (see Appendix D, Section D.7.3.3, of the January 2011 *Mercury Storage EIS*). In this form, mercury can deposit by dry deposition or wet deposition. The January 2011 *Mercury Storage EIS* Appendix D, Section D.7.3.3, also discusses the choice of dry deposition velocities and the rainfall scavenging rate for use in the Gaussian dispersion model.

The Gaussian model calculations for the fire scenarios were carried out in three weather conditions that are representative of the full range of weather conditions:

- Atmospheric Stability Class A with a windspeed of 1.5 meters per second, representative of conditions of low windspeed and high ambient thermally generated turbulence
- Atmospheric Stability Class D with a windspeed of 4.5 meters per second, representative of "average" weather conditions dominated by mechanically generated turbulence
- Atmospheric Stability Class F with a windspeed of 1.5 meters per second, representative of conditions with low ambient turbulence

<u>Human Exposure – Inhalation Pathway (Transportation Fire Scenarios)</u>

The generic results of the calculations for the inhalation pathway following a crash with fire for any potential site are shown in Table 4–8.

Table 4–8. Predicted Range of Distances (meters) Downwind Within Which Acute Airborne Severity Levels Are Exceeded – Crashes with Fires

Type of Accident	Atmospheric Stability Class/Windspeed	PAC-1 (SL-II)	AEGL-2 (SL-III)	AEGL-3 (SL-IV)
Truck crash, wooden pallets	A/1.5 m/s	<100–3,500	<100–130	Nowhere
	D/4.5 m/s	<100–25,000	Nowhere	Nowhere
	F/1.5 m/s	<100–>40,000[a]	500–1,200	Nowhere
Railcar crash, wooden pallets	A/1.5 m/s	<100–3,700	130–830	Nowhere
	D/4.5 m/s	<100–30,000	550–2,300	Nowhere
	F/1.5 m/s	<100–>40,000[a]	350–2,050	Nowhere

[a] The limit of validity of the dispersion model is 40,000 meters (approximately 25 miles).

Note: To convert meters to feet, multiply by 3.281.

Key: <=less than; AEGL=Acute Exposure Guideline Level; m/s=meters per second; PAC=Protective Action Criterion; SL=severity level.

The combination of the consequence results above with the frequencies of crashes with fires is explained in Appendix D, Section D.4.5, of the January 2011 *Mercury Storage EIS* (as updated in Appendix E, Section E.2, of this draft SEIS), and produces the results in Table 4–9.

Table 4–9. Summary of Acute-Inhalation Risks to Human Receptors, Accidents with Fires, Transportation Routes to All WIPP Vicinity Reference Locations

	Both Truck Scenarios[a] with Wooden Pallets	Railcar Scenario with Wooden Pallets
Frequency[b]	FL-III	FL-II
Consequence[c]	SL-II	SL-II
Risk	*Low*	*Low*

[a] Truck Scenarios 1 and 2 are defined in Appendix D, Section D.2.2.

[b] Frequencies of railcar or truck crashes with spills and fires from Table 4–8.

[c] The consequence in any weather (dry or wet) condition that yields the highest risk.

Key: FL=frequency level; SL=severity level.

Note that the risks presented in the above scenario are individual risks: they are the answer to the question, "What is the risk to me?" This is not the same as the risk that, somewhere along a transportation route, airborne concentrations would exceed the various SLs. Those risks would in fact be higher.

Human Exposure – Deposition on the Ground

The analyses performed for this draft SEIS show that, under all fire scenarios listed in Table 4–10, with and without rain, mercury deposited on the ground would never cause the benchmark of 180 milligrams per kilogram to be exceeded. Therefore, the corresponding risks would be negligible.

Table 4–10. Predicted Range of Distances (meters) Downwind to Which Lakes Could Potentially Be Contaminated Above Levels Safe for Consumption of Fish – Accidental Truck and Railcar Crashes with Fires

Type of Accident/Frequency Level	Atmospheric Stability Class/Windspeed	Consumption of Fish		
		National Average	Subsistence Fisherman	
			Average	95th Percentile
Truck Crash with Fire, Dry Deposition/FL-III[a]	A/1.5 m/s	Nowhere	Nowhere	500–700
	D/4.5 m/s	Nowhere	Nowhere	Nowhere
	F/1.5 m/s	Nowhere	Nowhere	Nowhere
Truck Crash with Fire, Wet Deposition/FL-II[b]	A/1.5 m/s	<100	500–700	2,000–3,000
	D/4.5 m/s	Nowhere	700–1,000	3,000–5,000
	F/1.5 m/s	<100	1,000–2,000	5,000–7,000
Railcar Crash with Fire, Dry Deposition/FL-II[c]	A/1.5 m/s	100–200	300–500	700–1,000
	D/4.5 m/s	Nowhere	Nowhere	2,000–3,000
	F/1.5 m/s	Nowhere	Nowhere	Nowhere
Railcar Crash with Fire, Wet Deposition/FL-I[b]	A/1.5 m/s	200–300	1,000–2,000	3,000–5,000
	D/4.5 m/s	300–500	1,000–2,000	5,000–7,000
	F/1.5 m/s	700–1,000	3,000–5,000	7,000–10,000

[a] From Appendix D, Tables D–13 and D–14, of the January 2011 *Mercury Storage EIS*.

[b] From Appendix D, Table D–17, of the January 2011 *Mercury Storage EIS*.

[c] From Appendix D, Table D–15, of the January 2011 *Mercury Storage EIS*.

Note: To convert meters to feet, multiply by 3.281.

Key: <=less than; FL=frequency level; m/s=meters per second.

Human Exposure – Consumption of Fish

Appendix D, Section D.1.1.2.7, of the January 2011 *Mercury Storage EIS*, presents the reasons for the choice of 0.3 milligrams of methylmercury per kilogram of fish tissue, wet weight, as the boundary between SL-I and SL-II for the accumulation of methylmercury in fish to levels that could be harmful to humans if consumed at the national average rate of 0.0175 kilograms per day. Appendix D, Section D.1.1.2.7, of the January 2011 *Mercury Storage EIS* also considers subsistence fishermen. Based on data provided by EPA (2001), a subsistence fisherman would on average consume 0.059 kilograms per day, while the 95th percentile of fish consumption is 0.170 kilograms per day (about 62 kilograms per year). Table 4–10 summarizes the results of the analysis of distances downwind to which bodies of water might be contaminated with methylmercury to levels at which fish caught there would be unsafe for human consumption.

Appendix D, Section D.4.5, of the January 2011 *Mercury Storage EIS*, presents a semi-quantitative analysis of these results and the associated risks. Should a truck or rail accident with fire occur, the risk to fishermen (that eat fish at both the national average and subsistence consumption rates) would be negligible, with the possible exception of a low risk for a subsistence fisherman that eats fish at the 95th percentile consumption rate following a railcar fire with dry deposition. However, irrespective of frequency, should such an accident occur within a few kilometers upwind of a body of water used by subsistence fishermen, it would be advisable as a mitigation measure to monitor the levels of methylmercury in fish to ensure that subsistence fishermen do not consume amounts of methylmercury that might cause adverse health effects. Subsequent to mandated reporting of any such release by the shipper of the elemental mercury, the appropriate state environmental agency would be responsible for determining appropriate fish consumption advisories and monitoring requirements of mercury concentrations in waters and fish stocks.

Table 4–11 summarizes the human health risks associated with all transportation spills.

Table 4–11. Summary of Transportation Risks to Human Receptors – All WIPP Vicinity Reference Locations

Spill Scenario	Truck Scenario 1[a]	Truck Scenario 2[a]	Railcar Scenario
Elemental mercury, spill onto ground	Negligible	Negligible	Negligible
Elemental mercury, spill into water	Negligible to low within a large range of uncertainty	Negligible to low within a large range of uncertainty	Negligible to low within a large range of uncertainty
Spill with fire, inhalation	Low	Low	Low
Spill with fire, dry and wet deposition onto soils	Negligible	Negligible	Negligible
Fish consumption pathway – national average	Negligible	Negligible	Negligible
Fish consumption pathway – average subsistence fisherman	Negligible	Negligible	Negligible
Fish consumption pathway – 95th percentile subsistence fisherman	Negligible	Negligible	Negligible to low – dry deposition Negligible – wet deposition

[a] Truck Scenarios 1 and 2 are defined in Appendix D, Section D.2.2.

4.2.9.1.4 Intentional Destructive Acts

A wide range of intentional destructive acts (IDAs) involving a release of mercury can be postulated for the WIPP Vicinity Section 10 site itself and transportation routes being considered. Each involves an action by intruders or insiders that affects mercury inventories either at the storage facility or during transportation to the storage facility. The human health impacts of an IDA are directly related to the amount of mercury available for dispersion, as well as the means of dispersing it to the environment. Other factors that affect impacts include population density, distance to the population, and meteorology.

IDA scenarios were selected based on the amount of mercury at the storage facility or in a transport vehicle. Other factors that were considered include the nature of the IDA event that would result in the highest dispersion of mercury to the environment. The likelihood or frequency of the IDA scenarios analyzed in this section cannot be quantified because of the dependence on unpredictable intruder actions and security measures that would be employed by DOE or hazardous material transporters. Each IDA scenario assumes multiple actions by intruders with no successful mitigation or protection measures. Conservative analytical assumptions are also imposed on the calculations. The results are presented in terms of consequences, but not annual risks because of the lack of an annual probability or frequency for these IDA events.

The accident analyses in Appendix D of the January 2011 *Mercury Storage EIS* (as updated in Appendix E, Section E.2, of this draft SEIS) show that the largest airborne and ground mercury concentrations would result from scenarios in which a quantity of mercury in containers is exposed to a fire. The energy of a fire would increase the mercury release rate and plume release height. Since the accident analysis evaluates fire scenarios involving available fuel in a truck or railcar that contains mercury, the IDA scenarios were developed to incorporate larger quantities of flammable material in concert with mercury in containers on a truck or railcar. The largest easily accessible and mobile source of large quantities of flammable material is a gasoline tank truck, which may contain between 18,927 and 34,069 liters (5,000 and 9,000 gallons) of gasoline. The IDA scenario postulates that a group of individuals hijack a fully loaded 34,069-liter (9,000-gallon) gasoline tank truck, which they then drive into either another truck or a railcar loaded with mercury being carried in either 34.6-kilogram (76-pound) flasks or 1-MT (1.1-ton) containers. Another postulated scenario would involve two groups of armed intruders: one hijacking the loaded tanker truck and the other disabling the train or truck carrying mercury.

The postulated armed intruders would incapacitate any persons accompanying the shipment; release the gasoline in the gasoline tanker on and around the mercury storage containers; and set the gasoline on fire, thereby engulfing the mercury cargo in an unmitigated fire. This IDA event may occur either in transit or at the unloading location at the mercury storage facility. The same quantity of gasoline and mercury are assumed to be available under both scenarios; these quantities would only be limited by the transport capacity of the truck or railcar. The most vulnerable large quantities of mercury were determined to be truck or rail shipments either in transit or at the facility prior to unloading.

IDA scenarios involving an attack on the storage facility other than during unloading of a truck or railcar are considered to be less likely because of the distribution of mercury within the facility, presence of security, and facility design features that would ameliorate mercury releases to the environment.

Appendix D, Section D.2.6, of the January 2011 *Mercury Storage EIS* describes a fire caused by an IDA. The parameters needed for input into the atmospheric dispersion model are discussed in Appendix D, Section D.7.4.2, of the January 2011 *Mercury Storage EIS*, where it is explained that the railcar fire is a somewhat conservative bounding case for the truck fire. The results of the analyses are as follows.

Human Exposure – Atmospheric Pathway

Per Appendix D, Table D–64, of the January 2011 *Mercury Storage EIS*, the duration of release is 10,660 seconds (approximately 3 hours). Interpolation from Appendix D, Table D–6, gives a corresponding Acute Exposure Guideline Level (AEGL)-2 (SL-III) of 1 milligram per cubic meter (1.0×10^{-6} kilograms per cubic meter) and an AEGL-3 (SL-IV) of 4.4 milligrams per cubic meter (4.4×10^{-6} kilograms per cubic meter). The "surrogate AEGL-1" is the American Conference of Governmental Industrial Hygienists' threshold limit value of 0.025 milligrams per cubic meter as a time-weighted average for an 8-hour workday exposure, as discussed in Appendix B.

The results of the atmospheric dispersion analyses and predictions of potential acute-inhalation exposures are shown in Table 4–12.

Table 4–12. Predicted Range of Distances (meters) Downwind to Which Acute Airborne Severity Levels Are Exceeded – IDA Fires

Type of Accident	Atmospheric Stability Class/Windspeed	ACGIH TLV 8-hour TWA (SL-II)	AEGL-2 (SL-III)	AEGL-3 (SL-IV)
Truck crash	A/1.5 m/s	<100–9.000	370–780	Nowhere
	D/4.5 m/s	<100–>40,000[a]	Nowhere	Nowhere
	F/1.5 m/s	<100–>40,000[a]	100–5,700	680–870

[a] The limit of validity of the dispersion model is 40,000 meters (approximately 25 miles).

Note: To convert meters to feet, multiply by 3.281.

Key: <=less than; ACGIH=American Conference of Governmental Industrial Hygienists; AEGL=Acute Exposure Guideline Level; IDA=intentional destructive act; m/s=meters per second; SL=severity level; TLV=threshold limit value; TWA=time-weighted average.

Comparisons with the railcar crash results in Table 4–8 show that the predicted downwind distances are, as expected, generally greater for the IDA fire. As noted above, because frequencies are not assigned to IDA scenarios, it is not possible to match the concentrations described above with corresponding estimates of risk.

Human Exposure – Inorganic Mercury Deposited on the Ground

The calculations predict that the threshold for SL-II (180 milligrams per kilogram) would not be exceeded anywhere following an IDA.

Human Exposure – Consumption of Fish

The predicted ranges of distances downwind to which bodies of water could be contaminated with methylmercury at levels that would be unsafe for human consumption of fish caught there are shown in Table 4–13.

As can be seen, lakes located up to tens of kilometers (tens of miles) downwind could be contaminated to levels unacceptable for subsistence fishermen; lakes up to 10 kilometers (approximately 6 miles) downwind could be unacceptable for people who consume fish at the national average rate. However, as noted previously, it is not possible to associate risks with these predictions.

Table 4–13. Predicted Range of Distances (meters) Downwind to Which Lakes Could Potentially Be Contaminated Above Levels Safe for Consumption of Fish – Intentional Destructive Acts

Type of Accident	Atmospheric Stability Class/Windspeed	Consumption of Fish		
		National Average	Subsistence Fisherman	
			Average	95th Percentile
IDA Fire, Dry Deposition	A/1.5 m/s	Nowhere	1,000–2,000	2,000–3,000
	D/4.5 m/s	Nowhere	Nowhere	10,000–20,000
	F/1.5 m/s	Nowhere	Nowhere	1,000–2,000
IDA Fire, Wet Deposition	A/1.5 m/s	2,000–3,000	7,000–10,000	10,000–20,000
	D/4.5 m/s	5,000–7,000	10,000–20,000	30,000–40,000
	F/1.5 m/s	7,000–10,000	10,000–20,000	20,000–30,000

Note: To convert meters to feet, multiply by 3.281.
Key: IDA=intentional destructive act; m/s=meters per second.

4.2.9.2 WIPP Vicinity Section 20

The consequences to involved and noninvolved workers remain the same for WIPP Vicinity Section 20 as they were presented for WIPP Vicinity Section 10 in Section 4.2.9.1. Because WIPP Vicinity Section 20 is located inside the WIPP LWB and is a further distance from potential public receptors, the consequences to the public would also be smaller than those calculated in the previous sections for WIPP Vicinity Section 10.

4.2.9.3 WIPP Vicinity Section 35

The consequences to involved and noninvolved workers remain the same for WIPP Vicinity Section 35 as they were presented for WIPP Vicinity Section 10 in Section 4.2.9.1.

4.2.10 Ecological Risk

4.2.10.1 WIPP Vicinity Section 10

The following is a summary of the generic analysis of ecological risks that appears in Appendix D, Section D.5, of the January 2011 *Mercury Storage EIS*. It applies equally to all of the sites being considered as possibilities for mercury storage, including WIPP.

The ecological risk assessment considers chronic exposures to the following potentially sensitive ecological receptors:

- Plants
- Soil invertebrates
- The short-tailed shrew
- The American robin
- The red-tailed hawk
- The great blue heron
- The river otter
- Aquatic biota
- Sediment-dwelling (i.e., benthic) biota

Appendix D, Section D.5, of the January 2011 *Mercury Storage EIS* contains a discussion of why these representative receptors were chosen. Ecological exposures from elemental mercury deposited onto surface soil, sediment, and surface water are expected to pose the greatest risk to ecological receptors. The ecological health consequence levels for these receptors are expressed in terms of environmental-medium- and receptor-specific ecological benchmark values or equivalent screening values that are the upper concentration limits for mercury in soil, sediment, and/or surface water. The screening values are expressed in milligrams per kilogram or micrograms per liter depending on whether they are for mercury in soil/sediment or mercury in water, respectively. Appendix D, Section D.5, of the January 2011 *Mercury Storage EIS* describes how these values are calculated.

Table 4–14 provides the screening values for the receptors listed above. The output of the atmospheric dispersion model provides airborne concentrations in kilograms per cubic meter and amounts of deposited mercury in kilograms per square meter. For ease of comparison with these outputs, the ecological screening values can be converted into equivalent levels of deposited mercury (independent of the mercury release scenario). Note that, for each receptor, there are two screening values: one for ingestion of whatever portion of the deposited mercury is converted into methylmercury in the soil, sediment, or water and one for the portion that remains in the inorganic form.

Table 4–14. Screening Values and Equivalent Deposited Screening Values

Ecological Receptor, Pathway	Inorganic or Methylmercury	Screening Value (mg/kg or µg/L)	Equivalent Deposited Screening Value (kg/m^2)
Plants	Inorganic	3.00×10^{-1}	2.76×10^{-5}
Soil invertebrates	Inorganic	1.00×10^{-1}	9.18×10^{-6}
Short-tailed shrew	Inorganic	1.10×10^{2}	1.01×10^{-2}
American robin	Inorganic	2.00×10^{0}	1.84×10^{-4}
Red-tailed hawk	Inorganic	1.62×10^{3}	1.49×10^{-1}
Great blue heron, sediment	Inorganic	7.36×10^{2}	3.12×10^{-2}
Great blue heron, water	Inorganic	1.40×10^{0}	3.61×10^{-2}
River otter, sediment	Inorganic	5.26×10^{3}	2.23×10^{-1}
River otter, water	Inorganic	1.03×10^{1}	2.67×10^{-1}
Aquatic biota	Inorganic	1.30×10^{0}	3.36×10^{-2}
Sediment-dwelling biota	Inorganic	1.50×10^{-1}	6.35×10^{-6}
Plants	Methyl	None	None
Soil invertebrates	Methyl	2.50×10^{0}	1.13×10^{-2}
Short-tailed shrew	Methyl	8.00×10^{-2}	3.60×10^{-4}
American robin	Methyl	1.00×10^{-2}	4.50×10^{-5}
Red-tailed hawk	Methyl	6.86×10^{0}	3.09×10^{-2}
Great blue heron, sediment	Methyl	2.09×10^{0}	5.02×10^{-4}
Great blue heron, water	Methyl	3.20×10^{-2}	3.11×10^{-3}
River otter, sediment	Methyl	5.40×10^{-1}	1.31×10^{-4}
River otter, water	Methyl	8.00×10^{-3}	7.78×10^{-4}
Aquatic biota	Methyl	2.80×10^{-3}	2.72×10^{-4}
Sediment-dwelling biota	Methyl	None	None

Key: µg/L=micrograms per liter; kg/m^2=kilograms per square meter; mg/kg=milligrams per kilogram.

The SL to which a particular ecological consequence estimate is assigned is obtained by dividing the predicted exposure concentration of mercury by the appropriate screening value for ecological effects. If the ratio is 20 or higher, SL-IV is assigned; between 10 and 20, SL-III; between 1 and 10, SL-II; and below 1, SL-I (which is predicted to correspond to negligible consequences).

4.2.10.1.1 Slow Leaks, Accidental Spills at Storage Sites, and Spills Without Fires During Transportation

Ecological risks associated with slow leaks during normal operations and accidental spills arise from the escape of mercury vapors from containers during storage and handling. For ecological receptors, ingestion of soil contaminated with mercury represents the greatest plausible long-term threat from mercury releases. As discussed in Appendix D of the January 2011 *Mercury Storage EIS*, deposition of airborne mercury is the primary mechanism of soil contamination. However, elemental mercury is not subject to significant atmospheric deposition, unlike divalent mercury. As a result, risks to ecological receptors from slow leaks, accidental spills at storage sites, and spills without fires during transportation (other than those directly into a water body) are considered to be negligible at all storage sites and along all transportation routes.

4.2.10.1.2 Spills of Elemental Mercury into Water Bodies

It is conceivable that, during transportation, there could be a crash and a resulting spill of elemental mercury into a river or other body of water. For an assessment of the physical and chemical phenomena that would control how such a spill might affect ecological receptors, see Appendix D, Section D.5.4.2, of the January 2011 *Mercury Storage EIS*, which also makes the following conclusions regarding the consequences of the spillage of elemental mercury into a water body. In summary:

- The available understanding of the behavior of elemental mercury spilled into a river or other water body is subject to great uncertainty so that an estimate of the consequences to ecological receptors is not possible.
- Should such a spillage occur, it appears that the processes that convert elemental mercury into forms that are potentially hazardous to ecological receptors (inorganic compounds of mercury and methylmercury) are slow and would generally allow ample time for cleanup.
- If the spillage occurs onto the banks of a river or water body, but not directly into it, transportation to the water body would be slow, again allowing ample time for cleanup.

Based on the comments above about cleanup, consequences to ecological receptors would likely be in the negligible-to-low range. However, the foregoing observations might break down if there is spillage into a fast-flowing river.

The overall conclusion is that, except for a direct spillage of elemental mercury into a body of water, the consequences to ecological receptors would be negligible. For direct spillages, the fact that the frequency of crashes with spills on any of the transportation routes is no more than moderate (and this is an upper bound on the frequency of spills directly into water), the risk to ecological receptors would be negligible or low for all transportation routes. However, because of the above-mentioned uncertainty about fast-flowing rivers, this observation should be tempered by noting that the uncertainty in the above statement regarding this prediction is large.

4.2.10.1.3 Transportation Spills with Fires

Ecological risks associated with transportation spills with fires principally arise from ingestion of mercury in soil, wetland sediments, or water bodies. Some of this mercury subsequently is converted to methylmercury; this conversion is taken into account in the analysis in Appendix D, Section D.5, of the January 2011 *Mercury Storage EIS*.

The following analysis of consequences considers truck and railcar crashes with fires, in each case with wooden pallets. The analysis uses the same computer runs as were used for the analysis of human receptors. Analyses have been carried out for the following three weather conditions (the same as for the human health risk assessment):

- Atmospheric Stability Class A with a windspeed of 1.5 meters per second
- Atmospheric Stability Class D with a windspeed of 4.5 meters per second
- Atmospheric Stability Class F with a windspeed of 1.5 meters per second

<u>Truck Fires – Dry Deposition</u>

Table 4–15 presents the predicted ranges of distances downwind to which ecological receptors might be exposed in SL-II, SL-III, and SL-IV following a truck crash with fire for each of the three weather conditions for which calculations were performed.

Table 4–15. Summary of Potential Exposure of Receptors to Consequence Severity Levels II, III, and IV – Truck Spill with Wooden Pallet Fire and No Rain

Ecological Receptor	Distance (meters) to Which Benchmark is Exceeded (A[a], 1.5 m/s[b])			Distance (meters) to Which Benchmark is Exceeded (D[a], 4.5 m/s[b])			Distance (meters) to Which Benchmark is Exceeded (F[a], 1.5 m/s[b])		
	SL-II	SL-III	SL-IV	SL-II	SL-III	SL-IV	SL-II	SL-III	SL-IV
Sediment-dwelling biota	1,000–2,000			3,000–5,000					
Soil invertebrates	700–1,000			2,000–3,000					
Plants	300–500								
American robin									
River otter									
Aquatic biota									
Short-tailed shrew									
Great blue heron									
Red-tailed hawk									

[a] Atmospheric Stability Class.

[b] Windspeed measured at 10 meters.

Note: Shaded cells denote no exceedance of the appropriate benchmark. The ranges in this table indicate that there is uncertainty in the predicted distance to which the various benchmarks are exceeded. The distances downwind at which the various concentrations are first encountered can conservatively be set to 0. To convert meters to feet, multiply by 3.281.

Key: m/s=meters per second; SL=severity level.

Table 4–16 shows that, for a truck crash with a pallet fire but no rain, no ecological receptors could be exposed to deposited mercury in the SL-IV and SL-III ranges in any weather conditions. Two receptors (sediment-dwelling biota and soil invertebrates) could be exposed in the SL-II range in Atmospheric Stability Class D with a windspeed of 4.5 meters per second. Three receptors (sediment-dwelling biota, soil invertebrates, and plants) could be exposed in the SL-II range in Atmospheric Stability Class A with a windspeed of 1.5 meters per second.

The consequences above can be combined with the predicted frequencies of crashes with fires presented in Appendix D, Tables D–13 and D–14, of the January 2011 *Mercury Storage EIS* to provide risks. Tables D–13 and D–14 show that the predicted frequencies of spills with fires are in the FL-III range under both Truck Scenarios and for all of the candidate storage sites. Conservatively, these frequencies are associated with the highest SL predicted in any weather condition in Table 4–15, a conservative assumption.[10] Table 4–16 summarizes the FL, consequence level, and risk to ecological receptors and applies to all candidate storage sites.

Table 4–16. Frequencies, Consequences, and Risks to Ecological Receptors from Truck Crashes with Wooden Pallet Fires and No Rain, All Sites[a]

Ecological Receptor	Frequency Level (FL) of Crash with Fire[b]	Consequence Severity Level (SL)[c]	Risk[d]
Sediment-dwelling biota	FL-III (moderate)	SL-II	Low
Soil invertebrates	FL-III (moderate)	SL-II	Low
Plants	FL-III (moderate)	SL-II	Low
American robin	FL-III (moderate)	SL-I	Negligible
River otter	FL-III (moderate)	SL-I	Negligible
Aquatic biota	FL-III (moderate)	SL-I	Negligible
Short-tailed shrew	FL-III (moderate)	SL-I	Negligible
Great blue heron	FL-III (moderate)	SL-I	Negligible
Red-tailed hawk	FL-III (moderate)	SL-I	Negligible

[a] Applies equally to all candidate sites.
[b] Frequencies of truck crashes with fires from Table 4–6.
[c] The highest consequence in any weather condition from Table 4–15.
[d] Applies to both Truck Scenarios 1 and 2.

As can be seen, only three receptors have a non-negligible risk: sediment-dwelling biota, soil invertebrates, and plants.

<u>Truck Fires – Wet Deposition</u>

The wet deposition analysis proceeded exactly as for the dry deposition, except that the quantity against which equivalent deposited screening values were compared was the amount of mercury deposited on the ground by the action of rain instead of by dry deposition. Table 4–17 is analogous to Table 4–15, but for wet deposition instead of dry deposition.

Table 4–17 shows that, for a truck crash with a pallet fire and rain, sediment-dwelling biota could be exposed to deposited mercury in the SL-IV range over distances of up to 500 meters (1,640 feet); in the SL-III range, up to 2,000 meters (6,600 feet); and in the SL-II range, up to about 20,000 meters (approximately 12.4 miles). The consequences above can be combined with the predicted frequencies of crashes with fires and rain from the January 2011 *Mercury Storage EIS* Appendix D, Table D–17, to provide risks; see Table 4–18. The predicted frequencies of truck spills with fire and rain are in the low (FL-II) range for all of the candidate storage sites and under both Truck Scenarios. Conservatively, these frequencies are associated with the highest SL predicted in any weather condition in Table 4–17. Table 4–18 summarizes the FL, consequence level, and risk to ecological receptors.

Table 4–18 shows that, for all candidate sites, there is a moderate risk that, somewhere along the truck routes, for truck crashes with pallet fires and rain, areas could contain deposited mercury in the SL-IV range for sediment-dwelling biota. Per the risk matrix in Appendix D, Section D.3.1, these indicate

[10] In principle, one could calculate the probability that, conditional on the occurrence of the crash with fire, an SL-IV consequence for (say) sediment-dwelling biota could occur. This probability is less than unity, because it does not occur in all weather conditions. It might be small enough that, when multiplied by the FL-III frequencies in Table 4–16, it would drop those frequencies into a lower frequency range. However, this is not possible because the calculations reported in Table 4–16 were only done for the three representative weather conditions, not all weather conditions. Nevertheless, omitting this step in the calculation of frequency does add considerable conservatism.

situations of concern. Furthermore, though not shown explicitly in Table 4–18, there could be a low risk that areas along truck routes could contain deposited mercury in the SL-III range for sediment-dwelling biota.

Table 4–17. Summary of Potential Exposure of Receptors to Consequence Severity Levels II, III, and IV – Truck Spill with Wooden Pallet Fire and Rain

Ecological Receptor	Distance (meters) to Which Benchmark is Exceeded (A[a], 1.5 m/s[b])			Distance (meters) to Which Benchmark is Exceeded (D[a], 4.5 m/s[b])			Distance (meters) to Which Benchmark is Exceeded (F[a], 1.5 m/s[b])		
	SL-II	SL-III	SL-IV	SL-II	SL-III	SL-IV	SL-II	SL-III	SL-IV
Sediment-dwelling biota	3,000–5,000	300–500	100–200	10,000–20,000	500–700	100–200	10,000–20,000	1,000–2,000	300–500
Soil invertebrates	3,000–5,000	200–300		7,000–10,000	300–500		7000–10,000	700–1,000	
Plants	1,000–2,000			1,000–2,000			3,000–5,000		
American robin	500–700			700–1,000			2,000–3,000		
River otter	100–200						300–500		
Aquatic biota									
Short-tailed shrew									
Great blue heron									
Red-tailed hawk									

[a] Atmospheric Stability Class.
[b] Windspeed measured at 10 meters.
Note: Shaded cells denote no exceedance of the appropriate benchmark. The ranges in this table indicate that there is uncertainty in the predicted distances to which the various benchmarks are exceeded. The distances downwind at which the various concentrations are first encountered can conservatively be set to 0. To convert meters to feet, multiply by 3.281.
Key: m/s=meters per second; SL=severity level.

Table 4–18. Frequencies, Consequences, and Risks to Ecological Receptors from Truck Crashes with Wooden Pallet Fires and Rain, All Sites[a]

Ecological Receptor	Frequency Level (FL) of Crash with Fire[b]	Consequence Severity Level (SL)[c]	Risk[d]
Sediment-dwelling biota	FL-II (low)	SL-IV	Moderate
Soil invertebrates	FL-II (low)	SL-III	Low
Plants	FL-II (low)	SL-II	Low
American robin	FL-II (low)	SL-II	Low
River otter	FL-II (low)	SL-II	Low
Aquatic biota	FL-II (low)	SL-I	Negligible
Short-tailed shrew	FL-II (low)	SL-I	Negligible
Great blue heron	FL-II (low)	SL-I	Negligible
Red-tailed hawk	FL-II (low)	SL-I	Negligible

[a] Applies equally to all candidate sites.
[b] Frequencies of truck crashes with fires and rain from Table 4–6.
[c] The highest consequence in any weather condition from Table 4–17.
[d] Applies to both Truck Scenarios 1 and 2.

For all candidate sites, there is a low risk that, for the same event, somewhere along the truck routes, areas could contain deposited mercury in the SL-III range for soil invertebrates. Per the risk matrix in Appendix D, Section D.3.1, these indicate situations of minimal concern. Furthermore, though not shown explicitly in Table 4–18, there is a low risk that areas along truck routes could contain deposited mercury in the SL-II range for sediment-dwelling biota and soil invertebrates.

For all candidate sites, there is a low risk that, for the same event, somewhere along the truck routes, areas could contain deposited mercury in the SL-II range for plants, the American robin, and the river otter. Per the risk matrix in Appendix D, Section D.3.1, these indicate situations of minimal concern.

For all candidate sites, the risk to aquatic biota, the short-tailed shrew, the great blue heron, and the red-tailed hawk is negligible.

Railcar Fires

The risks associated with railcar fires are calculated in the same way as for truck fires. Table 4–19 shows the risk results for dry deposition. As can be seen, only sediment-dwelling biota can be exposed in the SL-III range, with a corresponding low risk. Soil invertebrates, plants, and the American robin could be exposed in the SL-II range, also with a corresponding low risk. Consequences and risks to all other receptors are negligible.

Per Table 4–6, the frequencies of railcar crashes with subsequent fire and rain would be negligible for the rail routes to every site. Therefore, all corresponding risks would be negligible.

Table 4–19. Frequencies, Consequences, and Risks to Ecological Receptors from Railcar Crashes with Wooden Pallet Fires and No Rain, All Sites[a]

Ecological Receptor	Frequency Level (FL) of Crash with Fire[b]	Consequence Severity Level (SL)	Risk
Sediment-dwelling biota	FL-II (low)	SL-III	Low
Soil invertebrates	FL-II (low)	SL-II	Low
Plants	FL-II (low)	SL-II	Low
American robin	FL-II (low)	SL-II	Low
River otter	FL-II (low)	SL-I	Negligible
Aquatic biota	FL-II (low)	SL-I	Negligible
Short-tailed shrew	FL-II (low)	SL-I	Negligible
Great blue heron	FL-II (low)	SL-I	Negligible
Red-tailed hawk	FL-II (low)	SL-I	Negligible

[a] Applies equally to all candidate sites.

[b] Frequencies of railcar crashes with fires from Table 4–6.

4.2.10.1.4 Consequences – Intentionally Initiated Fire with Mercury Spill

Tables 4–20 and 4–21 summarize the results of calculations of the impact on ecological receptors resulting from an intentionally initiated gasoline tanker fire (IDA fire), described in Appendix D, Section D.2.6, of the January 2011 *Mercury Storage EIS*. As described previously, the railcar fire is taken as the surrogate for both railcar and truck IDA fires. Table 4–20 is for dry deposition and Table 4–21 is for wet deposition.

Table 4–20. Summary of Potential Exposure of Receptors to Consequence Severity Levels II, III, and IV – Intentionally Initiated Railcar Spill with Fire, No Rain

Ecological Receptor	Distance (meters) to Which Benchmark is Exceeded (A[a], 1.5 m/s[b])			Distance (meters) to Which Benchmark is Exceeded (D[a], 4.5 m/s[b])			Distance (meters) to Which Benchmark is Exceeded (F[a], 1.5 m/s[b])		
	SL-II	SL-III	SL-IV	SL-II	SL-III	SL-IV	SL-II	SL-III	SL-IV
Sediment-dwelling biota	3,000–5,000	1,000–2,000		30,000–40,000			5,000–7,000		
Soil invertebrates	3,000–5,000			20,000–30,000			3,000–5,000		
Plants	1,000–2,000			3,000–5,000			700–1,000		
American robin	1,000–2,000								
River otter									
Aquatic biota									
Short-tailed shrew									
Great blue heron									
Red-tailed hawk									

[a] Atmospheric Stability Class.

[b] Windspeed measured at 10 meters.

Note: Shaded cells denote no exceedance of the appropriate benchmark. The ranges in this table indicate that there is uncertainty in the predicted distances to which the various benchmarks are exceeded. The distances downwind at which the various concentrations are first encountered can conservatively be set to 0. To convert meters to feet, multiply by 3.281.

Key: m/s=meters per second; SL=severity level.

Table 4–20 shows the following for an intentionally initiated railcar fire with dry deposition:

- No receptors would be exposed at the SL-IV level.
- Sediment-dwelling biota could be exposed up to SL-III levels, but only in Atmospheric Stability Class A with a low windspeed, and then out to no more than 2,000 meters (6,600 feet).
- Soil invertebrates, plants, and the American robin could be exposed at the SL-II level to considerable distances downwind.

Table 4–21. Summary of Potential Exposure of Receptors to Consequence Severity Levels II, III, and IV – Intentionally Initiated Railcar Spill with Fire and Rain

Ecological Receptor	Distance (meters) to Which Benchmark is Exceeded (A[a], 1.5 m/s[b])			Distance (meters) to Which Benchmark is Exceeded (D[a], 4.5 m/s[b])			Distance (meters) to Which Benchmark is Exceeded (F[a], 1.5 m/s[b])		
	SL-II	**SL-III**	**SL-IV**	**SL-II**	**SL-III**	**SL-IV**	**SL-II**	**SL-III**	**SL-IV**
Sediment-dwelling biota	20,000–30,000	5,000–7,000	3,000–5,000	>40,000[c]	10,000–20,000	5,000–7,000	30,000–40,000	10,000–20,000	10,000–20,000
Soil invertebrates	20,000–30,000	3,000–5,000	2,000–3,000	>40,000[c]	7,000–10,000	3,000–5,000	30,000–40,000	10,000–20,000	7,000–10,000
Plants	10,000–20,000	1,000–2,000	300–500	20,000–30,000	2,000–3,000	1,000–2,000	20,000–30,000	5,000–7,000	2,000–3,000
American robin	7,000–10,000	500–700	200–300	10,000–20,000	2,000–3,000	500–700	10,000–20,000	3,000–5,000	1,000–2,000
River otter	3,000–5,000	100–200		5,000–7,000			7,000–10,000	1,000–2,000	200–300
Aquatic biota	1,000–2,000			3,000–5,000			5,000–7,000	200–300	
Short-tailed shrew	700–1,000			2,000–3,000			3,000–5,000		
Great blue heron	300–500			2,000–3,000			3,000–5,000		
Red-tailed hawk									

[a] Atmospheric Stability Class.

[b] Windspeed measured at 10 meters.

[c] The limit of validity of the model is 40,000 meters (approximately 25 miles).

Note: Shaded cells denote no exceedance of the appropriate benchmark. The ranges in this table indicate that there is uncertainty in the predicted distances to which the various benchmarks are exceeded. The distances downwind at which the various concentrations are first encountered can conservatively be set to 0. To convert meters to feet, multiply by 3.281.

Key: >=greater than; m/s=meters per second; SL=severity level.

Table 4–21 shows that the IDA fire with rain could lead to severe consequences to ecological receptors at considerable distances downwind.

It is not possible to estimate the frequencies of IDAs, so the risks are not tabulated.

4.2.10.2 WIPP Vicinity Section 20

The consequences to ecological resources remain the same for WIPP Vicinity Section 20 as they were presented for WIPP Vicinity Section 10 in Section 4.2.10.1.

4.2.10.3 WIPP Vicinity Section 35

The consequences to ecological resources remain the same for WIPP Vicinity Section 20 as they were presented for WIPP Vicinity Section 10 in Section 4.2.10.1.

4.2.11 Socioeconomics

4.2.11.1 WIPP Vicinity Section 10

Employment during construction is expected to average 18 people for approximately 6 months. Operation of the facility is estimated to require approximately 8 individuals for routine maintenance and support activities during the first 7 years, when higher volumes of shipments are expected, and approximately 5 to 6 individuals thereafter, resulting in a possible increase of the WIPP workforce of approximately 0.7 percent and an increase in the ROI of approximately 0.01 percent. This estimate assumes that new employees would be hired for construction and operation of the new facility rather than drawn from existing onsite personnel. Regardless, neither construction nor operation of a new facility is expected to generate substantial direct or indirect employment. Thus, negligible impacts on socioeconomic conditions (i.e., overall employment and population trends) in the ROI would result from implementing this alternative.

Construction-related transportation, including employee vehicle trips and equipment and materials shipments, is not expected to adversely impact traffic conditions on roads leading to the site. It is assumed that there would be approximately 1.5 employees per vehicle, and every vehicle is counted twice to account for round trips. It is estimated that average construction transportation of 45 vehicles a day could increase the average annual daily traffic count by approximately 0.9 percent on U.S. Route 62 or up to approximately 3.2 percent on Texas State Route 128. Fifty-three percent of these vehicles would be attributed to employee transportation. Impacts on traffic during construction would be minor.

Transportation impacts during the operations phase would include employee vehicle trips and shipments of mercury to the site for storage. Appendix C, Section C.1, provides an estimate of the number of shipments by truck. The additional vehicles due to facility operations are not expected to noticeably increase traffic volumes on roads leading to the site. The greatest impact would be during the first 2 years of operations, when it is estimated that approximately 11 vehicles a day could increase the average annual traffic count by approximately 0.2 percent on U.S. Route 62 or up to approximately 0.9 percent on State Route 128. At the peak of operations, it is estimated that up to 79 shipments would be made in a year. Approximately 96 percent of the additional vehicles would be attributed to employee transportation. Impacts on traffic during operations would be minor.

Traffic in the vicinity of WIPP has experienced temporary increases in volume at various times due to oil production activities; however, these impacts are perceived to be transient in nature and would not impact shipments of mercury to the site.

4.2.11.2 WIPP Vicinity Section 20

The socioeconomic impacts would be identical to those described above in Section 4.2.11.1 for Section 10. Therefore, negligible impacts on socioeconomic conditions in the ROI would result from implementation of this alternative. Impacts on traffic during construction and operation would be minor.

4.2.11.3 WIPP Vicinity Section 35

The socioeconomic impacts would be identical to those described above in Section 4.2.11.1 for Section 10. Therefore, negligible impacts on socioeconomic conditions in the ROI would result from implementation of this alternative. Impacts on traffic during construction and operation would be minor.

4.2.12 Environmental Justice

4.2.12.1 WIPP Vicinity Section 10

None of the block groups within either the 16-kilometer (10-mile) radius or the 3.2-kilometer (2-mile) radius surrounding WIPP Vicinity Section 10 contain a minority or low-income population (see Chapter 3, Section 3.2.11.1). Therefore, no disproportionately high and adverse effects on minority or low-income populations are expected.

4.2.12.2 WIPP Vicinity Section 20

None of the block groups within either the 16-kilometer (10-mile) radius or the 3.2-kilometer (2-mile) radius surrounding WIPP Vicinity Section 20 contain a minority or low-income population (see Chapter 3, Section 3.2.11.2). Therefore, no disproportionately high and adverse effects on minority or low-income populations are expected.

4.2.12.3 WIPP Vicinity Section 35

None of the block groups within either the 16-kilometer (10-mile) radius or the 3.2-kilometer (2-mile) radius surrounding WIPP Vicinity Section 35 contain a minority or low-income population (see Chapter 3, Section 3.2.11.3). Therefore, no disproportionately high and adverse effects on minority or low-income populations are expected.

4.3 CLOSURE

At the end of their useful lives, proposed mercury storage facilities would be subject to closure. This would occur under all the action alternatives. Under the No Action Alternative, existing mercury storage facilities could also be subject to closure.

The DOE mercury storage facilities would be closed in a manner that (1) minimizes the need for further maintenance and (2) controls, minimizes, or eliminates, to the extent necessary to protect human health and the environment, postclosure escape of hazardous waste, hazardous constituents, and contaminated runoff to the ground or surface waters or to the atmosphere from the facility (40 CFR 264.11). All hazardous waste and hazardous waste residues would be removed from the facility, and remaining containers and any soil containing or contaminated with hazardous waste or hazardous waste residues would be decontaminated or removed (40 CFR 264.178).

Closure would be executed in accordance with a detailed closure plan prepared by the facility operator (i.e., by DOE or DOE's authorized contractor). This plan would be subject to review and approval by EPA or the state's environmental protection agency responsible for permitting the long-term elemental mercury storage facility. The closure plan would also contain a credible site-specific cost estimate for these actions to allow DOE to allocate adequate funding such that closure activities could be conducted in a timely manner.

Closure activities would involve removing any remaining elemental mercury in storage and transporting it to suitable treatment, storage, and disposal facilities, as appropriate. In addition, the closure plan would include a detailed description of the steps needed to remove or decontaminate all hazardous waste residues and contaminated containment system components, equipment, structures, and soils during closure (40 CFR 264.112(b)(4)). For example, storage facilities would be inspected for residual mercury contamination. Affected surfaces would then be cleaned with a mercury-absorbing cleaner, as appropriate. Any contaminated materials would be isolated and contained. Workers performing such inspections, testing, and cleanup activities would wear appropriate personal protective gear, including disposable coveralls and air filtration systems.

Contaminated debris or soils, contaminated PPE, and other contaminated materials used for cleanup would be packaged prior to transport off site to a commercial hazardous waste management facility for mercury recovery, recycling, and/or disposal.

It is not possible to project the volume of mercury-contaminated material that may be generated from closure activities. It is likely, however, that much less waste would be generated during closure than during normal facility operations.

Closure activities are expected to occur mostly inside the storage facilities, except for the transport of wastes, and are expected to result in negligible air and water emissions. The cleaning procedure would be designed to minimize the release of any material to the air or water (i.e., mercury or cleaning agent). Therefore, air and water quality impacts from such activities are expected to be minor and human health risks to be low. Because the shipment of wastes resulting from closure should be limited to a few truck trips, impacts on traffic and transportation are expected to be negligible. As there would be little air or water emissions and no land disturbance, no impacts are expected on land use and visual resources, geology and soils, water resources, air quality and noise, ecological resources, cultural and paleontological resources, site infrastructure, or socioeconomics.

Further analysis of alternatives for future use of mercury storage facilities is not possible at this time. Future plans for facility reuse or other disposition would be the subject of additional NEPA analysis, as appropriate.

4.4 CUMULATIVE IMPACTS

The cumulative impacts analysis has been conducted in accordance with the Council on Environmental Quality (CEQ) regulations that implement NEPA and the CEQ handbook, *Considering Cumulative Effects Under the National Environmental Policy Act* (CEQ 1997).

4.4.1 Methodology and Analytical Baseline

The CEQ regulations implementing NEPA define cumulative effects as "impacts on the environment which result from the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 CFR 1508.7). The regulations further explain that "cumulative effects can result from individually minor but collectively significant actions taking place over a period of time." The cumulative impacts assessment is based on both geographic and time considerations.

The ROI used in the cumulative impacts analysis is assumed to be within a 16-kilometer (10-mile) radius of the WIPP Vicinity reference locations. The general approach to the analysis involves the following process:

- Baseline impacts from past and present actions were identified (i.e., these are the baseline conditions described in Chapter 3).
- The potential impacts produced by the management and storage alternatives were identified (as described in Chapter 4).
- Reasonably foreseeable future actions were identified.
- Cumulative impacts of the proposed action at the WIPP Vicinity reference locations were estimated.

The analysis of constructing and operating a mercury storage facility at any of the WIPP Vicinity reference locations determined that impacts on the various resource areas ranged from none to moderate. In keeping with CEQ regulations (40 CFR 1508.7), those resource areas that were predicted to be impacted at greater than a negligible level were evaluated for their potential to contribute to cumulative impacts within the ROI. Where impacts were predicted not to occur or were negligible, cumulative impacts were not analyzed since there would be either no, or only a very small incremental increase in impacts on the resource within the ROI. This does not mean that other site activities associated with these resource areas are negligible; it means that impacts associated with a mercury storage facility would have a negligible contribution to their cumulative impacts.

4.4.2 Potential Cumulative Actions

Actions that may contribute to cumulative impacts at any of the WIPP Vicinity reference locations include on- and offsite projects conducted by government agencies, businesses, or individuals that are within the 16-kilometer (10-mile) ROI. The potential actions listed in Table 4–22 are those that may contribute to cumulative impacts on or within the ROI.

Table 4–22. Actions That May Contribute to Cumulative Impacts

Location	Description	Reference
Waste Isolation Pilot Plant		
Onsite DOE Action	Construction of a facility to dispose of greater-than-Class C low-level radioactive waste. Disposal in a trench, borehole, vault, or underground repository is being considered; one of the locations being considered is WIPP Vicinity Section 35.	DOE 2011b
Offsite Action	No known actions proposed by the U.S. Bureau of Land Management, the predominant land steward within the region of influence.	DOE 2011b
	Also present within the region of influence are a number of oil wells and underground potash mines located in the vicinity of WIPP, including an existing potash mine lease on WIPP Vicinity Section 10 and one oil well in WIPP Vicinity Section 35.	Rutley 2012 DOE 2011b

Key: DOE=U.S. Department of Energy; WIPP=Waste Isolation Pilot Plant.

A fluorine extraction and depleted uranium deconversion facility has been proposed for a site located 22.5 kilometers (14 miles) west of Hobbs, New Mexico (NRC 2012). Analysis of this project has projected that it would generally have small impacts on the environment. Additionally, the facility site is 64 kilometers (40 miles) northeast of the proposed mercury storage site. Thus, this project would not be expected to contribute to cumulative impacts.

4.4.2.1 Waste Isolation Pilot Plant Vicinity Reference Locations

The cumulative impacts of locating a mercury storage facility at any of the WIPP Vicinity reference locations on land use, air quality, infrastructure, and ecological resources were evaluated and predicted to be greater than negligible. Since there were either no or negligible impacts associated with locating a storage facility at any of the WIPP Vicinity reference locations on visual resources, geology and soils, water resources, cultural and paleontological resources, waste management, occupational and public health and safety, socioeconomics, and environmental justice, these resources were not evaluated with respect to their contribution to cumulative impacts.

4.4.2.1.1 Land Use

A mercury storage facility could be constructed at the Section 10 site located just to the north of the WIPP site boundary, the Section 20 site located within the Off-Limits Area, or the Section 35 site located just to the southeast of the WIPP site boundary (see Figure 4–1). At any of the WIPP Vicinity reference locations, the facility would require 3.1 hectares (7.6 acres). The mercury storage facility would be located on relatively undisturbed, rural land. The only major DOE project planned within the 16-kilometer (10-mile) ROI is the proposed greater-than-Class C (GTCC) waste disposal facility, also located in close proximity to WIPP, including an option to locate the facility in Section 35 (see Figure 4–1). Depending on the type of facility selected (i.e., borehole, trench, vault, or underground repository), the GTCC waste disposal facility could require up to 44 hectares (110 acres) (DOE 2011b). A mercury storage facility and GTCC waste disposal facility could be located within the 260-hectare (640-acre) area that comprises Section 35 without interference with operations or compromising the safety and security of these facilities. Also present within the ROI are a number of oil wells and extensive potash mining that occur in the vicinity of WIPP outside of the LWB. Although the mercury storage facility would slightly increase development with the ROI, due to the limited area of disturbance, its contribution to cumulative impacts on land use would be negligible.

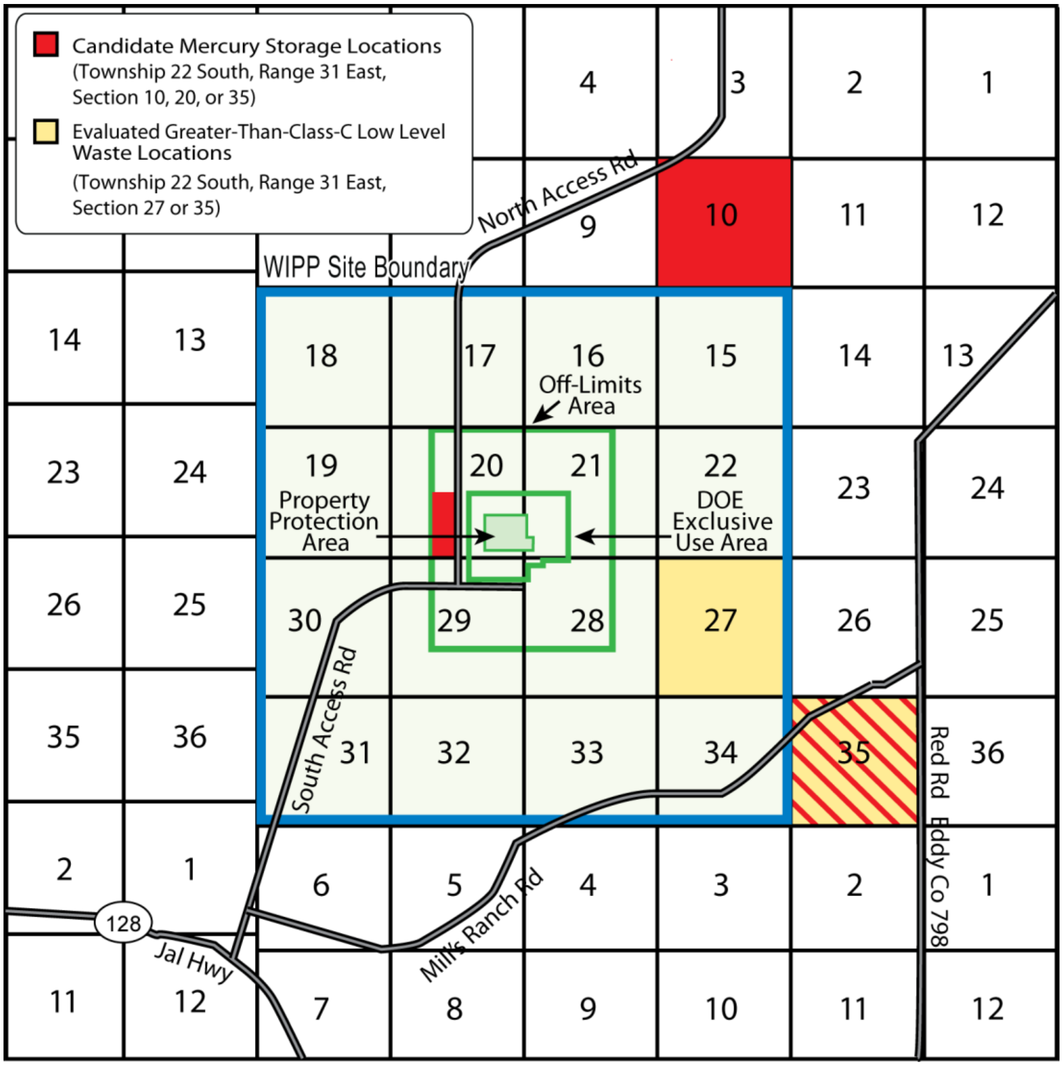

Figure 4–1. Candidate Mercury Storage and Greater-Than-Class C Waste Disposal Facility Locations

4.4.2.1.2 Air Quality

Construction of a mercury storage facility at any of the WIPP Vicinity reference locations would result in minor short-term impacts on air quality. Emissions would occur over a 6-month construction period and are not expected to result in exceedance of the ambient air quality standards. Also, it has been estimated that total peak-year emission rates for construction of a facility for disposal of GTCC waste would be small (DOE 2011b). Thus, due to the projected low levels of emissions and the fact that peak air pollutant concentrations from the two proposed facilities would likely occur at different times, the mercury storage facility would be unlikely to contribute to cumulative air quality impacts.

Exposures to the public from small amounts of mercury vapor emitted from storage containers or residual contamination during operation of a mercury storage facility are expected to have a negligible effect on public health. Further, since such emissions are not expected from other activities within the ROI, there would be no cumulative impacts related to mercury emissions.

Transportation of mercury to a storage facility at any of the WIPP Vicinity reference locations would result in minor short-term air quality impacts; as is the case for construction, these impacts are not likely to overlap in place and time with other projects and activities within the ROI. Since transportation-related air quality impacts associated with mercury storage and other activities within the ROI would be short term and are not expected to substantially change existing baseline conditions, their contribution to cumulative impacts would be negligible.

4.4.2.1.3 Site Infrastructure

Construction and operation of a mercury storage facility are not expected to appreciably increase demands on the transportation systems leading to the WIPP Vicinity reference locations. A maximum of 79 shipments would be made to the proposed mercury storage facility during the peak year of operation (see Appendix C). Depending on the alternative, the proposed GTCC waste disposal facility would involve 630 to 1,685 truck trips per year during its 20 years of operations (DOE 2011b). Since WIPP received its first shipment of transuranic waste in 1999, WIPP has received 10,244 shipments through 2011, an average of approximately 800 shipments per year (DOE 2012).

Fuel and water requirements during construction and operation of the mercury storage facility would be minimal and would not impact regional supplies. During construction, both would be delivered by truck on an as-needed basis. During operations, fuel oil would continue to be supplied via truck; however, potable water would be supplied through tie-in to the existing water supply at WIPP. Fuel oil needed for construction and operation of the proposed GTCC waste disposal facility would also be delivered by truck and water use would be small, with impacts on the water supply system being negligible (DOE 2011b). Demand for these resources is not expected to impact local or regional supplies. Thus, cumulative impacts on fuel and water supplies are not expected.

Electricity demand during construction of the mercury storage facility would be minimal and would likely be supplied by a diesel-fired generator. However, during operations, electric power requirements would increase the annual electrical energy consumption at the WIPP site, resulting in the need to provide a new service connection to the Xcel Energy powerline that is separate from the electrical substation that supports WIPP operations (see Section 4.2.7). This would lead to a moderate impact on electrical infrastructure. In additional to the proposed mercury storage facility and WIPP, the proposed GTCC waste disposal facility would create a small increase in the electrical energy demand (DOE 2011b). However, the increase in electric power demand from these projects is not expected to have a cumulative impact on the ability of Xcel Energy to supply power within the ROI.

4.4.2.1.4 Ecological Resources

None of the WIPP Vicinity reference locations have been disturbed by current development, and each exhibits terrestrial resources common to the area (see Chapter 3, Section 3.2.5.1). Construction of a mercury storage facility would result in the loss of 3.1 hectares (7.6 acres) of desert grassland and short-grass prairie habitat. There are no wetlands or aquatic habitat at any of the sites, nor have any federally threatened or endangered species or critical habitat been identified. Depending on the type of facility selected (i.e., borehole, trench, vault, or underground repository), the GTCC waste disposal facility could disturb up to 44 hectares (110 acres) of similar habitat within and adjacent to the WIPP site boundary. Although mercury storage facility construction would remove a small area of habitat, its contribution to cumulative impacts on terrestrial resources would be negligible. Due to the lack of occurrence of wetlands, aquatic resources, or threatened or endangered species within the potential development sites, the new facility would not contribute to cumulative impacts on those resources.

4.5 MITIGATION MEASURES

This section summarizes the mitigation measures that could be used to avoid or reduce environmental impacts resulting from implementation of the alternatives, as described in the preceding sections. As specified in CEQ's NEPA regulations (40 CFR 1508.20), mitigation includes the following:

- Avoiding impacts altogether by not taking a certain action or parts of an action
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation
- Rectifying impacts by repairing, rehabilitating, or restoring the affected environment
- Reducing or eliminating impacts over time by preserving and maintaining the affected environment throughout the duration of the action
- Compensating for impacts by replacing or providing substitute resources or environments

Following the completion of an environmental impact statement and its associated Record of Decision (ROD), DOE is required to prepare a mitigation action plan that addresses any mitigation commitments expressed in the ROD (10 CFR 1021.331). If the ROD contains no mitigation commitments, a mitigation action plan is not required. The mitigation action plan would explain how certain measures would be planned and implemented to mitigate any adverse environmental impacts identified in the ROD. The mitigation action plan would be prepared before DOE would take any action requiring mitigation.

As described throughout this chapter, the impacts of construction and normal operations of the DOE-designated mercury storage facility(ies) would be negligible to minor and would not require mitigation to reduce impacts to acceptable levels. Activities associated with the establishment of a new mercury storage facility(ies) would follow standard procedures for minimizing construction impacts on such resources as air quality and surface water, as well as operational impacts on public health and safety, including accident prevention. These practices are required by Federal and state licensing and permitting requirements, as noted throughout this chapter and further discussed in Chapter 5. Further, DOE has considered mitigation in the formulation of the alternatives as currently proposed, which serve to prevent or reduce short- and/or long-term environmental impacts. Specifically, site location, design, and construction of the proposed new mercury storage facility(ies) would be conducted in accordance with the standards specified under 40 CFR 264 for hazardous waste treatment, storage, and disposal facilities. These include, but are not limited to, the location and performance standards for new RCRA-permitted facilities under 40 CFR 264.18 that address seismic considerations, floodplains, and other natural hazards.

Nonetheless, mitigation measures could be used to further reduce potential mercury vapor emissions from mercury storage facility(ies) operations. Although mercury vapor emissions from the Storage Area of the facility during normal operations would be below all applicable standards, emissions could be further reduced by using mercury vapor filters and by lowering the temperature of the air in the storage building through the use of air conditioning. Filters would actively remove mercury vapor as air passes through the filters, and air conditioning would reduce mercury vapor emissions because cooler temperatures result in less mercury vaporization. Although mercury vapor filters could be used to further reduce mercury emissions, these filters would be expensive to operate and maintain in order to achieve relatively small decreases in emissions that would already be low. They would also generate additional hazardous waste (e.g., spent filters) requiring disposal. Although air conditioning could be used to further reduce mercury vapor emissions, air conditioning equipment would be expensive both to install and to operate (e.g., maintenance and energy costs) and would consume electrical energy that may be generated by burning greenhouse-gas-generating fossil fuels.

As a mitigation measure, emergency response planning for a facility accident would take into account the potential for individuals to be linguistically isolated and implement appropriate steps to ensure timely communication of hazards that may adversely affect such offsite individuals. DOE works closely with Federal, state, and local agencies that would provide first responders. Emergency response planning would take into account the applicable procedures in DOE's *Emergency Management Guide* (DOE Guide 151.1-4).

Irrespective of frequency, should a transportation accident occur within a few kilometers upwind of a body of water used by subsistence fishermen, it would be advisable as a mitigation measure to monitor the levels of methylmercury in fish and to post appropriate advisories to ensure that subsistence fishermen do not consume amounts of methylmercury that might cause adverse health effects. Subsequent to mandated reporting of any such release by the shipper of the elemental mercury, the appropriate state environmental agency would be responsible for determining appropriate fish consumption advisories and monitoring requirements of mercury concentrations in waters and fish stocks.

4.6 RESOURCES

This section describes any unavoidable adverse environmental impacts that could result from siting a mercury storage facility(ies) at any of the candidate sites evaluated in the January 2011 *Mercury Storage EIS* and in this draft SEIS; irreversible and irretrievable commitments of resources; and the relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity. Unavoidable adverse environmental impacts are impacts that would occur after implementation of all feasible mitigation measures. A resource commitment is considered irreversible when direct and indirect impacts from its use limit future use options. Irreversible commitments apply primarily to nonrenewable resources, such as cultural resources, and also to those resources that are renewable only over long periods of time, such as soil productivity. A resource commitment is considered irretrievable when the use or consumption of the resource is neither renewable nor recoverable for future use. Irretrievable commitment applies to the loss of production, harvest, or natural resources. The relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity addresses issues associated with the condition and maintenance of existing environmental resources used to support the proposed action and the function of these resources after their use.

4.6.1 Unavoidable Adverse Environmental Impacts

Siting a mercury storage facility(ies) at any of the candidate sites considered in the January 2011 *Mercury Storage EIS* and this draft SEIS for the long-term storage of elemental mercury would result in unavoidable adverse impacts on the human environment. In general, these impacts are expected to be negligible overall and would arise from incremental impacts attributed to the construction and normal operations of new and/or modified mercury storage facilities at any of the candidate sites.

As further described in this chapter, construction of a new mercury storage facility(ies) at any site would result in land disturbance, generation of fugitive dust and noise, soil erosion, consumption of utilities and natural resources, and increased vehicle traffic that would be unavoidable, even with the application of best management and conservation practices. These activities would generally occur in or adjacent to previously disturbed areas with existing complementary land uses. Construction activities are expected to have negligible impacts overall and would be temporary in nature (i.e., lasting up to 6 months). A full-size mercury storage facility would occupy up to 3.1 hectares (7.6 acres) of land over the long term (assumed, for purposes of analysis, to be up to 40 years). Activities performed to modify or upgrade existing facilities for long-term storage of elemental mercury would also result in some unavoidable adverse impacts that would generally be similar to but less than those noted above for construction of a new storage facility.

Operations of new or modified facilities at any of the candidate sites would have minimal unavoidable adverse impacts on air quality associated with semiannual testing of diesel fuel–fired emergency generators. Emissions would also be generated from employee vehicle trips, relatively infrequent delivery vehicle trips, and truck trips for transporting elemental mercury to the facility(ies). The associated emissions would not measurably degrade ambient air quality or jeopardize compliance with air quality standards around any candidate site.

Also unavoidable would be the generation of small amounts of hazardous and industrial waste associated with normal facility(ies) operations. Any waste generated during operations would be collected, packaged, and eventually removed for suitable recycling or disposal in accordance with applicable EPA and/or state regulations. Sanitary wastewater would also be generated and disposed of through onsite sewage disposal systems or municipal sanitary sewer systems, as appropriate for each site.

Under the No Action Alternative, operation of non-DOE mercury storage facilities and Y–12 would also result in some unavoidable adverse impacts in terms of air emissions, consumption of utility resources, and waste generation. However, at some storage locations, mercury storage may necessitate that the owners provide for expanded storage, resulting in additional construction and operational environmental impacts (see Chapter 4, Section 4.2, of the January 2011 *Mercury Storage EIS*).

Future closure of mercury storage facilities (see Chapter 4, Section 4.10, of the January 2011 *Mercury Storage EIS*) would result in the one-time generation of waste material. Such waste would be collected, packaged as appropriate, and removed for suitable recycling or disposal in accordance with applicable EPA and/or state regulations.

4.6.2 Irreversible and Irretrievable Commitment of Resources

This section summarizes the major irreversible and irretrievable commitments of resources that have been identified under each alternative considered in the January 2011 *Mercury Storage EIS* and this draft SEIS. Implementation of any of the alternatives considered for long-term storage of elemental mercury, including the No Action Alternative, would entail the commitment of land, energy (e.g., electricity, fossil fuels), water, construction materials (e.g., steel, concrete), geologic resources, equipment, human labor, and capital. In general, the commitments of energy, materials, labor, and capital would be irreversible and, once committed, these resources would be unavailable for other purposes. Capital would be committed permanently. In addition, the generation of waste would indirectly entail the irreversible and irretrievable commitment of resources due to the land required for landfill space, utilities consumed to operate disposal facilities, and human labor.

Key resource commitments for construction and operation of a new mercury storage facility(ies) are presented in Appendix C. The No Action Alternative would entail the least commitment of land, material, and energy resources based on the analyses presented in Chapter 4 of the January 2011 *Mercury Storage EIS*.

4.6.2.1 Land Use

Operation of modified existing facilities or proposed new facilities for mercury storage would require the commitment of land to the prescribed use over the 40-year period of analysis. Thus, the commitment of land is irreversible in the short term, but not necessarily irreversible over the long term. Over the long term, the land that would be occupied by either existing or proposed facilities could ultimately be returned to open space uses if buildings, roads, and other structures were removed and the land revegetated. Alternatively, the facilities could be modified for use in other DOE programs.

4.6.2.2 Energy and Water

Energy expended directly or indirectly to support long-term storage of mercury would be in the form of electricity to operate equipment and fossil fuels to operate equipment and vehicles. Electricity and fuels would be purchased from commercial sources. Consumption of electricity and fossil fuels would be an irretrievable commitment of nonrenewable resources. Water consumed for construction and operation would constitute an irreversible commitment and would not be available for other uses. Water would be obtained via each site's existing water supply system, as described in this chapter. However, these resources are readily available, and the amounts projected to be required are not expected to deplete available supplies.

4.6.2.3 Materials and Geologic Resources

The irreversible and irretrievable commitment of materials, equipment, and other resources comprises those used in the modification or new construction of mercury storage facilities at the candidate sites. This includes materials that cannot be recovered or recycled, materials that are contaminated and cannot be effectively decontaminated, and materials consumed or reduced to unrecoverable forms of waste. Principal construction materials would include steel, concrete (a product of cement, sand, gravel, and other minerals), asphalt, and gravel, although other materials such as wood, plastics, and other metals would also be used (see Appendix C). For practical purposes, materials including concrete, steel, and other materials incorporated into the framework of existing or new facilities would be unrecoverable and irretrievably lost. Certain materials and equipment used during operation of the storage facilities could be recycled when the facilities are closed. All materials and commodities would be procured from commercial vendors in the regions surrounding each candidate site, and all are commonly available materials that are not expected to be in short supply in the affected regions.

4.6.2.4 Waste

Mercury storage operations at any candidate site would generate nonrecyclable waste streams, such as solid waste, sanitary wastewater, and potentially hazardous (mercury-contaminated) waste. The treatment and disposal of any solid waste would cause irreversible and irretrievable commitments of landfill space, energy, and materials. Hazardous waste disposal would require an irreversible and irretrievable commitment of land. This space would be unavailable for wastes from other sources. Sanitary wastewater generated and discharged to treatment systems and/or to the land would eventually be recycled through the ecosphere and would not entail a permanent commitment or impairment of resources.

4.6.3 Relationship Between Short-Term Uses of the Environment and Maintenance and Enhancement of Long-Term Productivity

Under each action alternative, adverse impacts from short-term use of resources would be balanced by long-term benefits and enhancement of long-term productivity associated with the reduction of elemental mercury in the environment. Each of the action alternatives would entail similar relationships between local, short-term uses of the environment and the maintenance and enhancement of long-term productivity. However, there would be differences in the relative magnitude of the short-term uses based on differences in location, including use of existing and/or new storage facilities, utility and transportation infrastructure availability, and labor availability and utilization. Regardless, upon completion of mercury storage activities at any of the candidate locations, land and facilities could be returned to other uses, including long-term productive uses.

Under the No Action Alternative, environmental resources have already been committed to activities at Y–12 and at some existing source locations. There could be environmental impacts at non-DOE storage sites in the short term associated with the need to provide for new or increased storage requirements. Such activities could adversely affect the long-term productivity of the environment.

4.7 REFERENCES

CEQ (Council on Environmental Quality), 1997, *Considering Cumulative Effects Under the National Environmental Policy Act*, Executive Office of the President, Washington, DC, January.

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CHAPTER 5

ENVIRONMENTAL LAWS, REGULATIONS, PERMITS, AND OTHER POTENTIALLY APPLICABLE REQUIREMENTS

CHAPTER 5
ENVIRONMENTAL LAWS, REGULATIONS, PERMITS, AND OTHER POTENTIALLY APPLICABLE REQUIREMENTS

> Chapter 5 presents the laws, regulations, permits, and other requirements that could potentially apply to the proposed action. The proposed action would be implemented in accordance with all applicable Federal, state, and local laws and regulations and in full compliance with U.S. Department of Energy policies, orders, procedures, and guidance documents. Consultations have been initiated with Federal and state agencies in accordance with applicable requirements.

5.1 INTRODUCTION

In compliance with the National Environmental Policy Act (NEPA) of 1969, as amended, Council on Environmental Quality (CEQ) NEPA regulations (40 CFR 1500–1508), and U.S. Department of Energy (DOE) NEPA implementing procedures (10 CFR 1021), DOE must consider applicable environmental regulations and any permitting or licensing requirements (including permit applications for new permits or permit modifications for existing permits) when evaluating alternatives for implementing the proposed action. The initial Notice of Intent (NOI) announcing the preparation of the January 2011 *Long-Term Management and Storage of Elemental Mercury Environmental Impact Statement (Mercury Storage EIS)* (DOE 2011), issued on July 2, 2009 (74 FR 31723), and the NOI announcing the preparation of this supplement to the January 2011 *Mercury Storage EIS*, issued on June 5, 2011 (77 FR 33204), identify that one of the issues to be considered is compliance with all applicable Federal, state, and local statutes and regulations and required Federal and state environmental permits, consultations, and notifications. Chapter 5 of the January 2011 *Mercury Storage EIS* discusses a range of potentially applicable Federal laws, regulations, and laws from the states where the potential candidate sites evaluated in the January 2011 *Mercury Storage EIS* are located. This chapter includes a range of potentially applicable Federal laws and regulations, and laws from New Mexico applicable to the three candidate sites identified near the Waste Isolation Pilot Plant (WIPP) that are evaluated in this *Draft Long-Term Management and Storage of Elemental Mercury Supplemental Environmental Impact Statement*: two outside the land withdrawal boundary (LWB) and one within the LWB in the vicinity of WIPP. These locations will be referred to individually as "WIPP Vicinity Section 10," "WIPP Vicinity Section 20," or "WIPP Vicinity Section 35," or together as the "WIPP Vicinity reference locations." State statutes typically mirror the Federal statutes in that they are required to be, at a minimum, equally as stringent.

This chapter identifies major requirements that could be applicable to the proposed action, which is to designate and operate a facility(ies) for the long-term management and storage of elemental mercury generated within the United States.[1] Section 5.2 describes the laws, regulations, and other applicable requirements that set environmental protection requirements that could apply to the WIPP Vicinity reference locations in New Mexico. Section 5.3 discusses potentially applicable permits. Section 5.4 describes applicable consultations.

5.2 LAWS, REGULATIONS, AND OTHER POTENTIALLY APPLICABLE REQUIREMENTS

This section describes the Mercury Export Ban Act of 2008 and the Waste Isolation Pilot Plant Land Withdrawal Act of 1992. Chapter 5, Sections 5.1 and 5.2, of the January 2011 *Mercury Storage EIS* (DOE 2011) describe additional Federal laws, regulations, and other potentially applicable requirements as they relate generally to Federal actions, specifically to elemental mercury management and storage, and to the construction and operation of a long-term management and storage facility(ies) for elemental

[1] Unless the context indicates otherwise, elemental mercury is referred to hereafter simply as "mercury" in this supplemental environmental impact statement.

mercury at any of the candidate sites, including the WIPP Vicinity reference locations. These additional Federal laws, regulations, and potentially applicable requirements are identified in the January 2011 *Mercury Storage EIS*. Mercury is addressed in numerous U.S. Environmental Protection Agency regulations, including regulations pertaining to air quality, water quality, hazardous waste management, and pollution prevention.

The Mercury Export Ban Act of 2008

On October 14, 2008, President George W. Bush signed into law the Mercury Export Ban Act of 2008 (the Act), Public Law No. 110-414. The overarching purpose of the Act is "to prohibit the sale, distribution, transfer, and export of elemental mercury."

Section 3 of the Act amends the Toxic Substances Control Act (TSCA) to prohibit any Federal agency from selling, distributing, conveying, or transferring to any other Federal, state, or local agency, or any private entity or individual, any elemental mercury under the control or jurisdiction of the Federal agency, effective beginning on the date of enactment of the Act. The Act sets forth two exceptions to this prohibition: (1) "a transfer between Federal agencies of elemental mercury for the sole purpose of facilitating storage of mercury to carry out this Act; or" (2) "a conveyance, sale, distribution, or transfer of coal."

Section 4 amends TSCA to prohibit the export of elemental mercury from the United States effective January 1, 2013. Section 4 also establishes certain reporting requirements and provides an essential use exemption.

Section 5, entitled "Long-Term Storage," directs DOE to designate a facility(ies) for the long-term management and storage of elemental mercury generated within the United States. It states that DOE's facility(ies) must be operational by January 1, 2013, and ready to accept custody of elemental mercury delivered to such a facility(ies). The Act also requires DOE to assess fees based upon the *pro rata* costs of long-term management and storage of the elemental mercury. The Act establishes October 1, 2012, as the date on which DOE must make public the fee schedule. Section 5(d)(1) further provides that the elemental mercury stored at the facility(ies) is subject to the requirements of the Solid Waste Disposal Act (SWDA), including the hazardous waste management requirements under Subtitle C of the SWDA; however, the Act provides that the elemental mercury stored at the DOE facility(ies) "shall not be subject to the storage prohibition of Section 3004(j) of the SWDA."

DOE's designation of a facility(ies) for the purpose of long-term management and storage of elemental mercury is a Federal action that is governed by NEPA and is the basis for DOE's preparation of this supplemental environmental impact statement.

Federal Land Policy and Management Act of 1976, as amended

On October 21, 1976, President Gerald R. Ford signed into law the Federal Land Policy and Management Act (FLPMA) of 1976, Public Law No. 94-579. FLPMA governs the way in which the public lands administered by the U.S. Bureau of Land Management (BLM) are managed. The passage of FLPMA is called the "organic act" because it consolidated many of BLM's responsibilities. Various land and resource management policies, statutes, and authorities were established, amended, or repealed by FLPMA. FLPMA addresses land use planning, land acquisition, fees and payments, administration of Federal land, range management, and rights-of-way on Federal land. FLPMA also establishes the concept of multiple use of public lands, which means they are utilized in a combination that will best meet present and future needs.

Two of the WIPP vicinity candidate sites considered for the long-term management and storage of elemental mercury are in Section 10 and Section 35, areas located outside the WIPP LWB. BLM-administered land outside the WIPP LWB used for construction and operations of a long-term management and storage facility for elemental mercury would be withdrawn from all forms of entry, appropriation, and disposal under the FLPMA and reserved for the purposes of operating a mercury storage facility, as was done for the WIPP land withdrawal.

The Waste Isolation Pilot Plant Land Withdrawal Act of 1992, as amended

On October 30, 1992, President George H.W. Bush signed into law the Waste Isolation Pilot Plant Land Withdrawal Act of 1992, Public Law No. 102-579, subsequently amended by the Waste Isolation Pilot Plant Land Withdrawal Act Amendments of 1996, Public Law No. 104-201 (WIPP LWA). The WIPP LWA withdrew land from the public domain for the purpose of creating and operating WIPP, the geologic repository in New Mexico designated as the national disposal site for transuranic waste generated by atomic energy defense activities.

One of the WIPP vicinity candidate sites considered for the long-term management and storage of elemental mercury is in Section 20, an area located inside the WIPP LWB. Land inside the WIPP LWB used for construction and operations of a long-term management and storage facility for elemental mercury would be subject to the provisions of the WIPP LWA (as discussed for WIPP) and may require Federal legislation.

5.3 PERMITS AND NOTIFICATIONS

This section summarizes the general requirements for either permit modification or permit application for the WIPP Vicinity reference locations, noting that there is a degree of uncertainty in the permitting process. Regulatory agencies responsible for applicable permitting at these locations are also identified. Table 5–1 summarizes the existing and potential new environmental permits for air, water, and hazardous waste for the WIPP Vicinity reference locations.

Regulatory notification to either the U.S. Environmental Protection Agency or the authorized New Mexico regulatory compliance divisions of the intent to provide long-term storage and management of elemental mercury and any treatment, storage, and disposal (TSD) facility design changes, modifications, etc., would be required. Communication and coordination with all applicable regulatory agencies, including site-specific discussions and facility-specific permitting requirements (application for new permits or modification to existing permits), will be required for the long-term management and storage of elemental mercury at the selected site. For example, because of the requirement that the elemental mercury storage facility(ies) operate under a permit pursuant to Section 3005 of SWDA, hazardous waste TSD facility requirements and all associated permitting will be necessary.

WIPP has experience applying for and operating under air quality and hazardous waste facility permits. The WIPP Vicinity reference locations would require new permits or modifications to existing permits, where appropriate. These new or modified permits would be subject to approval by the applicable regulatory agency.

Table 5–1. Environmental Permit Summary

Permits	WIPP Vicinity Reference Locations New Mexico
Air	
Existing Permit(s)	None for WIPP Vicinity reference locations. However, WIPP has an Air Quality Permit (310-M-2) issued by the State of New Mexico for the operation of two emergency generators.
New Permit Application	Yes, State
Permit Modification	No
Regulatory Notification	Yes, State
Water	
National Pollutant Discharge Elimination System	
Existing Permit(s)	No
New Permit Application	Yes, State
Permit Modification	No
Regulatory Notification	Yes, State
General Construction Stormwater Permit	
Existing Permit(s)	No
New Permit Application	Yes, State
Permit Modification	No
Regulatory Notification	Yes, Federal
Hazardous Waste	
Existing Permit(s)	None for WIPP Vicinity reference locations. However, WIPP has a Hazardous Waste Facility Permit (NM 4890139088) issued by the State of New Mexico for mixed transuranic waste storage and disposal.
New Permit Application	Yes, State
Permit Modification	No
Regulatory Notification	Yes, State

Potential permits that may be required for the WIPP Vicinity reference locations are described below.

***New Mexico Statutes Annotated* (NMSA), Chapter 74, Environmental Improvement, Article 2, Air Pollution, and Implementing Regulations at *New Mexico Administrative Code* (NMAC), Title 20, Environmental Protection, Chapter 2, Air Quality.** Establishes air quality standards and requires a permit prior to construction or modification of an air contaminant source. Also requires an operating permit for major producers of air pollutants and imposes emission standards for hazardous air pollutants.

NMSA, Chapter 74, Article 6, Water Quality, and Implementing Regulations at NMAC, Title 20, Chapter 6, Water Quality. Establishes water quality standards and requires a permit prior to the construction or modification of a water discharge source.

NMSA, Chapter 74, Article 9, Solid Waste Act, and Implementing Regulations at NMAC, Title 20, Chapter 9, Solid Waste. Requires a permit prior to construction or modification of a solid waste disposal facility.

NMSA, Chapter 74, Article 4, Hazardous Waste, and Implementing Regulations at NMAC, Title 20, Chapter 4, Hazardous Waste. Establishes permit requirements for construction, operation, modification, and closure of a hazardous waste management facility and establishes state standards for cleanup of releases from leaking underground storage tanks.

Environmental Oversight and Monitoring Agreement. Agreement in Principle between DOE and the State of New Mexico. Provides DOE support for state activities in environmental oversight, monitoring, access, and emergency response.

5.4 CONSULTATIONS

NEPA and CEQ regulations require DOE and other Federal agencies to consult with Federal agencies, federally recognized tribal governments, and state and local agencies with jurisdiction or special expertise regarding any environmental impact of Federal actions. Agencies involved include those with authority to issue applicable permits, licenses, and other regulatory approvals, as well as those responsible for protecting significant resources (e.g., endangered species, critical habitats, or historic resources). The majority of consultations are in the areas of ecological and cultural resources, and American Indian heritage, religious and cultural areas. In addition, DOE policies require consultation with American Indian tribal governments with regard to any DOE action that might affect any property to which these governments attach religious or cultural importance. DOE is committed to fulfilling its responsibilities of providing open communication and full consultations with federally recognized tribal governments.

If a proposed action has the potential to disturb sensitive species or habitats, ecological resource consultations with the appropriate agencies are required. If a proposed action has the potential to disturb or disrupt a cultural resource or an archaeological site, cultural resource consultations are required.

If, at any time during implementation of a proposed action, an inadvertent discovery is made with potential impacts on ecological, cultural, or American Indian artifacts or materials or human remains, all activity would cease until consultation with affected agencies, organizations, and/or governments is completed. Actions would not resume until a plan is established to mitigate any potential adverse impacts and all applicable consultations have been completed. Table 5–2 provides a summary of consultations pertaining to the WIPP Vicinity reference locations. Chapter 5, Table 5–4, of the January 2011 *Mercury Storage EIS* (DOE 2011) presents a summary of consultations for all other candidate sites.

Table 5–2. Summary of Consultations[a]

Subject	Consultation Letter Addressed to
Ecological Resources	Mr. Wally Murphy, Field Supervisor U.S. Fish and Wildlife Service New Mexico Ecological Services Office 2105 Osuna NE Albuquerque, NM 87113
	Matthew Wunder, Division Chief Conservation Services New Mexico Department of Game and Fish P.O. Box 25112 Santa Fe, NM 87504
	Tony Delfin, State Forester Forestry Division 1220 South Saint Francis Drive Santa Fe, NM 87505
Cultural Resources	Jan Biella, State Historic Preservation Officer Historic Preservation Division Department of Cultural Affairs Bataan Memorial Building 407 Galisteo Street, Suite 236 Santa Fe, NM 87501

[a] Copies of letters are presented in Appendix I.

5.4.1 Consultations Regarding Ecological Resources

Consultations with applicable organizations regarding ecological resources for the WIPP Vicinity reference locations have been initiated (see Table 5–2). The consultations support the process to obtain input regarding the potential for ecological impacts on threatened, endangered, or otherwise protected species or habitats.

5.4.2 Consultations Regarding Cultural Resources

Consultation with the New Mexico State Historic Preservation Officer has been initiated for the WIPP Vicinity reference locations (see Table 5–2). The consultation supports the process to obtain input regarding the potential for impacts on cultural resources.

5.5 REFERENCES

DOE (U.S. Department of Energy), 2011, *Final Long-Term Management and Storage of Elemental Mercury Environmental Impact Statement*, DOE/EIS-0423, Office of Environmental Management, Washington, DC, January.

CHAPTER 6
GLOSSARY

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GLOSSARY

accident – An unplanned sequence of events resulting in undesirable consequences, such as the release of hazardous material to the environment.

active fault – A fault that is likely to have another earthquake sometime in the future. Faults are commonly considered to be active if they have moved one or more times in the last 10,000 years. In assessing seismic hazard as part of the U.S. Geological Survey's National Earthquake Hazard Reduction Program, faults for which there is surface evidence of tectonic activity during the Quaternary Period are considered active.

acute – Severe but of short duration; not chronic.

Acute Exposure Guideline Levels (AEGLs) – Threshold values published by the National Research Council and National Academy of Sciences for use in chemical emergency planning, prevention, and response programs. AEGLs represent threshold exposure limits for the general population, including susceptible individuals, and are developed for exposure periods of 10 minutes, 30 minutes, 1 hour, 4 hours, and 8 hours. AEGL values are defined for varying degrees of severity of toxic effects, as follows:

> **AEGL-1:** The airborne level of concentration of a substance above which the exposed population could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects would not be disabling and would be transient and reversible upon cessation of exposure.
>
> **AEGL-2:** The airborne level of concentration of a substance above which the exposed population could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.
>
> **AEGL-3:** The airborne level of concentration of a substance above which the exposed population could experience life-threatening health effects or death.

air pollutant – Generally, an airborne substance that could, in high-enough concentrations, harm living things or cause damage to materials. From a regulatory perspective, an air pollutant is a substance for which emissions or atmospheric concentrations are regulated or for which maximum guideline levels have been established due to potential harmful effects on human health and welfare.

air quality – The cleanliness of the air as measured by the levels of pollutants relative to the standards or guideline levels established to protect human health and welfare. Air quality is often expressed in terms of the pollutant for which concentrations are the highest percentage of a standard (e.g., air quality may be unacceptable if the level of one pollutant is 150 percent of its standard, even if levels of other pollutants are well below their respective standards).

air quality control region – Geographic subdivisions of the United States designed to deal with pollution on a regional or local level. Some regions span more than one state.

alloy – A mixture containing mostly metals. For example, brass is an alloy of copper and zinc. An amalgam is an alloy (e.g., an amalgam of mainly silver and mercury).

alluvium (alluvial) – Unconsolidated, poorly sorted detrital sediments, ranging from clay to gravel sizes, deposited by streams.

ambient – Surrounding.

ambient air – The atmosphere around people, plants, and structures.

ambient air quality standards – Regulations prescribing the levels of airborne pollutants that may not be exceeded during a specified time in a defined area.

American Indian Religious Freedom Act of 1978 – An act that protects and preserves for American Indians their traditional religious rights, including the rights of access to religious sites, use and possession of sacred objects, and worship through traditional ceremonies and rites.

anthropogenic – Caused or produced by humans.

aquatic – Living or growing in, on, or near water.

aquifer – An underground geologic formation, group of formations, or part of a formation capable of yielding a significant amount of water to wells or springs.

aquitard – A relatively less permeable geologic unit that inhibits the flow of water.

Archaeological Resources Protection Act of 1979 – An act protecting cultural resources on federally owned lands. This act requires a permit for archaeological excavations or the removal of any archaeological resources on public or American Indian lands. It also prohibits interstate or foreign trafficking in cultural resources taken in violation of state or local laws and requires Federal agencies to develop plans for surveying lands under their control.

archaeological site – Any location where humans have altered the terrain or discarded artifacts during prehistoric or historic times.

artifact – An object produced or shaped by human beings and of archaeological or historic interest.

artisanal gold mining – A general term used in reference to small-scale mining operations prevalent in some developing countries that employ the crude and highly polluting process of mixing mercury with sediments from river bottoms and adjacent areas to extract gold.

atmospheric dispersion – The distribution of pollutants from their source into the atmosphere by wind, turbulent air motion attributable to solar heating of Earth's surface, or air movement over rough terrain and variable land and water surfaces.

attainment area – An area considered to have air quality as good as or better than the National Ambient Air Quality Standards for a given pollutant. An area may be in attainment for one pollutant and nonattaining for others. (See also *nonattainment area*.)

basalt – The most common volcanic rock, dark gray to black in color, high in iron and magnesium and low in silica. It is typically found in lava flows.

baseline – A quantitative expression of conditions, costs, schedule, or technical progress that constitutes the standard against which to measure the performance of an effort. For National Environmental Policy Act evaluations, baseline is defined as the existing environmental conditions against which impacts of the proposed action and its alternatives can be compared. The environmental baseline is the site environmental conditions as they exist or are estimated to exist in the absence of the proposed action.

basin – Geologically, a circular or elliptical downwarp or depression in the Earth's surface that collects sediment. Younger sedimentary beds occur in the center of basins. Topographically, a depression into which water from the surrounding area drains.

bedding plane – Surface separating layers of sedimentary rocks and deposits. Each bedding plane marks the termination of one deposit and the beginning of another of different character, such as a surface separating a sandstone bed from an overlying mudstone bed. Rock tends to break or separate readily along bedding planes.

bedrock – The solid rock that lies beneath soil and other loose surface materials.

bioaccumulation – The accumulation or buildup of contaminants in living systems by biological processes. Methylmercury can bioaccumulate in animal tissue.

bioaccumulation factor – The ratio of the concentration of a chemical in an organism to its concentration in a medium to which the organism is exposed.

bound – An analysis of impacts or risks such that the result overestimates or describes a limit on (i.e., "bounds") potential impacts or risks.

bounding analysis – An analysis designed to overestimate or determine an upper limit to potential impacts or risks.

cancer – The name given to a group of diseases characterized by uncontrolled cellular growth where the cells have invasive characteristics that enable the disease to transfer from one organ to another.

carbon dioxide – A colorless, odorless, nonpoisonous gas that is a normal component of the ambient air and an expiration product of normal animal life.

carbon monoxide – A common air pollutant formed by incomplete combustion; a colorless, odorless gas that is toxic if breathed in high concentrations over an extended period; when humans are exposed to lower concentrations, it can result in chronic effects.

carbonate – A sedimentary rock made mainly of calcium carbonate ($CaCO_3$). Limestone and dolomite are common carbonate sedimentary rocks. (See *dolomite* and *limestone*.)

carcinogen – A substance or agent that produces or incites cancerous growth.

chronic – Lasting for a long period or marked by frequent recurrence.

Class I area – A specifically designated area where the degradation of air quality is stringently restricted (e.g., many national parks, wilderness areas). (See *Prevention of Significant Deterioration*.)

Class II area – Most of the country that is not designated as Class I is designated as Class II. Class II areas are generally cleaner than air quality standards require, and moderate increases in new pollution are allowed after a regulatory-mandated impacts review.

clay – The name for a family of finely crystalline sheet silicate minerals that commonly form as a product of rock weathering. Also, any soil particle smaller than or equal to about 0.002 millimeters (0.00008 inches) in diameter.

Clean Air Act – An act mandating and providing for the enforcement of regulations to control air pollution from various sources.

Clean Air Act Amendments of 1990 – Amendments expanding the U.S. Environmental Protection Agency's enforcement powers and adding restrictions on air toxics, ozone-depleting chemicals, stationary and mobile emission sources, and emissions implicated in acid rain and global warming.

Code of Federal Regulations – A publication in codified form of all Federal regulations in force.

colluvium (colluvial) – A loose deposit of rock debris accumulated at the base of a cliff or slope.

conformity – As defined in the Clean Air Act, "the nation's compliance with an implementation plan's purpose of eliminating or reducing the severity and number of violations of the National Ambient Air Quality Standards and achieving expeditious attainment of such standards. Activities in conformity will not (1) cause or contribute to any new violation of any standard in any area, (2) increase the frequency or severity of any existing violation of any standard in any area, or (3) delay timely attainment of any standard or any required interim emission reduction or other milestones in any area."

conglomerate – A sedimentary rock made of rounded rock fragments, such as pebbles, cobbles, and boulders, in a finer-grained matrix. To be classified as a conglomerate, some of the constituent pebbles must be at least about 2 millimeters (one-thirteenth of 1 inch) across.

criteria pollutant – An air pollutant that is regulated by National Ambient Air Quality Standards. The U.S. Environmental Protection Agency must describe the characteristics and potential health and welfare effects that form the basis for setting, or revising, the standard for each regulated pollutant. Criteria pollutants include sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, lead, and two size classes of particulate matter, less than 10 micrometers (0.0004 inches) in diameter, and less than 2.5 micrometers (0.0001 inches) in diameter. New pollutants may be added to, or removed from, the list of criteria pollutants as more information becomes available. (See *National Ambient Air Quality Standards*.) *Note: Sometimes pollutants regulated by state laws are also called criteria pollutants.*

critical habitat – Habitat essential to the conservation of an endangered or threatened species that has been designated as critical by the U.S. Fish and Wildlife Service or the National Marine Fisheries Service following the procedures outlined in the Endangered Species Act and its implementing regulations (50 CFR 424). (See *endangered species* and *threatened species*.)

The lists of critical habitats can be found in Title 50 of the *Code of Federal Regulations*, Sections 17.95 (fish and wildlife) and 17.96 (plants), and in Part 226 (marine species).

cultural resources – Archaeological sites, architectural features, historic resources, traditional-use areas, and American Indian sacred sites.

cumulative impacts – Impacts on the environment that result when the incremental impact of a proposed action is added to the impacts from other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes the other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

day-night average sound level – The 24-hour, A-weighted equivalent sound level expressed in decibels. A 10-decibel penalty is added to sound levels between 10:00 P.M. and 7:00 A.M. to account for increased annoyance due to noise during night hours.

decibel – A unit for expressing the relative intensity of sounds on a logarithmic scale from zero for the average least perceptible sound to about 130 for the average level at which sound causes pain to humans. For traffic and industrial noise measurements, the A-weighted decibel, a frequency-weighted noise unit, is widely used. The A-weighted decibel scale corresponds approximately to the frequency response of the human ear and thus correlates well with loudness.

decibel, A-weighted – A unit of sound measurement that incorporates a metering characteristic and the "A" weighting specified by the American National Standards Institute in S1.4–1983 (R 2001) to account for the frequency response of the human ear.

decontamination – The removal of chemical contamination from facilities, equipment, or soils by washing, heating, chemical or electrochemical action, mechanical cleaning, or other techniques.

deposition – In geology, the laying down of potential rock-forming materials; sedimentation. In atmospheric transport, the settling out on ground and building surfaces of atmospheric aerosols and particles ("dry deposition") or their removal from the air to the ground by precipitation ("wet deposition").

dip – A measure of the angle between the flat horizon and the slope of a sedimentary layer, fault plane, metamorphic foliation, or other geologic structure.

discharge – In surface-water hydrology, the amount of water issuing from a spring or in a stream that passes a specific point in a given period of time.

dolomite – A mineral composed of calcium-magnesium-carbonate ($CaMg[CO_3]_2$) that is the chief constituent of a sedimentary rock commonly called dolomite, as well as of some kinds of marble. It is thought to form by the alteration of limestone by seawater. (See *carbonate*.)

drainage basin – The land area drained by a particular stream.

drinking water standards – The level of constituents or characteristics in a drinking water supply specified in regulations under the Safe Drinking Water Act as the maximum permissible.

earthquake – A sudden ground motion or vibration of the Earth. It can be produced by a rapid release of stored-up energy along an active fault.

ecology – A branch of science dealing with the interrelationships of living organisms with one another and with their nonliving environment.

ecosystem – A community of organisms and their physical environment interacting as an ecological unit.

effluent – A waste stream flowing into the atmosphere, surface water, groundwater, or soil.

endangered species – Plants or animals that are in danger of extinction through all or a significant portion of their ranges and that have been listed as endangered by the U.S. Fish and Wildlife Service or the National Marine Fisheries Service, following the procedures outlined in the Endangered Species Act and its implementing regulations (50 CFR 424). (See *threatened species*.) The lists of endangered species can be found in Title 50 of the *Code of Federal Regulations*, Sections 17.11 (wildlife), 17.12 (plants), and 222.23(a) (marine organisms).

Endangered Species Act of 1973 – An act requiring Federal agencies, with the consultation and assistance of the Secretaries of the Interior and Commerce, to ensure that their actions will not likely jeopardize the continued existence of any endangered or threatened species or adversely affect the habitat of such species.

environmental assessment (EA) – A concise public document that a Federal agency prepares under the National Environmental Policy Act (NEPA) to provide sufficient evidence and analysis to determine whether a proposed agency action would require preparation of an environmental impact statement (EIS) or a Finding of No Significant Impact. A Federal agency may also prepare an EA to aid its compliance with NEPA when no EIS is necessary or to facilitate preparation of an EIS when one is necessary. An EA must include brief discussions of the need for the proposal, alternatives, environmental impacts of the proposed action and alternatives, and a list of agencies and persons consulted. (See *Finding of No Significant Impact*, *environmental impact statement*, and *National Environmental Policy Act*.)

environmental impact statement – The detailed written statement that is required by Section 102(2)(C) of the National Environmental Policy Act (NEPA) for a proposed major Federal action significantly affecting the quality of the human environment. A U.S. Department of Energy (DOE) EIS is prepared in accordance with applicable requirements of the Council on Environmental Quality NEPA regulations in Title 40 of the *Code of Federal Regulations* (CFR), Parts 1500–1508, and DOE NEPA regulations in Title 10 of the CFR, Part 1021. The statement includes, among other information, discussions of the environmental impacts of the proposed action and all reasonable alternatives, adverse environmental effects that cannot be avoided should the proposal be implemented, the relationship between short-term uses of the human environment and enhancement of long-term productivity, and any irreversible and irretrievable commitments of resources.

environmental justice – The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including racial, ethnic, or socioeconomic groups, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, or commercial operations or the execution of Federal, state, local, or tribal programs and policies. Executive Order 12898 directs Federal agencies to make achieving environmental justice part of their missions by identifying and addressing disproportionately high and adverse effects of agency programs, policies, and activities on minority and low-income populations. (See *minority population* and *low-income population*.)

erosion – Removal of material by water, wind, or ice.

Exclusive Use Area – A 112-hectare (277-acre) area surrounded by a barbed-wire fence that is restricted for the exclusive use of the U.S. Department of Energy and its contractors and subcontractors in support of Waste Isolation Pilot Plant activities. The area is marked with "no trespassing" signs and is patrolled by WIPP security personnel.

exposure – The condition of being subject to the effects of, or acquiring a dose of, a potential stressor such as a hazardous chemical agent; also, the process by which an organism acquires a dose of a chemical such as mercury. Exposure can be quantified as the amount of the agent available at various boundaries of the organism (e.g., skin, lungs, gut) and available for absorption.

exposure limit – The level of exposure to a hazardous chemical (set by law or a standard) at which or below which adverse human health effects are not expected to occur. (See *reference concentration* and *reference dose.*)

exposure pathway – The course a chemical or physical agent takes from the source to the exposed organism. An exposure pathway describes a mechanism by which chemicals or physical agents at or originating from a release site reach an individual or population. Each exposure pathway includes a source or release from a source, an exposure route, and an exposure point. If the exposure point differs from the source, the transport/exposure medium such as air or water is also included. (See *exposure*.)

fault – A fracture or a zone of fractures within a rock formation along which vertical, horizontal, or transverse slippage has occurred. A normal fault occurs when the hanging wall has been depressed in relation to the footwall. A reverse fault occurs when the hanging wall has been raised in relation to the footwall.

Finding of No Significant Impact – A public document issued by a Federal agency briefly presenting the reasons why an action for which the agency has prepared an environmental assessment has no potential to have a significant effect on the human environment and, thus, will not require preparation of an environmental impact statement. (See *environmental assessment* and *environmental impact statement*.)

flask – A container used to store mercury. Mercury storage flasks, typically made of 0.5-centimeter-thick (0.2-inch-thick) low-carbon steel, can hold 34.6 kilograms (76 pounds) of mercury and are sealed with a threaded plug. A typical mercury storage flask is similar in size and dimensions to a 3-liter soda bottle.

floodplain – The lowlands and relatively flat areas adjoining inland and coastal waters and the flood-prone areas of offshore islands. Floodplains include, at a minimum, that area with at least a 1.0 percent chance of being inundated by a flood in any given year.

The *base floodplain* is defined as the area that has a 1.0 percent or greater chance of being flooded in any given year. Such a flood is known as a 100-year flood.

The *critical action floodplain* is defined as the area that has at least a 0.2 percent chance of being flooded in any given year. Such a flood is known as a 500-year flood.

The *probable maximum flood* is the hypothetical flood considered to be the most severe reasonably possible flood, based on the comprehensive hydrometeorological application of maximum precipitation and other hydrological factors favorable for maximum flood runoff (e.g., sequential storms and snowmelts). It is usually several times larger than the maximum recorded flood.

formation – In geology, the primary unit of formal stratigraphic mapping or description. Most formations possess certain distinctive features.

fracture – Any break in rock along which no significant movement has occurred.

geology – The science that deals with the Earth: the materials, processes, environments, and history of the planet, including rocks and their formation and structure.

global climate change – Changes in the Earth's surface temperature thought to be caused by the greenhouse effect and responsible for changes in global climate patterns. The greenhouse effect is the trapping and buildup of heat in the atmosphere (troposphere) near the Earth's surface. Some of the heat flowing back toward space from the Earth's surface is absorbed by water vapor, carbon dioxide, ozone, and several other gases in the atmosphere and then reradiated back toward the Earth's surface.

greater-than-Class C (GTCC) low-level radioactive waste (LLW) – LLW generated by the commercial sector that exceeds U.S. Nuclear Regulatory Commission (NRC) concentration limits for Class C LLW, as specified in "Licensing Requirements for Land Disposal of Radioactive Waste" (Title 10 of the *Code of Federal Regulations*, Part 61).

In addition to the GTCC LLW generated as a result of NRC-licensed or agreement-state-licensed activities, the U.S. Department of Energy (DOE) generates waste containing concentrations of radionuclides that are similar to GTCC LLW. This waste is referred to as "DOE GTCC-like waste."

groundwater – Water below the ground surface in a zone of saturation. It usually occurs in aquifers that may supply wells and springs, as well as baseflow, to major streams and rivers.

Hazard Index – *(ecological definition)* The sum of the individual Hazard Quotients of constituents within a class that exert effects with the same toxicological mechanism or endpoint and are additive in effect.

Hazard Index – *(human health definition)* A summation of the Hazard Quotients for all chemicals now being used at a site, as well as those proposed to be added, to yield the cumulative levels for the site. A Hazard Index value of 1.0 or less means that no adverse human health effects (noncancer) are expected to occur. (See *Hazard Quotient*.)

Hazard Quotient – The value used as an assessment of non-cancer-associated toxic effects of chemicals, e.g., kidney or liver dysfunction. It is a ratio of the estimated exposure to that level of exposure at which it is expected that adverse health effects would begin to be produced. It is independent of a cancer risk, which is calculated for only those chemicals identified as carcinogens.

hazardous air pollutants – Air pollutants not covered by National Ambient Air Quality Standards but which may present a threat of adverse human health or environmental effects. Those specifically listed in Title 40 of the *Code of Federal Regulations*, Section 61.01, are asbestos, benzene, beryllium, coke oven emissions, inorganic arsenic, mercury, radionuclides, and vinyl chloride. More broadly, hazardous air pollutants are any of the 188 pollutants to be regulated or reviewed under Section 112(b) of the Clean Air Act. Very generally, hazardous air pollutants are any air pollutants that may realistically be expected to pose a threat to human health or welfare.

hazardous chemical – Under Title 29 of the *Code of Federal Regulations*, Part 1910, Subpart Z, hazardous chemicals are defined as "any chemical that is a physical hazard or a health hazard." Physical hazards include combustible liquids, compressed gases, explosives, flammables, organic peroxides, oxidizers, pyrophorics, and reactives. A health hazard is any chemical for which there is good evidence that acute or chronic health effects occur in exposed employees. Hazardous chemicals include carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, agents that act on the hematopoietic system, and agents that damage the lungs, skin, eyes, or mucous membranes.

hazardous material – A material, including a hazardous substance as defined by Title 49 of the *Code of Federal Regulations*, Section 171.8, that poses a risk to health, safety, and property when transported or handled.

hazardous waste – A category of waste regulated under the Resource Conservation and Recovery Act (RCRA). To be considered hazardous, a waste must be a solid waste under RCRA and must exhibit at least one of four characteristics described in Title 40 of the *Code of Federal Regulations*, Sections 261.20 through 261.24 (i.e., ignitability, corrosivity, reactivity, or toxicity) or be specifically listed by the U.S. Environmental Protection Agency in Sections 261.31 through 261.33.

historic resources – Archaeological sites, architectural structures, and objects dating from 1492 or later, after the arrival of the first Europeans to the Americas.

infrastructure – The basic facilities, services, and utilities needed for the functioning of an industrial facility. Transportation and electrical systems are part of the infrastructure.

interbedded – Occurring between beds (layers) or lying in a bed parallel to other beds of a different material.

interim status – Period during which treatment, storage, and disposal facilities subject to the Resource Conservation and Recovery Act are temporarily allowed to operate while awaiting the issuance or denial of a permanent permit.

labor force – All persons of a defined geographic area classified as employed or unemployed.

land use – A characterization of land surface in terms of its potential utility for various activities.

land withdrawal boundary (LWB) – A 4,146-hectare (10,240-acre) area that delineates the perimeter of the Waste Isolation Pilot Plant site.

limestone – A sedimentary rock composed mostly of the mineral calcite, $CaCO_3$. (See *carbonate*.)

loam – Soil material that is composed of 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

local magnitude – See *magnitude.*

low-income individuals/persons – Individuals whose income is less than the poverty threshold defined in the U.S. Bureau of the Census' Current Population Reports, Series P-60 on Income and Poverty.

low-income population – Low-income populations, defined in terms of U.S. Census Bureau annual statistical poverty levels (Current Population Reports, Series P-60 on Income and Poverty), may consist of groups or individuals who live in geographic proximity to one another or who are geographically dispersed or transient (such as migrant workers or American Indians), where either type of group experiences common conditions of environmental exposure or effect. (See *environmental justice* and *minority population*.)

magnitude – A number that reflects the relative strength or size of an earthquake. Magnitude is based on the logarithmic measurement of the maximum motion recorded by a seismograph. An increase of one unit of magnitude (for example, from 4.6 to 5.6) represents a 10-fold increase in wave amplitude on a seismograph recording or approximately a 30-fold increase in the energy released. Several scales have been defined, but the most commonly used are (1) local magnitude (M_L), commonly referred to as "Richter magnitude," (2) surface-wave magnitude (M_s), and (3) body-wave magnitude (M_b). Each is valid for a particular type of seismic signal varying by such factors as frequency and distance. These magnitude scales will yield approximately the same value for any given earthquake within each scale's respective range of validity. A fourth scale (moment magnitude [M_w]) is the latest to be applied that better estimates the size of very large earthquakes that the other scales underestimate by varying degrees.

megawatt – A unit of power equal to 1 million watts. Megawatt-thermal is commonly used to define heat produced, while megawatt-electric defines electricity produced.

mercury (elemental) – Elemental mercury is a dense, naturally occurring, silver-colored metallic element that is liquid at room temperature. Sometimes called "quicksilver," liquid mercury has been used extensively in manufacturing processes because it conducts electricity, reacts to temperature changes, and alloys with many other metals.

mercury (primary) – Unused, 'virgin' mercury that has been produced as the main product of mining activities.

mercury (secondary) – Mercury recycled from the dismantling of used products or equipment.

meteorology – The science dealing with the atmosphere and its phenomena, especially as relating to weather.

migration – The natural movement of a material through the air, soil, or groundwater; also, seasonal movement of animals from one area to another.

minority individuals – Individuals who identify themselves as a member of the following population groups: American Indian or Alaska Native; Asian; black or African American; Hispanic or Latino; Native Hawaiian or other Pacific Islander; or multiracial minority (two or more races, at least one of which is a minority race under Council on Environmental Quality guidelines). This definition is similar to that given in the Council on Environmental Quality's environmental justice guidance; however, it has been modified to reflect revisions to the Standards for the Classification of Federal Data on Race and Ethnicity (62 FR 58782 through 58790), which is published by the Office of Management and Budget.

minority population – Minority populations exist where either: (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than in the general population or other appropriate unit of geographic analysis (such as a governing body's jurisdiction, a neighborhood, census tract, or other similar unit). Minority populations include either a single minority group or the total of all minority persons in the affected area. They may consist of groups of individuals living in geographic proximity to one another or a geographically dispersed/transient set of individuals (such as migrant workers or American Indians), where either type of group experiences common conditions of environmental exposure or effect. (See *environmental justice* and *low-income population*.)

mitigation – Actions taken to lessen the impacts of a proposed action, including (1) avoiding an impact altogether by not taking a certain action or parts of an action; (2) minimizing impacts by limiting the degree or magnitude of an action and its implementation; (3) rectifying an impact by repairing, rehabilitating, or restoring the affected environment; (4) reducing or eliminating the impact over time by preservation and maintenance operations during the life of an action; or (5) compensating for an impact by replacing or providing substitute resources or environments.

Modified Mercalli Intensity – A level on the modified Mercalli scale. A measure of the perceived intensity of earthquake ground shaking with 12 divisions, from I (not felt by people) to XII (damage nearly total). It is a unitless expression of observed effects.

mudstone – A detrital sedimentary rock composed of clay-sized particles.

National Ambient Air Quality Standards – Standards defining the highest allowable levels of certain pollutants in the ambient air (i.e., the outdoor air to which the public has access). Because the U.S. Environmental Protection Agency must establish the criteria for setting these standards, the regulated pollutants are called *criteria* pollutants. Criteria pollutants include sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, lead, and two size classes of particulate matter, less than 10 micrometers (0.0004 inches) in diameter, and less than 2.5 micrometers (0.0001 inches) in diameter. Primary standards are established to protect public health; secondary standards are established to protect public welfare (e.g., visibility, crops, animals, buildings). (See *criteria pollutant*.)

National Emission Standards for Hazardous Air Pollutants (NESHAPs) – Emission standards set by the U.S. Environmental Protection Agency for air pollutants that are not covered by the National Ambient Air Quality Standards and may, at sufficiently high levels, cause increased fatalities, irreversible health effects, or incapacitating illness. These standards are given in Title 40 of the *Code of Federal Regulations*, Parts 61 and 63. NESHAPs are given for many specific categories of sources (e.g., equipment leaks, industrial process cooling towers, drycleaning, facilities, petroleum refineries).

National Environmental Policy Act of 1969 (NEPA) – NEPA is the basic national charter for protection of the environment. It establishes policy, sets goals (in Section 101), and provides means (in Section 102) for carrying out the policy. Section 102(2) contains action-forcing provisions to ensure that Federal agencies follow the letter and spirit of the Act. For major Federal actions significantly affecting the quality of the human environment, Section 102(2)(C) of NEPA requires Federal agencies to prepare a detailed statement that includes the environmental impacts of the proposed action and other specified information.

National Pollutant Discharge Elimination System (NPDES) – A provision of the Clean Water Act that prohibits discharge of pollutants into waters of the United States unless a special permit is issued by the U.S. Environmental Protection Agency, a state, or, where delegated, a tribal government on an American Indian reservation. The NPDES permit lists either permissible discharges, the level of cleanup technology required for wastewater, or both.

National Register of Historic Places (NRHP) – The official list of the Nation's cultural resources that are worthy of preservation. The National Park Service maintains the list under direction of the Secretary of the Interior. Buildings, structures, objects, sites, and districts are included in the NRHP for their importance in American history, architecture, archaeology, culture, or engineering. Properties included in the NRHP range from large-scale, monumentally proportioned buildings to smaller-scale, regionally distinctive buildings. The listed properties are not just of nationwide importance; most are significant primarily at the state or local level. Procedures for listing properties in the NRHP are found in Title 36 of the *Code of Federal Regulations*, Part 60.

natural phenomena hazard – A category of events (e.g., earthquake, wind, flood, and lightning) that must be considered in the U.S. Department of Energy (DOE) facility design, construction, and operations, as specified in DOE Order 420.1B.

nitrogen oxides – The oxides of nitrogen, primarily nitrogen oxide and nitrogen dioxide, produced in the combustion of fossil fuels. Nitrogen dioxide emissions constitute an air pollution problem, as they contribute to acid deposition and the formation of atmospheric ozone.

noise – Undesirable sound that interferes or interacts negatively with the human or natural environment. Noise may disrupt normal activities (e.g., hearing, sleep), damage hearing, or diminish the quality of the environment.

nonattainment area – An area that the U.S. Environmental Protection Agency has designated as not meeting (i.e., not being in attainment of) one or more of the National Ambient Air Quality Standards for sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, lead, and particulate matter. An area may be in attainment for some pollutants, but not for others.

Off-Limits Area – A 588-hectare (1,454-acre) area at the Waste Isolation Pilot Plant site where unauthorized entry and introduction of weapons and/or dangerous materials are prohibited. Prohibition signs are posted at consistent intervals along its perimeter. Unless they pose a threat to security, safety, or the environmental quality of the WIPP site, grazing and public thoroughfares can occur in this area. This area is patrolled by WIPP security personnel to prevent unauthorized activities or use.

ozone – The triatomic form of oxygen; in the stratosphere, ozone protects the Earth from the sun's ultraviolet rays, but in lower levels of the atmosphere, ozone is considered an air pollutant.

pallet – A small platform on which material is stored. Pallets are often constructed of wood and serve to lift the material off the ground to keep it dry. Pallets also enable the material to be easily lifted with a forklift.

particulate matter (PM) – Any finely divided solid or liquid material, other than uncombined (i.e., pure) water. A subscript denotes the upper limit of the diameter of particles included. Thus, PM_{10} includes only those particles equal to or less than 10 micrometers (0.0004 inches) in diameter; $PM_{2.5}$ includes only those particles equal to or less than 2.5 micrometers (0.0001 inches) in diameter. Total suspended particulates were first used as the indicator of particulate concentrations.

peak ground acceleration – A measure of the maximum horizontal acceleration (as a percentage of the acceleration due to Earth's gravity) experienced by a particle on the surface of the Earth during the course of earthquake motion.

percent *g* – In measuring earthquake ground motion, the acceleration (the rate of change in velocity) experienced relative to that due to Earth's gravity (i.e., 9.8 meters per square second).

perched aquifer/groundwater – A body of groundwater of small lateral dimensions separated from an underlying body of groundwater by an unsaturated zone.

permeability – The ability of a rock, soil, or other material to allow water to flow through its interconnected spaces.

persistence – The resistance to degradation as measured by the period of time required for complete decomposition of a material.

pH – A numeric value that indicates the relative acidity or alkalinity of a substance on a scale of 0 to 14, with the neutral point at 7.0. Acid solutions have pH values lower than 7.0, and basic (alkaline) solutions have values higher than 7.0.

plume – The elongated pattern of contaminated air or water originating at a point source such as a smokestack or hazardous waste disposal site.

$PM_{2.5}$ and **PM_{10}** – See *particulate matter*.

potable water – Water that is fit to drink.

potash – Potassium compounds or potassium-containing materials, especially those with potassium in a water soluble form. Commonly mined or manufactured as potassium-bearing salts and primarily used as a fertilizer.

prehistoric – Predating written history; in North America, also predating contact with Europeans.

Prevention of Significant Deterioration – Regulations required by the 1977 Clean Air Act amendments to limit increases in criteria air pollutant concentrations above baseline in areas that already meet the National Ambient Air Quality Standards. Cumulative increases in pollutant levels after specified baseline dates must not exceed specified maximum allowable amounts. These allowable increases, also known as increments, are especially stringent in areas designated as Class I areas (e.g., national parks, wilderness areas) where the preservation of clean air is particularly important. All areas not designated as Class I are currently designated as Class II. Maximum increments in pollutant levels are also given in Title 40 of the *Code of Federal Regulations*, Section 51.166, for Class III areas, if any such areas should be so designated by the U.S. Environmental Protection Agency. Class III increments are less stringent than those for Class I or Class II areas. (See *National Ambient Air Quality Standards*.)

Property Protection Area – A 14-hectare (35-acre) interior core of the Waste Isolation Pilot Plant site that is surrounded by a chain-link fence and is under 24-hour security.

Protective Action Criteria (PACs) – These are protective criteria introduced by the U.S. Department of Energy for use in the planning of emergency response to accidental releases of chemicals. There are three levels, PAC-1, PAC-2, and PAC-3. These are equal to the 1-hour Acute Exposure Guideline Levels (AEGL-1, -2, and -3, respectively), if available; otherwise, they are equal to the Emergency Response Planning Guidelines (ERPG-1, -2, and -3, respectively). If neither AEGLs nor ERPGs are available, PACs are equal to Temporary Emergency Exposure Limits (TEEL-1, -2, and -3, respectively).

Quaternary – The second geologic period of the Cenozoic Era, dating from about 1.6 million years ago to the present. It contains two epochs: the Pleistocene and the Holocene. It is characterized by the first appearance of human beings on Earth.

Record of Decision – A document providing a concise public record of an agency's decision on a proposed action for which an environmental impact statement was prepared. Prepared in accordance with Title 40 of the *Code of Federal Regulations*, Section 1505.2, the Record of Decision identifies the alternatives considered in reaching the decision, the environmentally preferable alternative, factors balanced by the agency in making the decision, whether all practicable means to avoid or minimize environmental harm have been adopted, and if not, why they were not.

reference concentration – The chronic exposure concentration for a given hazardous chemical at which or below which adverse human noncancer health effects are not expected to occur. (See *exposure limit* and *reference dose*.)

reference dose – The chronic exposure dose for a given hazardous chemical at which or below which adverse human noncancer health effects are not expected to occur. (See *exposure limit* and *reference concentration*.)

reflasking – The transfer of mercury from aging, damaged, or leaking 34.6-kilogram (76-pound) flasks to new 34.6-kilogram (76-pound) steel flasks.

region of influence – A site-specific geographic area. The regions of influence for different resources can vary widely in extent. For example, the region of influence for ecological resources would generally be confined to the site and nearby adjacent areas, whereas the socioeconomic region of influence would include the cities and counties surrounding each site that could be affected by the proposed action.

Resource Conservation and Recovery Act (RCRA), as amended – This law gives the U.S. Environmental Protection Agency the authority to control hazardous waste from "cradle to grave" (i.e., from the point of generation to the point of ultimate disposal), including its minimization, generation, transportation, treatment, storage, and disposal. RCRA also sets forth a framework for management of nonhazardous solid waste. (See *hazardous waste*.)

Richter magnitude – See *magnitude.*

rift – A valley caused by extension of the Earth's crust. Its floor forms as a portion of the crust moves downward along normal faults.

risk – The probability of a detrimental effect from exposure to a hazard. Risk is often expressed quantitatively as the probability of an adverse event occurring multiplied by the consequence of that event (i.e., the product of these two factors). However, separate presentation of probability and consequence is often more informative.

risk assessment (chemical) – The qualitative and quantitative evaluation performed to define the risk posed to human health and/or the environment by the presence or potential presence and/or use of specific chemical materials.

runoff – The portion of rainfall, melted snow, or irrigation water that flows across the ground and which may eventually enter surface waters.

sand – Loose grains of rock or mineral sediment formed by weathering that range in size from 0.0625 to 2.0 millimeters (0.0025 to 0.08 inches) in diameter and often consist of quartz particles.

sandstone – A sedimentary rock composed mostly of sand-size particles cemented usually by calcite, silica, or iron oxide.

sanitary waste (wastewater) – Wastes generated by normal housekeeping activities, liquid or solid (includes sludge), that are not hazardous or radioactive.

scoping – An early and open process for determining the scope of issues to be addressed in an environmental impact statement and for identifying the significant issues related to a proposed action.

sedimentary rock – Rock formed from the accumulation of sediment, which may consist of fragments and mineral grains of varying sizes from pre-existing rocks, remains or products of animals and plants, products of chemical action, or mixtures of these. Sedimentary rocks often have distinctive layering or bedding.

seismic – Pertaining to any earth vibration, especially that of an earthquake.

seismicity – The frequency and distribution of earthquakes.

sewage – The total nonhazardous organic waste and wastewater generated by an industrial establishment or a community.

sewer – A pipe or conduit (sewer) intended to carry wastewater or waterborne wastes from homes, businesses, and industries to a treatment facility.

shale – Sedimentary rock derived from mud, commonly finely laminated (bedded). Particles in shale are commonly clay minerals mixed with tiny grains of quartz eroded from pre-existing rocks. "Shaley" means like a shale or having some shale component, as in shaley sandstone.

silt – Loose particles of rock or mineral sediment that range in size from about 0.002 to 0.0625 millimeters (0.00008 to 0.0025 inches) in diameter. Silt is finer than sand, but coarser than clay.

siltstone – A fine-grained sedimentary rock composed mostly of silt-sized grains.

socioeconomics – Demographic and economic characteristics of a defined geographic area.

soils – All unconsolidated materials above bedrock. Natural earthy materials on the Earth's surface, in places modified or even made by human activity, containing living matter, and supporting or capable of supporting plants.

sole-source aquifer – A designation granted by the U.S. Environmental Protection Agency when groundwater from a specific aquifer supplies at least 50 percent of the drinking water for the area overlying the aquifer. Sole-source aquifers have no alternative source or combination of sources that could physically, legally, and economically supply all those who obtain their drinking water from the aquifer.

solid waste – In general, solid wastes are non-liquid, non-soluble discarded materials ranging from municipal garbage to industrial wastes that contain complex and sometimes hazardous substances. Solid wastes include sewage sludge, agricultural refuse, demolition wastes, and mining residues.

For purposes of regulation under the Resource Conservation and Recovery Act, solid waste is any garbage; refuse; sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility; and other discarded material. Solid waste includes solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations and from community activities. A more-detailed regulatory definition of solid waste can be found in Title 40 of the *Code of Federal Regulations,* Section 261.2. (See *hazardous waste* and *Resource Conservation and Recovery Act*.)

spill prevention, control, and countermeasures plan – A plan prepared by a facility to minimize the likelihood of a spill and to expedite control and cleanup activities should a spill occur.

stabilize – To convert a compound, mixture, or solution to a nonreactive form.

State Historic Preservation Officer – The state officer charged with the identification and protection of prehistoric and historic resources in accordance with the National Historic Preservation Act.

stormwater – Stormwater runoff, snowmelt runoff, and surface runoff and drainage.

subsistence consumption of fish and wildlife – Dependence by a minority population, low-income population, American Indian tribe, or subgroup of such populations on indigenous fish, vegetation, and/or wildlife as the principal portion of their diet.

sulfur oxides – Common air pollutants, primarily sulfur dioxide, a heavy, pungent, colorless gas (formed in the combustion of fossil fuels, considered a major air pollutant), and sulfur trioxide. Sulfur dioxide is involved in the formation of acid rain. It can also irritate the upper respiratory tract and cause lung damage.

surface water – All bodies of water on the surface of the Earth and open to the atmosphere, such as rivers, lakes, reservoirs, ponds, seas, and estuaries.

tectonic – Of or relating to motion in the Earth's crust and occurring on geologic faults.

Temporary Emergency Exposure Limits (TEELs) – Values developed by the U.S. Department of Energy (DOE) for use in DOE facility hazard analyses and emergency planning and response for chemicals lacking Acute Exposure Guideline Levels or Emergency Response Planning Guidelines. TEEL values are applied to the peak 15-minute time-weighted average concentration at the point of interest and are defined for varying degrees of severity of toxic effects, as follows:

> **TEEL-1:** The maximum concentration in air below which it is believed nearly all individuals could be exposed without experiencing other than mild transient adverse health effects or perceiving a clearly defined objectionable odor.
>
> **TEEL-2:** The maximum concentration in air below which it is believed nearly all individuals could be exposed without experiencing or developing irreversible or other serious health effects or symptoms that could impair their abilities to take protective action.
>
> **TEEL-3:** The maximum concentration in air below which it is believed nearly all individuals could be exposed without experiencing or developing life-threatening health effects.

threatened species – Any plants or animals that are likely to become endangered species within the foreseeable future throughout all or a significant portion of their ranges and that have been listed as threatened by the U.S. Fish and Wildlife Service or the National Marine Fisheries Service, following the procedures set out in the Endangered Species Act and its implementing regulations (50 CFR 424). (See *endangered species*.) The lists of threatened species can be found in Title 50 of the *Code of Federal Regulations*, Sections 17.11 (wildlife), 17.12 (plants), and 227.4 (marine organisms). *Note: Some states also list species as threatened. Thus, in certain cases a state definition would also be appropriate.*

threshold limit values – The recommended highest concentrations of contaminants to which workers may be exposed according to the American Conference of Governmental Industrial Hygienists.

toxic – Poisonous (to living organisms); capable of producing disease or otherwise harmful to human health when taken into the body. Mercury is toxic.

Toxic Substances Control Act (TSCA) – This law requires that the health and environmental effects of all new chemicals be reviewed by the U.S. Environmental Protection Agency before they are manufactured for commercial purposes. This act also imposes strict limitations on the use and disposal of polychlorinated biphenyls, chlorofluorocarbons, asbestos, dioxins, certain metal-working fluids, and hexavalent chromium. In addition, the provisions of the Mercury Export Ban Act relating to the prohibition on sale, distribution, or transfer of elemental mercury by Federal agencies, and to the prohibition on the export of elemental mercury, amended Sections 6 and 12, respectively, of TSCA.

toxicity reference value – An exposure level from a valid scientific study that represents a threshold for some level of ecological effect.

traditional cultural property – A property or place that is eligible for inclusion in the National Register of Historic Places because of its association with cultural practices and beliefs that are (1) rooted in the history of a community and (2) important to maintaining the continuity of that community's traditional beliefs and practices.

transuranic (TRU) waste – Radioactive waste containing more than 100 nanocuries (3,700 becquerels) of alpha-emitting TRU isotopes per gram of waste, with half-lives greater than 20 years, except for: (1) high-level radioactive waste; (2) waste that the Secretary of Energy has determined, with the concurrence of the Administrator of the U.S. Environmental Protection Agency, does not need the degree of isolation required by Title 40 of the *Code of Federal Regulations* (CFR), Part 191, disposal regulations; or (3) waste that the U.S. Nuclear Regulatory Commission has approved for disposal on a case-by-case basis in accordance with 10 CFR Part 61.

treatment – Under the Resource Conservation and Recovery Act, any method, technique, or process designed to change the physical, chemical, or biological character or composition of any hazardous waste.

unemployment rate – The number of unemployed persons as a percentage of the labor force.

viewshed – The extent of the area that may be viewed from a particular location. Viewsheds are generally bounded by topographic features such as hills or mountains.

visual resource management – A process devised by the U.S. Bureau of Land Management to assess the aesthetic quality of a landscape, and, consistent with the results of that analysis, to so design proposed activities as to minimize their visual impact on the landscape. The process consists of a rating of visual quality followed by a measurement of the degree of contrast between proposed development activities and the existing landscape. Four classifications are employed to describe different degrees of modification to landscape elements: Class I, areas where the natural landscape is preserved, including national wilderness areas and the wild sections of national wild and scenic rivers; Class II, areas with very limited land development activity, resulting in visual contrasts that are seen but do not attract attention; Class III, areas in which development may attract attention, but the natural landscape still dominates; and Class IV, areas in which development activities may dominate the view and may be the major focus in the landscape.

volatile organic compound – Any of a broad range of organic compounds, often halogenated, that vaporize at ambient or relatively low temperatures, such as benzene, chloroform, and methyl alcohol. In regard to air pollution, any organic compound that participates in atmospheric photochemical reaction, except for those determined by the U.S. Environmental Protection Agency Administrator to have negligible photochemical reactivity.

Waste Isolation Pilot Plant (WIPP) – WIPP is the Nation's only underground repository for the permanent disposal of defense-generated transuranic waste. The WIPP site is located in Eddy County in the Chihuahuan Desert of southeastern New Mexico. The site is about 42 kilometers (26 miles) east of Carlsbad in a region known as Los Medaños, a relatively flat, sparsely inhabited plateau with little surface water. The WIPP site encompasses approximately 41 square kilometers (16 square miles) under the jurisdiction of the U.S. Department of Energy pursuant to the Waste Isolation Pilot Plant Land Withdrawal Act (P.L. 102-579). (See *Waste Isolation Pilot Plant Land Withdrawal Act [WIPP LWA]*.)

Waste Isolation Pilot Plant Land Withdrawal Act (WIPP LWA) – An act that transferred responsibility of the Waste Isolation Pilot Plant withdrawal area from the Secretary of the Interior to the Secretary of Energy (P.L. 102-579).

wastewater – Water originating from human sanitary water use (domestic wastewater) and from a variety of industrial processes (industrial wastewater).

water quality standards and criteria – Limits on the concentrations of specific constituents or on the characteristics of water, often based on water use classifications (for example, drinking water, recreation, propagation of fish and aquatic life, agricultural and industrial use). Water quality standards are legally enforceable, whereas water quality criteria are nonenforceable recommendations based on biotic impacts.

water table – The boundary between the unsaturated zone and the deeper, saturated zone. The upper surface of an unconfined aquifer.

wetlands – Areas that are inundated or saturated by surface water or groundwater and that typically support vegetation adapted for life in saturated soils. Wetlands generally include swamps, marshes, bogs, and similar areas (e.g., sloughs, potholes, wet meadows, river overflow areas, mudflats, natural ponds).

WIPP Vicinity Section 10 – Section 10, Township 22 South, Range 31 East, approximately 5.6 kilometers (3.5 miles) north of the Waste Isolation Pilot Plant facility.

WIPP Vicinity Section 20 – Section 20, Township 22 South, Range 31 East, across the Waste Isolation Pilot Plant access road to the west of the Waste Isolation Pilot Plant facility.

WIPP Vicinity Section 35 – Section 35, Township 22 South, Range 31 East, approximately 5.6 kilometers (3.5 miles) southeast of the Waste Isolation Pilot Plant facility.

CHAPTER 7
LIST OF PREPARERS

CHAPTER 7
LIST OF PREPARERS

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CHAPTER 8
DISTRIBUTION LIST

CHAPTER 8
DISTRIBUTION LIST

The U.S. Department of Energy provided copies of this *Draft Long-Term Management and Storage of Elemental Mercury Supplemental Environmental Impact Statement (Draft Mercury Storage SEIS)* to members of Congress, American Indian tribal governments, state and local governments, other Federal agencies, and organizations and individuals listed in this chapter. Approximately 400 compact disk or hard copies of the complete *Draft Mercury Storage SEIS* were distributed, along with a compact disk of the complete January 2011 *Final Long-Term Management and Storage of Elemental Mercury Environmental Impact Statement (Mercury Storage EIS)*. Additionally, all stakeholders of record for the January 2011 *Mercury Storage EIS* were sent postcard notification that this *Draft Mercury Storage SEIS* was available for public comment and where the document could be found online and in reading rooms. Stakeholders of record for this *Draft Mercury Storage SEIS* that did not request a copy of this document were also sent postcard notification. Copies of the January 2011 *Mercury Storage EIS* or this *Draft Mercury Storage SEIS* will be provided upon request.

UNITED STATES CONGRESS

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The Honorable Mark Udall

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The Honorable Johnny Isakson

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The Honorable Mike Crapo

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U.S. Department of the Interior
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Richland Officials
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Cindy Johnson, City Manager
David Rose, Mayor Pro Tem

West Richland Officials
Donna Noski, Mayor

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Environmental Management Site-Specific Advisory Boards (SSAB)

AMERICAN INDIAN TRIBAL REPRESENTATIVES

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No American Indian tribal representatives have been identified.

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Silas Whitman, Chairman, Nez Perce Tribal Executive Committee
John Stanfill, Hanford Coordinator

Shoshone-Bannock Tribes
Nathan Small, Chairman, Fort Hall Business Council
Tino Batt, Treasurer, Fort Hall Business Council
Willie Preacher, Tribal Department of Energy Director
Roger Turner, Air Quality Manager

Kansas

No American Indian tribal representatives have been identified.

Missouri

No American Indian tribal representatives have been identified.

Nevada

Walker River Paiute Tribe
Lorren Sammaripa, Chairman

New Mexico

Pueblo of Acoma
Randall Vincente, Governor

Pueblo of Laguna
Richard Luarkie, Governor

Pueblo of Nambe
Phillip A. Perez, Governor

Pueblo of Pojoaque
George Rivera, Governor

Pueblo of San Ildelfonso
Terry Aguilar, Governor

Oregon

Confederated Tribes of the Umatilla Indian Reservation
Les Minthorn, Chairman, Board of Trustees
Thomas Bailor, Program Manager, Professional Services and Outreach, Department of Science and Engineering
Stuart Harris, Director, Department of Science and Engineering

South Carolina

Catawba Indian Nation
Bill Harris, Chief

Tennessee

No American Indian tribal representatives have been identified.

Texas

No American Indian tribal representatives have been identified.

Washington

Confederated Tribes and Bands of the Yakama Nation
Harry Smiskin, Chairman, Yakama Nation Tribal Council
Russell Jim, Manager, Yakama Nation Environmental Restoration and Waste Management Program

Confederated Tribes of the Colville Reservation
John E. Sirois, Chairman, Colville Business Council

Wanapum People
Rex Buck, Leader

READING ROOMS AND LIBRARIES

Colorado

U.S. Department of Energy
Office of Legacy Management
2597 Legacy Way
Grand Junction, CO 81503
(970) 248-6089

Mesa County Library
530 Grand Avenue
Grand Junction, CO 81502
(970) 243-4442

Georgia

Reese Library
Augusta State University
2500 Walton Way
Augusta, GA 30904
(706) 737-1745

Asa H. Gordon Library
Savannah State University
2200 Tompkins Road
Savannah, GA 31404
(912) 356-2183

Idaho

U.S. Department of Energy
Public Reading Room
1776 Science Center Drive
Idaho Falls, ID 83402
(208) 526-5190

Missouri

Mid-Continent Public Library
Blue Ridge Branch
9253 Blue Ridge Boulevard
Kansas City, MO 64138
(816) 761-3382

Nevada

Mineral County Library
First & "A" Street
Hawthorne, NV 89415
(775) 945-2778

New Mexico

Eunice Public Library
1003 Avenue N
Eunice, NM 88231
(575) 394-2336

Zimmerman Library
Government Information Department
1 University of New Mexico
Albuquerque, NM 87131
(505) 277-5441

WIPP Information Center
4021 National Parks Highway
Carlsbad, NM 88220
(505) 234-7200

Oregon

Portland State University
Government Information
Branford Price Millar Library
1875 SW Park Avenue
Portland, OR 97207
(503) 725-5874

South Carolina

Gregg-Graniteville Library
University of South Carolina-Aiken
471 University Parkway
Aiken, SC 29801
(803) 641-3320

South Carolina State Library
1500 Senate Street
Columbia, SC 29211
(803) 734-8026

Texas

Andrews County Library
109 NW 1st Street
Andrews, TX 79714
(432) 523-9819

Washington

U.S. Department of Energy
Public Reading Room
Consolidated Information Center
2770 University Drive, Room 101L
Richland, WA 99352
(509) 372-7443

University of Washington
Suzzallo-Allen Library
Government Publications
Seattle, WA 98195
(206) 543-4164

Gonzaga University
Foley Center Library
101-L East 502 Boone
Spokane, WA 99258
(509) 313-5931

Washington, DC

U.S. Department of Energy
Freedom of Information Reading Room
1000 Independence Avenue, SW, 1G-033
Washington, DC 20585
(202) 586-5955

ORGANIZATIONS/PUBLIC INTEREST GROUPS

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Alan S. Caldwell, A. S. Caldwell and Associates
Tom Clements, Alliance for Nuclear Accountability
Robert J. Simon, American Chemistry Council
Bruce Lawrence, Bethlehem Apparatus Company
A. Turner Shipman, Bridlespur Homes Association
Jody Knox, Carlsbad Department of Development
Janet Greenwald, Citizens for Alternatives to Radioactive Dumping
Deborah Reade, Citizens for Alternatives to Radioactive Dumping
Michael Crisenberry, Clean Harbors Environmental Services, Inc.
John Tanner, Coalition 21
Dana S. Kimbal, Coeur Rochester, Inc.
David Foy, Colorado Counties, Inc.
Penelope McMullen, Community of Loretto
Joni Arends, Concerned Citizens for Nuclear Safety
Yvonne Downs, DZHC
Lisa Hardison, Economic Development Corporation of Lea County New Mexico
Charlie Smith, Economic Development Corporation of Lea County New Mexico
Matthew C. Jones, Environmental Council of the States
Louis Clark, Government Accountability Project
Mark Cohen, Government Accountability Project

Bill Keller, Greenpeace
Gerald Pollet, Heart of America Northwest
Grant Taylor, Hobbs Chamber of Commerce
Oscar Gonzales, Hobbs Hispano Chamber of Commerce
Sara Navarro, Hobbs Hispano Chamber of Commerce
T.J. Parks, Hobbs Municipal Schools District
Lance Wiseman, Hobbs Municipal Schools District Board
Judy Hanna, Hobbs News Sun
Levi Hill, Hobbs News Sun
Arjun Makhijani, Institute for Energy & Environmental Research
Robert Reid, JF Maddox Energy
Hermilo Ojeda, KLMA
Russ Ptacek, KSHB
Brenda Brooks, LES Enrichment Facility
Sharon Duncan, Linden Hill Homes and Center Planning & Development Council
Michael Bender, Mercury Policy Project
Jim Hattler, Mercury Waste Solutions
Karen Bennett, National Mining Association
Tawny A. Bridgeford, National Mining Association
Sydney Gordon, National Securities Technologies
Thomas Cochran, Natural Resources Defense Council
Susan Egan Keane, Natural Resources Defense Council
Geoff Fettus, Natural Resources Defense Council
David Goldstein, Natural Resources Defense Council
David Lennett, Natural Resources Defense Council
Robert Caudle, New Mexico Junior College
Jeff White, Newmont Mining Corporation
Jay Coghlan, Nuclear Watch New Mexico
Scott Kovac, Nuclear Watch New Mexico
Norman A. Mulvenon, Oak Ridge Reservation Local Oversight Committee
John R. Parish, Oil Operation
Elaine K. Patterson, Olin Chlor Alkali Products
Madeline Riley, Physicians for Social Responsibility
Ann Suellentrop, Physicians for Social Responsibility
Tom Smith, Public Citizen Texas
C. Mark Smith, Quicksilver Caucus
Sandy Baranich, S.M. Stoller Corporation
Darlene DePinho, S.M. Stoller Corporation
Linda Sheader, S.M. Stoller Corporation
Dan Weaks, Shoats and Weaks Inc.
Ed Hopkins, Sierra Club, Washington, DC, Office
Niki Widmayer, Sierra Club
Don Hancock, Southwest Research and Information Center
Stephanie Lindsay, Stinson Morrison Hecker, LLP
Karen Hadden, Sustainable Energy and Economic Development Coalition
Sandra Carroll, Tetra Tech
Frank Reiner, The Chlorine Institute, Inc.
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Jude Van Buren, University of Washington Environmental Health Safety
Hemut Engebrecht, URENCO, Ltd.

Amy Taylor, U.S. Senate - Office of Senator James Risch
Nancy Bobbitt, U.S. Senate - Office of Senator Johnny Isakson
Phillip G. Ditter, Veolia ES Technical Solutions
Donavan Mager, Washington TRU Solutions
Samuel Alexander, Jr., Waste Control Specialists
Jay Britten, Waste Control Specialists, LLC
John Browder, Waste Control Specialists, LLC
Michael Burney, Waste Control Specialists, LLC
Juan Garza, Waste Control Specialists, LLC
Tom Jones, Waste Control Specialists, LLC
Karl Klotz, Waste Control Specialists, LLC
Jack Kraus, Waste Control Specialists, LLC
Sheila Parker, Waste Control Specialists, LLC
Charles E. Taylor, Waste Control Specialists, LLC
Ben Jaime, Xcel Energy

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Patricia Dominguez
Morgan Drewmiany
Susan Kamat
Judy Kaul
Christopher Miller
Rebecca Mitchell
Lilly K. Rendt
Greg M. Sehoen

CHAPTER 9
INDEX

CHAPTER 9
INDEX

A

B

C

G

H

I

K

L

M

N

O

P

R

S

T

U

V

W

Y

APPENDIX A
THE MERCURY EXPORT BAN ACT OF 2008
AND *FEDERAL REGISTER* NOTICES

APPENDIX A
THE MERCURY EXPORT BAN ACT OF 2008
AND *FEDERAL REGISTER* NOTICES

This appendix provides a copy of the Mercury Export Ban Act of 2008 and *Federal Register* notices associated with this *Draft Long-Term Management and Storage of Elemental Mercury Supplemental Environmental Impact Statement*. *Federal Register* notices and other public notices associated with the January 2011 *Long-Term Management and Storage of Elemental Mercury Environmental Impact Statement (Mercury Storage EIS)* are provided in Appendix A of the January 2011 *Mercury Storage EIS* and have not been reproduced here.

A.1 PUBLIC LAW 110-414: MERCURY EXPORT BAN ACT—OCTOBER 14, 2008

AUTHENTICATED U.S. GOVERNMENT INFORMATION GPO

PUBLIC LAW 110–414—OCT. 14, 2008 122 STAT. 4341

Public Law 110–414
110th Congress

An Act

To prohibit the sale, distribution, transfer, and export of elemental mercury, and for other purposes.

Oct. 14, 2008
[S. 906]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

Mercury Export Ban Act of 2008. 15 USC 2601 note.

SECTION 1. SHORT TITLE.

This Act may be cited as the “Mercury Export Ban Act of 2008”.

SEC. 2. FINDINGS.

15 USC 2611 note.

Congress finds that—

(1) mercury is highly toxic to humans, ecosystems, and wildlife;

(2) as many as 10 percent of women in the United States of childbearing age have mercury in the blood at a level that could put a baby at risk;

(3) as many as 630,000 children born annually in the United States are at risk of neurological problems related to mercury;

(4) the most significant source of mercury exposure to people in the United States is ingestion of mercury-contaminated fish;

(5) the Environmental Protection Agency reports that, as of 2004—

(A) 44 States have fish advisories covering over 13,000,000 lake acres and over 750,000 river miles;

(B) in 21 States the freshwater advisories are statewide; and

(C) in 12 States the coastal advisories are statewide;

(6) the long-term solution to mercury pollution is to minimize global mercury use and releases to eventually achieve reduced contamination levels in the environment, rather than reducing fish consumption since uncontaminated fish represents a critical and healthy source of nutrition worldwide;

(7) mercury pollution is a transboundary pollutant, depositing locally, regionally, and globally, and affecting water bodies near industrial sources (including the Great Lakes) and remote areas (including the Arctic Circle);

(8) the free trade of elemental mercury on the world market, at relatively low prices and in ready supply, encourages the continued use of elemental mercury outside of the United States, often involving highly dispersive activities such as artisinal gold mining;

(9) the intentional use of mercury is declining in the United States as a consequence of process changes to manufactured products (including batteries, paints, switches, and measuring devices), but those uses remain substantial in the developing world where releases from the products are extremely likely due to the limited pollution control and waste management infrastructures in those countries;

(10) the member countries of the European Union collectively are the largest source of elemental mercury exports globally;

(11) the European Commission has proposed to the European Parliament and to the Council of the European Union a regulation to ban exports of elemental mercury from the European Union by 2011;

(12) the United States is a net exporter of elemental mercury and, according to the United States Geological Survey, exported 506 metric tons of elemental mercury more than the United States imported during the period of 2000 through 2004; and

(13) banning exports of elemental mercury from the United States will have a notable effect on the market availability of elemental mercury and switching to affordable mercury alternatives in the developing world.

SEC. 3. PROHIBITION ON SALE, DISTRIBUTION, OR TRANSFER OF ELEMENTAL MERCURY.

Section 6 of the Toxic Substances Control Act (15 U.S.C. 2605) is amended by adding at the end the following:

"(f) MERCURY.—

Effective date.

"(1) PROHIBITION ON SALE, DISTRIBUTION, OR TRANSFER OF ELEMENTAL MERCURY BY FEDERAL AGENCIES.—Except as provided in paragraph (2), effective beginning on the date of enactment of this subsection, no Federal agency shall convey, sell, or distribute to any other Federal agency, any State or local government agency, or any private individual or entity any elemental mercury under the control or jurisdiction of the Federal agency.

"(2) EXCEPTIONS.—Paragraph (1) shall not apply to—

"(A) a transfer between Federal agencies of elemental mercury for the sole purpose of facilitating storage of mercury to carry out this Act; or

"(B) a conveyance, sale, distribution, or transfer of coal.

"(3) LEASES OF FEDERAL COAL.—Nothing in this subsection prohibits the leasing of coal.".

SEC. 4. PROHIBITION ON EXPORT OF ELEMENTAL MERCURY.

Section 12 of the Toxic Substances Control Act (15 U.S.C. 2611) is amended—

(1) in subsection (a) by striking "subsection (b)" and inserting "subsections (b) and (c)"; and

(2) by adding at the end the following:

"(c) PROHIBITION ON EXPORT OF ELEMENTAL MERCURY.—

Effective date.

"(1) PROHIBITION.—Effective January 1, 2013, the export of elemental mercury from the United States is prohibited.

"(2) INAPPLICABILITY OF SUBSECTION (a).—Subsection (a) shall not apply to this subsection.

"(3) REPORT TO CONGRESS ON MERCURY COMPOUNDS.—

"(A) REPORT.—Not later than one year after the date of enactment of the Mercury Export Ban Act of 2008, the Administrator shall publish and submit to Congress a report on mercuric chloride, mercurous chloride or calomel, mercuric oxide, and other mercury compounds, if any, that may currently be used in significant quantities in products or processes. Such report shall include an analysis of— Publication.

"(i) the sources and amounts of each of the mercury compounds imported into the United States or manufactured in the United States annually;

"(ii) the purposes for which each of these compounds are used domestically, the amount of these compounds currently consumed annually for each purpose, and the estimated amounts to be consumed for each purpose in 2010 and beyond;

"(iii) the sources and amounts of each mercury compound exported from the United States annually in each of the last three years;

"(iv) the potential for these compounds to be processed into elemental mercury after export from the United States; and

"(v) other relevant information that Congress should consider in determining whether to extend the export prohibition to include one or more of these mercury compounds.

"(B) PROCEDURE.—For the purpose of preparing the report under this paragraph, the Administrator may utilize the information gathering authorities of this title, including sections 10 and 11.

"(4) ESSENTIAL USE EXEMPTION.—(A) Any person residing in the United States may petition the Administrator for an exemption from the prohibition in paragraph (1), and the Administrator may grant by rule, after notice and opportunity for comment, an exemption for a specified use at an identified foreign facility if the Administrator finds that—

"(i) nonmercury alternatives for the specified use are not available in the country where the facility is located;

"(ii) there is no other source of elemental mercury available from domestic supplies (not including new mercury mines) in the country where the elemental mercury will be used;

"(iii) the country where the elemental mercury will be used certifies its support for the exemption;

"(iv) the export will be conducted in such a manner as to ensure the elemental mercury will be used at the identified facility as described in the petition, and not otherwise diverted for other uses for any reason;

"(v) the elemental mercury will be used in a manner that will protect human health and the environment, taking into account local, regional, and global human health and environmental impacts;

"(vi) the elemental mercury will be handled and managed in a manner that will protect human health and the environment, taking into account local, regional, and global human health and environmental impacts; and "(vii) the export of elemental mercury for the specified use is consistent with international obligations of the United States intended to reduce global mercury supply, use, and pollution.

"(B) Each exemption issued by the Administrator pursuant to this paragraph shall contain such terms and conditions as are necessary to minimize the export of elemental mercury and ensure that the conditions for granting the exemption will be fully met, and shall contain such other terms and conditions as the Administrator may prescribe. No exemption granted pursuant to this paragraph shall exceed three years in duration and no such exemption shall exceed 10 metric tons of elemental mercury.

"(C) The Administrator may by order suspend or cancel an exemption under this paragraph in the case of a violation described in subparagraph (D).

"(D) A violation of this subsection or the terms and conditions of an exemption, or the submission of false information in connection therewith, shall be considered a prohibited act under section 15, and shall be subject to penalties under section 16, injunctive relief under section 17, and citizen suits under section 20.

"(5) CONSISTENCY WITH TRADE OBLIGATIONS.—Nothing in this subsection affects, replaces, or amends prior law relating to the need for consistency with international trade obligations.

"(6) EXPORT OF COAL.—Nothing in this subsection shall be construed to prohibit the export of coal.".

Deadline.
42 USC 6939f.

SEC. 5. LONG-TERM STORAGE.

(a) DESIGNATION OF FACILITY.—

(1) IN GENERAL.—Not later than January 1, 2010, the Secretary of Energy (referred to in this section as the "Secretary") shall designate a facility or facilities of the Department of Energy, which shall not include the Y–12 National Security Complex or any other portion or facility of the Oak Ridge Reservation of the Department of Energy, for the purpose of long-term management and storage of elemental mercury generated within the United States.

(2) OPERATION OF FACILITY.—Not later than January 1, 2013, the facility designated in paragraph (1) shall be operational and shall accept custody, for the purpose of long-term management and storage, of elemental mercury generated within the United States and delivered to such facility.

(b) FEES.—

(1) IN GENERAL.—After consultation with persons who are likely to deliver elemental mercury to a designated facility for long-term management and storage under the program prescribed in subsection (a), and with other interested persons, the Secretary shall assess and collect a fee at the time of delivery for providing such management and storage, based on the pro rata cost of long-term management and storage of elemental mercury delivered to the facility. The amount of such fees—

Public information.

(A) shall be made publically available not later than October 1, 2012;

(B) may be adjusted annually; and

(C) shall be set in an amount sufficient to cover the costs described in paragraph (2).

(2) COSTS.—The costs referred to in paragraph (1)(C) are the costs to the Department of Energy of providing such management and storage, including facility operation and maintenance, security, monitoring, reporting, personnel, administration, inspections, training, fire suppression, closure, and other costs required for compliance with applicable law. Such costs shall not include costs associated with land acquisition or permitting of a designated facility under the Solid Waste Disposal Act or other applicable law. Building design and building construction costs shall only be included to the extent that the Secretary finds that the management and storage of elemental mercury accepted under the program under this section cannot be accomplished without construction of a new building or buildings.

(c) REPORT.—Not later than 60 days after the end of each Federal fiscal year, the Secretary shall transmit to the Committee on Energy and Commerce of the House of Representatives and the Committee on Environment and Public Works of the Senate a report on all of the costs incurred in the previous fiscal year associated with the long-term management and storage of elemental mercury. Such report shall set forth separately the costs associated with activities taken under this section.

(d) MANAGEMENT STANDARDS FOR A FACILITY.—

(1) GUIDANCE.—Not later than October 1, 2009, the Secretary, after consultation with the Administrator of the Environmental Protection Agency and all appropriate State agencies in affected States, shall make available, including to potential users of the long-term management and storage program established under subsection (a), guidance that establishes procedures and standards for the receipt, management, and long-term storage of elemental mercury at a designated facility or facilities, including requirements to ensure appropriate use of flasks or other suitable shipping containers. Such procedures and standards shall be protective of human health and the environment and shall ensure that the elemental mercury is stored in a safe, secure, and effective manner. In addition to such procedures and standards, elemental mercury managed and stored under this section at a designated facility shall be subject to the requirements of the Solid Waste Disposal Act, including the requirements of subtitle C of that Act, except as provided in subsection (g)(2) of this section. A designated facility in existence on or before January 1, 2013, is authorized to operate under interim status pursuant to section 3005(e) of the Solid Waste Disposal Act until a final decision on a permit application is made pursuant to section 3005(c) of the Solid Waste Disposal Act. Not later than January 1, 2015, the Administrator of the Environmental Protection Agency (or an authorized State) shall issue a final decision on the permit application.

Procedures. Standards.

Deadline.

(2) TRAINING.—The Secretary shall conduct operational training and emergency training for all staff that have responsibilities related to elemental mercury management, transfer, storage, monitoring, or response.

(3) EQUIPMENT.—The Secretary shall ensure that each designated facility has all equipment necessary for routine operations, emergencies, monitoring, checking inventory, loading, and storing elemental mercury at the facility.

(4) FIRE DETECTION AND SUPPRESSION SYSTEMS.—The Secretary shall—

(A) ensure the installation of fire detection systems at each designated facility, including smoke detectors and heat detectors; and

(B) ensure the installation of a permanent fire suppression system, unless the Secretary determines that a permanent fire suppression system is not necessary to protect human health and the environment.

(e) INDEMNIFICATION OF PERSONS DELIVERING ELEMENTAL MERCURY.—

(1) IN GENERAL.—(A) Except as provided in subparagraph (B) and subject to paragraph (2), the Secretary shall hold harmless, defend, and indemnify in full any person who delivers elemental mercury to a designated facility under the program established under subsection (a) from and against any suit, claim, demand or action, liability, judgment, cost, or other fee arising out of any claim for personal injury or property damage (including death, illness, or loss of or damage to property or economic loss) that results from, or is in any manner predicated upon, the release or threatened release of elemental mercury as a result of acts or omissions occurring after such mercury is delivered to a designated facility described in subsection (a).

(B) To the extent that a person described in subparagraph (A) contributed to any such release or threatened release, subparagraph (A) shall not apply.

Records.

(2) CONDITIONS.—No indemnification may be afforded under this subsection unless the person seeking indemnification—

Notification.
Deadline.

(A) notifies the Secretary in writing within 30 days after receiving written notice of the claim for which indemnification is sought;

(B) furnishes to the Secretary copies of pertinent papers the person receives;

(C) furnishes evidence or proof of any claim, loss, or damage covered by this subsection; and

(D) provides, upon request by the Secretary, access to the records and personnel of the person for purposes of defending or settling the claim or action.

(3) AUTHORITY OF SECRETARY.—(A) In any case in which the Secretary determines that the Department of Energy may be required to make indemnification payments to a person under this subsection for any suit, claim, demand or action, liability, judgment, cost, or other fee arising out of any claim for personal injury or property damage referred to in paragraph (1)(A), the Secretary may settle or defend, on behalf of that person, the claim for personal injury or property damage.

(B) In any case described in subparagraph (A), if the person to whom the Department of Energy may be required to make indemnification payments does not allow the Secretary to settle or defend the claim, the person may not be afforded indemnification with respect to that claim under this subsection.

(f) TERMS, CONDITIONS, AND PROCEDURES.—The Secretary is authorized to establish such terms, conditions, and procedures as are necessary to carry out this section.

(g) EFFECT ON OTHER LAW.—

(1) IN GENERAL.—Except as provided in paragraph (2), nothing in this section changes or affects any Federal, State, or local law or the obligation of any person to comply with such law.

(2) EXCEPTION.—(A) Elemental mercury that the Secretary is storing on a long-term basis shall not be subject to the storage prohibition of section 3004(j) of the Solid Waste Disposal Act (42 U.S.C. 6924(j)). For the purposes of section 3004(j) of the Solid Waste Disposal Act, a generator accumulating elemental mercury destined for a facility designated by the Secretary under subsection (a) for 90 days or less shall be deemed to be accumulating the mercury to facilitate proper treatment, recovery, or disposal.

(B) Elemental mercury may be stored at a facility with respect to which any permit has been issued under section 3005(c) of the Solid Waste Disposal Act (42 U.S.C. 6925(c)), and shall not be subject to the storage prohibition of section 3004(j) of the Solid Waste Disposal Act (42 U.S.C. 6924(j)) if— Certification.

(i) the Secretary is unable to accept the mercury at a facility designated by the Secretary under subsection (a) for reasons beyond the control of the owner or operator of the permitted facility;

(ii) the owner or operator of the permitted facility certifies in writing to the Secretary that it will ship the mercury to the designated facility when the Secretary is able to accept the mercury; and

(iii) the owner or operator of the permitted facility certifies in writing to the Secretary that it will not sell, or otherwise place into commerce, the mercury.

This subparagraph shall not apply to mercury with respect to which the owner or operator of the permitted facility fails to comply with a certification provided under clause (ii) or (iii).

(h) STUDY.—Not later than July 1, 2014, the Secretary shall transmit to the Congress the results of a study, conducted in consultation with the Administrator of the Environmental Protection Agency, that— Deadline.

(1) determines the impact of the long-term storage program under this section on mercury recycling; and

(2) includes proposals, if necessary, to mitigate any negative impact identified under paragraph (1).

SEC. 6. REPORT TO CONGRESS.

At least 3 years after the effective date of the prohibition on export of elemental mercury under section 12(c) of the Toxic Substances Control Act (15 U.S.C. 2611(c)), as added by section 4 of this Act, but not later than January 1, 2017, the Administrator of the Environmental Protection Agency shall transmit to the Committee on Energy and Commerce of the House of Representatives and the Committee on Environment and Public Works of the Senate a report on the global supply and trade of elemental mercury, including but not limited to the amount of elemental mercury traded globally that originates from primary mining, where such primary mining is conducted, and whether additional primary mining has occurred as a consequence of this Act.

Approved October 14, 2008.

LEGISLATIVE HISTORY—S. 906:

SENATE REPORTS: No. 110–477 (Comm. on Environment and Public Works).
CONGRESSIONAL RECORD, Vol. 154 (2008):
Sept. 26, considered and passed Senate.
Sept. 27, 29, considered and passed House.

A.2 NOTICE OF INTENT TO PREPARE A SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT FOR THE LONG-TERM MANAGEMENT AND STORAGE OF ELEMENTAL MERCURY (77 FR 33204, JUNE 5, 2012)

33204 Federal Register / Vol. 77, No. 108 / Tuesday, June 5, 2012 / Notices

20202. Email: *equitycommission@ed.gov.* Telephone: (202) 453–6567.

John DiPaolo,

Chief of Staff, Assistant Secretary for Civil Rights, Office for Civil Rights.

[FR Doc. 2012–13499 Filed 6–4–12; 8:45 am]

BILLING CODE 4000–01–P

DEPARTMENT OF ENERGY

Notice of Intent To Prepare a Supplemental Environmental Impact Statement for the Long-Term Management and Storage of Elemental Mercury

AGENCY: Department of Energy.

ACTION: Notice of intent.

SUMMARY: As required by the Mercury Export Ban Act of 2008 (the Act), the Department of Energy (DOE) plans to identify a facility or facilities for the long-term management and storage of elemental mercury generated in the United States. To this end, DOE intends to prepare a supplement to the January 2011 *Environmental Impact Statement for the Long-Term Management and Storage of Elemental Mercury* to analyze additional alternatives, in accordance with the National Environmental Policy Act (NEPA). This supplemental EIS (SEIS) will evaluate alternatives for a facility at and in the vicinity of the Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico.

DATES: DOE invites public comment on the scope of this SEIS until July 5, 2012. The first scoping meeting will be held on June 26, 2012, from 5:30 p.m.–8 p.m., at the Skeen-Whitlock Building auditorium at the U.S. DOE, Carlsbad Field Office, 4021 National Parks Highway, Carlsbad, New Mexico 88220. An open house will be held on the same day at the same location from 4:30 p.m.–5:30 p.m. A second scoping meeting will be held on June 28, 2012, from 6 p.m.–8:30 p.m. at the Crowne Plaza Albuquerque, 1901 University Blvd. NE., Albuquerque, New Mexico 87102. An open house will be held on the same day at the same location from 4:30 p.m.–6 p.m.

ADDRESSES: Written comments on the scope of the SEIS should be sent to: Mr. David Levenstein, Document Manager, Office of Environmental Compliance (EM–11), U.S. Department of Energy, Post Office Box 2612, Germantown, Maryland 20874; to the Mercury Storage EIS Web site at *http://mercurystorageeis.com/;* or via email to *David.Levenstein@em.doe.gov.*

This Notice will be available on the Internet at *http://www.energy.gov/NEPA/* and on the project Web site at *http://mercurystorageeis.com/.*

FOR FURTHER INFORMATION CONTACT: To request further information about the SEIS or the Mercury Storage EIS, or to be placed on the SEIS distribution list, use any of the methods (mail, Web site, or email) listed under **ADDRESSES** above. In requesting a copy of the Draft SEIS, please specify a request for a paper copy of the Summary only; a paper copy of the full SEIS; the full SEIS on a computer CD; or any combination thereof.

For general information concerning DOE's NEPA process, please contact: Ms. Carol M. Borgstrom, Director, Office of NEPA Policy and Compliance (GC–54), U.S. Department of Energy, 1000 Independence Avenue SW., Washington, DC 20585, either by telephone at (202) 586–4600, by fax at (202) 586–7031, or leave a message at 1–800–472–2756.

SUPPLEMENTARY INFORMATION:

Background

The Mercury Export Ban Act of 2008 (Pub. L. 110–414) amends the Toxic Substances Control Act (TSCA) (15 U.S.C. 2605(f)) to prohibit the sale, distribution, or transfer by Federal agencies to any other Federal agency, any state or local government agency, or any private individual or entity, of any elemental mercury under the control or jurisdiction of a Federal agency (with certain limited exceptions). It also amends TSCA (15 U.S.C. 2611(c)) to prohibit the export of elemental mercury from the U.S. effective January 1, 2013 (subject to certain essential use exemptions). Section 5 of the Act, *Long-Term Storage,* directs DOE to designate a facility or facilities for the long-term management and storage of elemental mercury generated within the U.S. Pursuant to this law, this facility is required to be operational and ready to accept custody of any elemental mercury generated within the U.S. by January 1, 2013. The Act also requires DOE to assess fees based upon the *pro rata* costs of long-term management and storage of elemental mercury delivered to the facility or facilities.

The sources of elemental mercury in the U.S. include mercury used in the chlorine and caustic soda manufacturing process (i.e., chlor-alkali industry), reclaimed from recycling and waste recovery activities, and generated as a byproduct of the gold mining process. In addition, DOE's National Nuclear Security Administration stores approximately 1,200 metric tons of elemental mercury at the Oak Ridge Reservation in Tennessee.

To evaluate the range of reasonable alternatives for siting, constructing and operating a facility or facilities to meet its obligations under the Act, DOE prepared the Mercury Storage EIS (DOE/EIS–0423) in accordance with NEPA and its implementing regulations (40 CFR parts 1500–1508 and 10 CFR part 1021) and issued the Mercury Storage Final EIS in January 2011 (76 FR 5156). DOE estimated that up to approximately 10,000 metric tons of elemental mercury would need to be managed and stored at the DOE facility during the 40-year period of analysis. These estimates do not include approximately 4,400 metric tons of elemental mercury that the Department of Defense (DOD) stores at its facility in Hawthorne, Nevada.

Purpose and Need for Action

As indicated in the Mercury Storage EIS, DOE needs to designate a facility for the long-term management and storage of elemental mercury generated within the U.S., as required by the Act.

Proposed Action

As also indicated in the Mercury Storage EIS, DOE proposes to construct one or more new facilities and/or select one or more existing facilities (including modification as needed) for the long-term management and storage of elemental mercury in accordance with the Act. Facilities to be constructed as well as existing or modified facilities must comply with applicable requirements of section 5(d) of the Act, *Management Standards for a Facility,* including the requirements of the Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act (42 U.S.C. 6901 *et seq.*), and other permitting requirements.

Proposed Alternatives

The Mercury Storage EIS evaluated seven candidate locations for the elemental mercury storage facility, as well as the No Action Alternative. Those candidate locations are: DOE Grand Junction Disposal site near Grand Junction, Colorado; DOE Hanford site near Richland, Washington; Hawthorne Army Depot near Hawthorne, Nevada; DOE Idaho National Laboratory near Idaho Falls, Idaho; DOE Kansas City Plant in Kansas City, Missouri; DOE Savannah River Site near Aiken, South Carolina; and Waste Control Specialists, LLC, site near Andrews, Texas.

Since publication of the Final Mercury Storage EIS, DOE has reconsidered the range of reasonable alternatives evaluated in that EIS. Accordingly, DOE now proposes to evaluate two additional locations for a long-term mercury storage facility, both near the Waste Isolation Pilot Plant (WIPP), which DOE operates for disposal of defense transuranic waste. One of the additional locations to be evaluated is in Section 20, Township 22 South, Range 31 East within the land subject to the WIPP Land Withdrawal Act (Pub. L. 102–579) as amended (Act), across the WIPP access road from the WIPP facility. The second is in the vicinity of WIPP, but outside of the lands withdrawn by the Act, in Section 10, Township 22 South, Range 31 East, approximately 3½ miles north of the WIPP facility. Through development of the SEIS, DOE will evaluate the cumulative impacts of constructing and operating a facility for long-term management and storage of elemental mercury with the ongoing and planned operations of WIPP for disposal of defense transuranic waste, as well as the potential disposal of greater-than-Class C waste (*Draft Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-level Radioactive Waste and GTCC–Like Waste* (GTCC EIS, DOE/EIS–0375, February 2011). The locations to be evaluated in the SEIS would be suitable for an above-ground storage facility.

Identification of Environmental Issues

DOE proposes to analyze the potential environmental impacts of the two additional alternatives for management and storage of elemental mercury as they apply to the following:

- Land use and visual resources.
- Geology, soils, and geologic hazards, including seismicity.
- Water resources (surface water and groundwater).
- Meteorology, air quality and noise.
- Ecological resources (terrestrial resources, wetlands and aquatic resources, and species that are Federal- or state-listed as threatened, endangered, or of special concern).
- Cultural and paleontological resources such as prehistoric, historic, or Native American sites.
- Site infrastructure.
- Waste management.
- Occupational and public health and safety, including from construction, operations, facility accidents, transportation, and intentional destructive acts.
- Ecological risk.
- Socioeconomic impacts on potentially affected communities.
- Environmental Justice (i.e., whether long-term mercury management and storage activities have a disproportionately high and adverse effect on minority and low-income populations).
- Facility closure.
- Cumulative impacts, including global commons cumulative impacts, i.e., ozone depletion and climate change.
- Potential mitigation measures.
- Unavoidable adverse environmental impacts.
- Irreversible and irretrievable commitments of resources.
- Relationship between short-term uses of the environment and maintenance and enhancement of long-term productivity.

Public Participation in the SEIS Process

NEPA implementing regulations require an early and open process for determining the scope of an EIS (or SEIS) and for identifying the significant issues related to the proposed action. To ensure that the full range of issues related to the proposed action are addressed, DOE invites Federal agencies, state, local, and tribal governments, and the general public to comment on the scope of the SEIS, including identification of reasonable alternatives and specific issues to be addressed. DOE will hold a public scoping meeting in Carlsbad, New Mexico, on June 26, 2012, and in Albuquerque, New Mexico, on June 28, 2012, as previously described (see **DATES**).

Issued in Washington, DC, on May 24, 2012.

Mark A. Gilbertson,

Deputy Assistant Secretary for Site Restoration.

[FR Doc. 2012–13614 Filed 6–4–12; 8:45 am]

BILLING CODE 6450–01–P

DEPARTMENT OF ENERGY

Federal Energy Regulatory Commission

Combined Notice of Filings

May 30, 2012.

Take notice that the Commission has received the following Natural Gas Pipeline Rate and Refund Report filings:

Filings Instituting Proceedings

Docket Numbers: RP12–754–000.
Applicants: Arkansas Electric Cooperative Corp., Hot Spring Power Company, LLC.
Description: Petition for Waiver of Gas Regulations of Arkansas Electric Cooperative Corporation and Hot Spring Power Company, LLC in RP12–754.
Filed Date: 5/25/12.
Accession Number: 20120525–5153.
Comments Due: 5 p.m. ET 6/6/12.

Docket Numbers: RP12–755–000.
Applicants: MarkWest Pioneer, LLC.
Description: MarkWest Pioneer—Quarterly FRP Filing to be effective 7/1/2012.
Filed Date: 5/29/12.
Accession Number: 20120529–5201.
Comments Due: 5 p.m. ET 6/11/12.

Any person desiring to intervene or protest in any of the above proceedings must file in accordance with Rules 211 and 214 of the Commission's Regulations (18 CFR 385.211 and 385.214) on or before 5:00 p.m. Eastern time on the specified comment date. Protests may be considered, but intervention is necessary to become a party to the proceeding.

Filings in Existing Proceedings

Docket Numbers: CP10–16–001.
Applicants: Cadeville Gas Storage LLC.
Description: Abbreviated amendment of Cadeville Gas Storage LLC under CP10–16.
Filed Date: 5/15/12.
Accession Number: 20120515–5240.
Comments Due: 5 p.m. ET 6/4/12.

Any person desiring to protest in any the above proceedings must file in accordance with Rule 211 of the Commission's Regulations (18 CFR 385.211) on or before 5:00 p.m. Eastern time on the specified comment date.

The filings are accessible in the Commission's eLibrary system by clicking on the links or querying the docket number.

eFiling is encouraged. More detailed information relating to filing requirements, interventions, protests, and service can be found at: *http://www.ferc.gov/docs-filing/efiling/filing-req.pdf*. For other information, call (866) 208–3676 (toll free). For TTY, call (202) 502–8659.

Nathaniel J. Davis, Sr.,

Deputy Secretary.

[FR Doc. 2012–13552 Filed 6–4–12; 8:45 am]

BILLING CODE 6717–01–P

DEPARTMENT OF ENERGY

Federal Energy Regulatory Commission

Combined Notice of Filings

Take notice that the Commission has received the following Natural Gas Pipeline Rate and Refund Report filings:

Filings Instituting Proceedings

Docket Numbers: RP12–748–000.
Applicants: Algonquin Gas Transmission, LLC.
Description: AGT Negotiated Rate—Taunton 66667 to be effective 6/1/2012.
Filed Date: 5/24/12.

APPENDIX B
IMPACT ASSESSMENT METHODOLOGY

APPENDIX B
IMPACT ASSESSMENT METHODOLOGY

Appendix B of the January 2011 *Long-Term Management and Storage of Elemental Mercury Environmental Impact Statement (Mercury Storage EIS)* briefly described the methods used to assess the potential direct, indirect, and cumulative effects of the alternatives for long-term management and storage of elemental mercury. Included were impact assessment methods for land use and visual resources; geology and soils; water resources; meteorology, air quality, and noise; ecological resources; cultural and paleontological resources; site infrastructure; waste management; socioeconomics; environmental justice; and cumulative impacts. Appendix D of the January 2011 *Mercury Storage EIS* described the methodology used to assess occupational and public health and safety impacts and ecological risk. The analyses presented in the January 2011 *Mercury Storage EIS* remain valid and are incorporated into this *Draft Long-Term Management and Storage of Elemental Mercury Supplemental Environmental Impact Statement (Draft Mercury Storage SEIS)* with two exceptions: (1) the occupational and public health and safety analysis; and (2) the socioeconomics and environmental justice analysis. This *Draft Mercury Storage SEIS* includes updates to the occupational and public health and safety analysis resulting from changes to the definition of severity levels (i.e., magnitude of impacts) for acute-inhalation exposures to the public under certain accident scenarios. This *Draft Mercury Storage SEIS* also includes updates to the socioeconomics and environmental justice analyses to incorporate 2010 decennial census information that was not available at the time the January 2011 *Mercury Storage EIS* was published. This appendix updates the methodology for conducting impacts analysis on these resource areas. Additional details of the methods for the evaluation of occupational and public health and safety and ecological risk from normal operations, facility accidents, and mercury transportation are presented separately in Appendix D of this *Draft Mercury Storage SEIS*.

B.1 INTRODUCTION

Methods for assessing environmental impacts vary for each resource area (discipline). In addition, disciplines are analyzed in a manner commensurate with their importance and the expected level of impact on them under a specific alternative—the sliding-scale assessment approach. This is consistent with U.S. Department of Energy (DOE) guidance contained in its *Recommendations for the Preparation of Environmental Assessments and Environmental Impact Statements* (known as *The Green Book*) (DOE 2004:1, 2, 19, 20), in which DOE expands on Council on Environmental Quality instructions for preparing environmental impact statements (40 CFR 1502.2) by stating that impacts should be discussed in proportion to their significance and specifically recommending the use of the sliding scale for impact identification and quantification.

For air quality, for example, pollutant emissions from the mercury[1] storage activities were evaluated for their effect on ambient concentrations and compliance with ambient air quality standards. Comparison with regulatory standards is a commonly used method for benchmarking environmental impacts and is conducted—where appropriate—to provide perspective on the magnitude of identified impacts. Impacts in all resource areas were analyzed consistently; that is, the impact values were estimated using a consistent set of input variables and computations. Moreover, efforts were made to ensure that calculations in all areas used accepted protocols and up-to-date models.

[1] Unless the context indicates otherwise, elemental mercury is referred to hereafter simply as "mercury" in this supplemental environmental impact statement.

In this *Draft Long-Term Management and Storage of Elemental Mercury Supplemental Environmental Impact Statement (Draft Mercury Storage SEIS)*, impacts are typically described in terms of intensity and duration. The term "impact," when used in this draft SEIS, refers to adverse, long-term impacts, unless otherwise stated. A set of standardized impacts terminology was developed for use. Beneficial impacts are those that would improve current conditions, while adverse impacts would degrade current conditions. Intensities are categorized as negligible, minor, moderate, or major, with durations classified as either short term (less than or equal to 5 years) or long term. These categories are defined as follows:

- Negligible: There would be little or no impact on the resource in the region of influence (ROI). Where slight impacts occur, they would be relatively short term, and/or the impacts would not be of any perceptible consequence over the long term.

- Minor: Impacts on the resource in the ROI would be detectable, although localized, relatively small, and of little long-term consequence to the overall makeup of the ROI. Resource loss, consumption, or change would be a small percentage (i.e., generally between 1 and 10 percent) of the resource or resource indicator in the ROI. There would be no loss, damage, or alteration of any rare, unique, special status, or other legally protected resources (e.g., threatened and endangered species or critical habitat).

- Moderate: Impacts on the resource in the ROI would be readily detectable, generally long term, and localized. Resource loss, consumption, or change would be a sizable percentage (i.e., generally between 10 and 40 percent) of the resource or resource indicator in the ROI. Such impacts may prompt consideration of specific project design changes and/or compensatory mitigation for resource loss. Moderate effects may also denote resource conditions that are not expected to affect or impair project implementation but that could prompt consideration of special design or construction mitigation.

- Major: Impacts on the resource in the ROI would be obvious and long term and would have substantial consequences. Either substantial project design changes and/or compensatory mitigation for resource loss would be evaluated. Major effects may also denote resource conditions (e.g., presence of active geologic fault) prompting consideration of substantial changes in project implementation in terms of location and/or special design or construction mitigation.

These terms are used for the analysis of impacts for all resources areas, exclusive of occupational and public health and safety and ecological risk, which are presented separately in Appendix D of this draft SEIS.

DOE evaluated the environmental impacts of the proposed action within defined ROIs specific to each resource area and site evaluated. ROIs encompass the geographic areas within which any meaningful impact is expected to occur, and can include the area within which the proposed action would take place, the site as a whole, or nearby offsite areas. ROIs that are defined with the term "nearby offsite areas" may be different for each site depending on the extent to which meaningful impacts are expected to occur. For example, impacts on historic resources were evaluated at specific facility locations within each site, whereas human health risks to the general public were assessed for an area within a 16-kilometer (10-mile) radius of the facility location. Brief descriptions of the ROIs for each resource area are presented in Table B–1. Detailed definitions of the various ROIs can be found in Appendix B of the January 2011 *Long-Term Management and Storage of Elemental Mercury Environmental Impact Statement (Mercury Storage EIS)*.

Table B–1. General Regions of Influence

Environmental Resource Area	Region of Influence
Land use and visual resources	The project location, the site, and nearby offsite areas
Geology, soils, and geologic hazards	The project location, the site, and nearby offsite areas
Water resources	The project location, the site, and adjacent surface-water bodies and groundwater
Meteorology, air quality, and noise	For meteorology and air quality, the site and nearby offsite areas potentially affected by air pollutant emissions; for noise, the project location, the site, and surrounding areas, including transportation corridors where proposed activities might increase noise levels
Ecological resources	The project location, the site, and nearby offsite areas
Cultural and paleontological resources	The project location and adjacent areas
Site infrastructure	The project location, the site, and local areas supporting the site
Waste management	Site waste management facilities
Occupational and public health and safety and ecological risk	The site, offsite areas, and the transportation corridors
Socioeconomics	The counties where at least 90 percent of site employees reside
Environmental justice	The area within 16 kilometers (10 miles) of the site and the area within 3.2 kilometers (2 miles) of the site as a subset of the 16-kilometer (10-mile) area

B.2 UPDATES TO OCCUPATIONAL AND PUBLIC HEALTH AND SAFETY METHODOLOGY

The occupational and public health and safety analysis presented in the January 2011 *Mercury Storage EIS* is based on DOE's Protective Action Criteria, Revision 25, published in August 2009 (DOE 2009). Since the publication of the January 2011 *Mercury Storage EIS*, DOE has published Revision 27 of the Protective Action Criteria in February 2012 (DOE 2012). This has resulted in changes to the definition of severity levels (i.e., magnitude of impacts) for assessing acute-inhalation exposures to the public under certain accident scenarios, as discussed below. Accordingly, Appendix E, Section E.2, of this draft SEIS updates the occupational and public health and safety analysis for the candidate sites previously analyzed in the January 2011 *Mercury Storage EIS* using these revised exposure criteria; otherwise, the methodology remains the same. The analysis for the Waste Isolation Pilot Plant Vicinity reference locations presented in Chapter 4, Section 4.2.9, and Appendix D of this draft SEIS uses the revised exposure criteria.

Appendix D, Section D.3.1, of this draft SEIS defines four severity levels (SL-I through SL-IV) varying from negligible-to-very-low exposure at SL-I, the possibility of reversible health effects at SL-II, the possibility of irreversible health effects at SL-III, and up to the potential for fatality at SL-IV. In the January 2011 *Mercury Storage EIS*, the boundary between exposures at SL-III and SL-IV was taken to be the U.S. Environmental Protection Agency's (EPA's) Acute Exposure Guideline Level 3 (AEGL-3). For the definition of AEGLs, see Appendix D, Section D.3.1, of this draft SEIS. The boundary between SL-II and SL-III was taken to be EPA's AEGL-2. It would be logical to assume that the boundary between SL-I and SL-II should be AEGL-1. However, EPA has not defined an AEGL-1 for mercury vapor. In the January 2011 *Mercury Storage EIS*, it was judged that the following is conservative as a "surrogate AEGL-1:"[2] the boundary between SL-I and SL-II is equal to DOE's Protective Action Criterion 1 (PAC-1) of 0.3 milligrams per cubic meter for durations of exposure up to 1 hour and equal to

[2] The use of TEEL-0 and PAC-1 in the definition of a "surrogate AEGL-1" should not be taken as having any justification or validity beyond use in this SEIS.

DOE's Temporary Emergency Exposure Limit 0 (TEEL-0) of 0.025 milligrams per cubic meter for durations of exposure exceeding 1 hour (DOE 2009). This latter assumption is highly conservative.

Since the publication of the January 2011 *Mercury Storage EIS*, there have been changes to the DOE PAC-1 and TEEL-0 guidance that warrant reconsideration of the above assumptions. First, the value of the PAC-1 for mercury has decreased from 0.3 to 0.15 milligrams per cubic meter (DOE 2012). This has necessitated reexamination of all accident scenarios with acute-inhalation exposures to the public with durations of release up to 1 hour. Second, DOE has discontinued the publication of TEEL-0 values as part of the ongoing effort to more sharply focus on those hazards that may lead to operational emergencies (DOE 2012). There are no comparable values published by DOE. Therefore, TEEL-0 cannot be referenced for the analysis in this draft SEIS. However, the American Conference of Governmental Industrial Hygienists (ACGIH) publishes a time-weighted average (TWA) for exposures of up to 8 hours in the workplace. For mercury vapor, this is 0.025 milligrams per cubic meter (OSHA 2012), identical to the previously published TEEL-0 value. The TWA is a level of exposure below which workers can be exposed for 8 hours a day and 40 hours a week without adverse health effects. The longest exposure of any accident scenario considered in the analysis is 3 hours. Therefore, it is judged that continuing to use a value of 0.025 milligrams per cubic meter for durations of exposure exceeding 1 hour remains conservative as a "surrogate AEGL-1." Because only the source reference changed and not the value used as a "surrogate AEGL-1" for acute-inhalation exposure exceeding 1 hour, the analyses carried out in the January 2011 *Mercury Storage EIS* remain unchanged.

B.3 UPDATES TO SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE METHODOLOGY

The socioeconomics and environmental justice analyses presented in the January 2011 *Mercury Storage EIS* are based on 2000 census data. Since the publication of the January 2011 *Mercury Storage EIS*, 2010 decennial census data have been published. Accordingly, Appendix E, Section E.3, of this draft SEIS updates the socioeconomics and environmental justice analyses for the candidate sites previously analyzed in the January 2011 *Mercury Storage EIS* using these 2010 census data. Furthermore, the tables shown below have been updated using 2010 census data and supersede those that were presented in Appendix B of the January 2011 *Mercury Storage EIS*; otherwise, the methodology for evaluating socioeconomics and environmental justice impacts remains the same.

The environmental justice analysis focused on potential health risks resulting from normal operations and accidents that could occur during activities associated with implementation of the alternatives for mercury storage. Environmental justice impacts are determined based on the results from the occupational and public health and safety risk analysis, as well as land use, cultural and paleontological resources, socioeconomics, and other resource area impact analyses where impacts on resources may be high and adverse.

Tables B–2, B–3, and B–4 below update Tables B–13, B–14, and B–15, respectively, in Appendix B of the January 2011 *Mercury Storage EIS*.

Table B–2. Site-Specific Thresholds for Identification of Minority and Low-Income Communities Within the 16-Kilometer (10-Mile) Region of Influence (percentage)

Population	Grand Junction Disposal Site	Hanford Site	Hawthorne Army Depot	Idaho National Laboratory	Kansas City Plant	Savannah River Site	Waste Control Specialists, LLC, Site	WIPP Vicinity Reference Locations	Y–12 National Security Complex
Minority Population	36.9[a]	47.5[b]	50.0[a]	36.0[b]	39.9[b]	50.0[b]	50.0[a]	50.0[a]	33.6[a]
Low-Income Population	32.2[b]	32.1[b]	31.9[b]	33.6[b]	32.0[a]	35.9[b]	36.9[b]	35.8[a]	34.2[a]

[a] Indicates the county(ies) as the lower general population percentage.
[b] Indicates the state(s) as the lower general population percentage.
Key: WIPP=Waste Isolation Pilot Plant.

Table B–3. Site-Specific Thresholds for Identification of Minority and Low-Income Communities Within the 3.2-Kilometer (2-Mile) Region of Influence (percentage)

Population	Grand Junction Disposal Site	Hawthorne Army Depot	Kansas City Plant	Waste Control Specialists, LLC, Site	WIPP Vicinity Reference Locations	Y–12 National Security Complex
Minority Population	36.9[a]	50.0[a]	39.0[b]	50.0[b]	50.0[a]	29.3[a]
Low-Income Population	32.2[b]	31.9[b]	34.0[b]	36.9[b]	33.6[a]	36.5[a]

[a] Indicates the county(ies) as the lower general population percentage.
[b] Indicates the state(s) as the lower general population percentage.
Key: WIPP=Waste Isolation Pilot Plant.

Table B–4. Environmental Justice Impact Assessment Protocol

Resource	Required Data		Measure of Impact
	Affected Environment	**Alternative**	
Minority Populations	Baseline demographic data relative to race and ethnicity of all populations reported at the block group level of spatial resolution from the 2010 decennial census, Summary File 1, Table P5, Hispanic or Latino Origin by Race - Universe: Total Population (DOC 2011a).	Location of proposed facility.	Impacts are determined based on the results from the occupational and public health and safety risk analysis, land use, cultural and paleontological resources, socioeconomics, and other resource area impact analyses, as appropriate. For a proposed action to impose disproportionately high and adverse impacts upon minority and low-income communities, first high and adverse impacts must be identified as a result of the proposed action. For resource areas with no or negligible impacts, additional environmental justice analysis is not warranted. For resource areas where there may be the potential for high and adverse impacts, additional analysis is performed to determine if conditions exist that would result in those impacts being borne disproportionately by minority or low-income communities.
Low-Income Populations	Baseline demographic data relative to income reported at the block group level of spatial resolution from the *2006–2010 American Community Survey 5-Year Estimates*, Table C17002, Ratio of Income to Poverty Level in the Past 12 Months - Universe: Population for Whom Poverty Status is Determined (DOC 2011b).		

Data relative to race and ethnicity from the 2010 decennial census, Summary File 1, Table P5, Hispanic or Latino Origin by Race (DOC 2011a), are used to identify block groups that contain disproportionately high minority populations surrounding the candidate sites for mercury storage. Table P5 provides sufficient detail to determine baseline demographic data relative to race and ethnicity for all minority populations reported at the block group level.

There are no data relative to income available from the 2010 census. The Census Bureau's *American Community Survey (ACS)* 5-year estimates is the only data set that publishes current data relative to income at the block group level of spatial resolution. The geographic boundaries from the *2006–2010 ACS 5-Year Estimates* data set are consistent with those used during the 2010 census. Therefore, data relative to income from the *2006–2010 ACS 5-Year Estimates* data set, Table C17002, Ratio of Income to Poverty Level in the Past 12 Months (DOC 2011b), are used to identify block groups that contain disproportionately high low-income populations surrounding the candidate sites for mercury storage.

B.4 REFERENCES

DOC (U.S. Department of Commerce), 2011a, *U.S. Census Bureau, 2010 Decennial Census*, Summary File 1, Table P5: Hispanic or Latino Origin by Race - Universe: Total Population, accessed through http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml.

DOC (U.S. Department of Commerce), 2011b, *U.S. Census Bureau, 2006–2010 American Community Survey 5-Year Estimates*, Table C17002: Ratio of Income to Poverty Level in the Past 12 Months - Universe: Population for Whom Poverty Status is Determined, accessed through http://www2.census.gov/acs2010_5yr/summaryfile/UserTools/.

DOE (U.S. Department of Energy), 2004, *Recommendations for the Preparation of Environmental Assessments and Environmental Impact Statements*, 2nd ed., Office of NEPA Policy and Compliance, Washington, DC, December.

DOE (U.S. Department of Energy), 2009, *Protective Action Criteria (PAC): Chemicals with AEGLs, ERPGs, & TEELs*, Rev. 25, accessed through http://www.atlintl.com/DOE/teels/teel/teel_archives.html. August.

DOE (U.S. Department of Energy), 2012, *Protective Action Criteria (PAC): Chemicals with AEGLs, ERPGs, & TEELs*, Rev. 27, accessed through http://www.atlintl.com/DOE/teels/teel/teel_pdf.html. February.

OSHA (Occupational Safety and Health Administration), 2012, *Occupational Safety and Health Guideline for Mercury Vapor*, U.S. Department of Labor, accessed through http://www.osha.gov/SLTC/healthguidelines/mercuryvapor/recognition.html, November 12.

Code of Federal Regulations

40 CFR 1502.2, U.S. Environmental Protection Agency, "Environmental Impact Statement: Implementation."

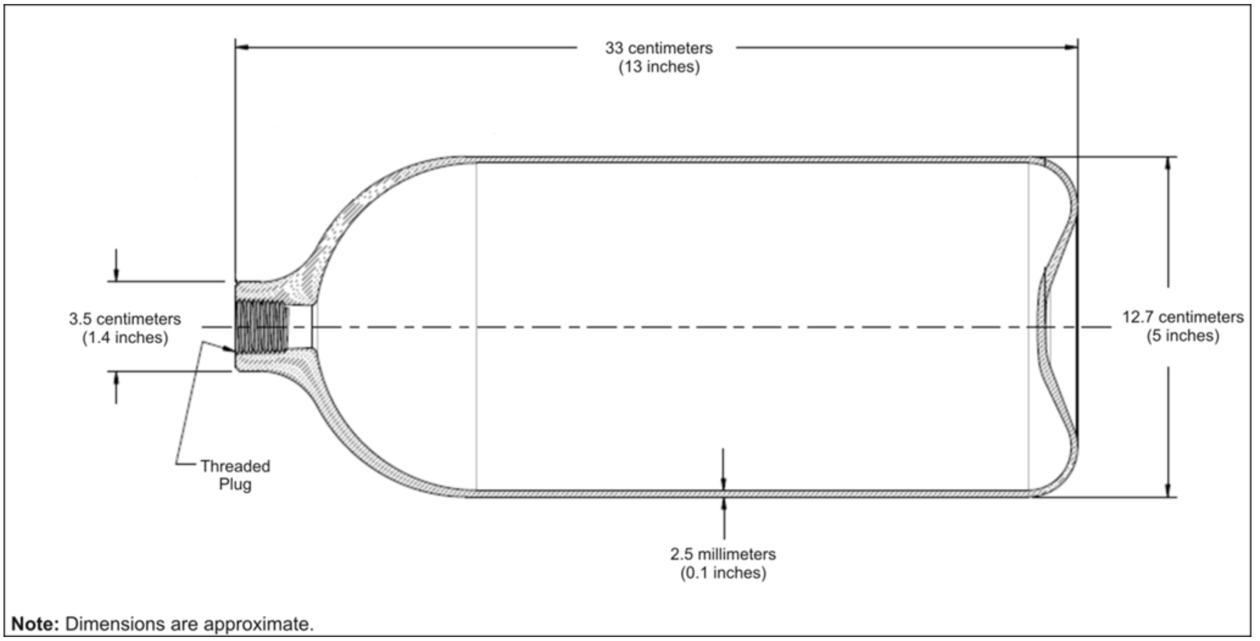
APPENDIX C
STORAGE FACILITY
CONSTRUCTION AND OPERATIONS DATA

APPENDIX C
STORAGE FACILITY CONSTRUCTION AND OPERATIONS DATA

This appendix presents data on construction and operations of a new mercury storage facility analyzed in this *Draft Long-Term Management and Storage of Elemental Mercury Supplemental Environmental Impact Statement (Draft Mercury Storage SEIS)*. Section C.1 provides data related to the transportation of elemental mercury to the storage facility. Section C.2 provides background information regarding design criteria, a general description of physical characteristics, and construction and operations data for a new facility that would be used to store mercury. Appendix C of the January 2011 *Long-Term Management and Storage of Elemental Mercury Environmental Impact Statement (Mercury Storage EIS)* presented data on construction and operations of a new mercury storage facility, as well as data on modification of existing buildings, as appropriate to each of the seven candidate sites analyzed in the January 2011 *Mercury Storage EIS* that are still under consideration for the long-term storage of mercury. The data from the January 2011 *Mercury Storage EIS* Appendix C related to construction and operations of a new facility are applicable to the Waste Isolation Pilot Plant Vicinity reference locations considered in this *Draft Mercury Storage SEIS*, and are reproduced in this appendix for convenience.

C.1 TRANSPORTATION REQUIREMENTS

Two acceptable container types for the mercury storage facility are 3-liter (3-L) (34.6-kilogram [76-pound]) flasks and 1-metric-ton (1-MT) (1.1-ton) containers. Figure C–1 illustrates the dimensions of a typical 3-L flask and Figure C–2 illustrates the dimensions of a typical 1-MT container. Other containers may be accepted for storage on a case-by-case basis. All containers are subject to U.S. Department of Transportation regulations regarding the transportation of elemental mercury.[1]



Note: Dimensions are approximate.

Figure C–1. Dimensions of a Typical 3-Liter Flask

[1] Unless the context indicates otherwise, elemental mercury is referred to hereafter simply as "mercury" in this supplemental environmental impact statement.

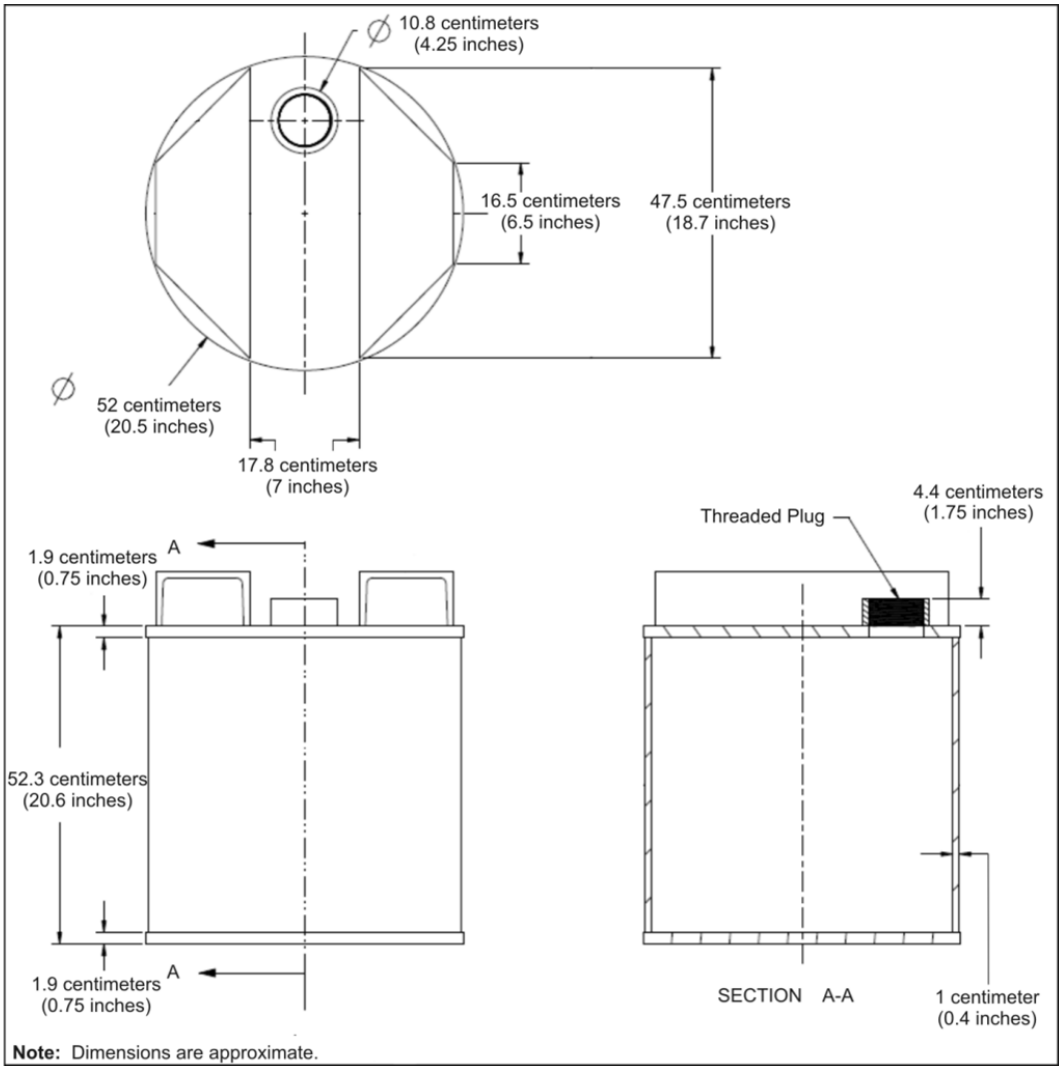
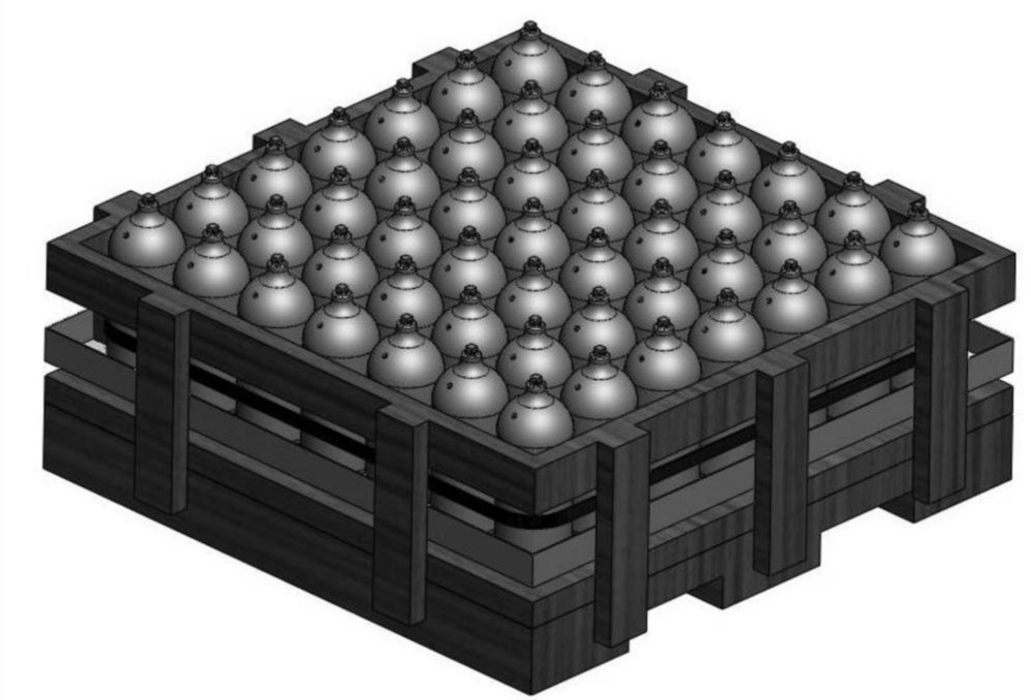


Figure C–2. Dimensions of a Typical 1-Metric-Ton Container

The 3-L flasks would be transported in pallets; such pallets may have a built-in spill tray. Each pallet would contain up to a maximum of 49 3-L flasks in a 7- by 7-flask configuration, not to exceed 1.4 meters (4.7 feet) on a side. The 3-L flasks could also be shipped in quantities of less than 49 per pallet. Full-size pallets (containing 49 3-L flasks) would be shipped "ready" for storage upon passing inspection and satisfying acceptance criteria. Smaller loads (pallets containing less than 49 3-L flasks) would be consolidated in the Handling Area at the U.S. Department of Energy (DOE) facility for efficient storage. Noncombustible (i.e., metal) or fire-resistant wooden pallets are recommended as a best management practice over non-fire-resistant wooden pallets (DOE 2009). An example of typical shipment of a full-size pallet of 49 3-L flasks is provided in Figure C–3.

The 1-MT containers would also be shipped on box pallets; however, there would be only one container per pallet. Each pallet would be constructed of wood or metal, similar to the 3-L flask pallets. Once received and visually inspected for integrity, the 1-MT containers would be removed from their shipping pallets and placed in a spill tray in long-term storage. The transportation pallets would be returned to the generator for reuse, if requested. Each spill tray would accommodate eight 1-MT containers in a 2-container by 4-container configuration (DOE 2009).



Source: DOE 2009.

Figure C–3. Example Box Pallet for Shipping 3-Liter Flasks in a 7-Flask by 7-Flask Configuration

Consistent with the estimated amount of potentially available mercury discussed in Chapter 1, Section 1.3.1, of this *Draft Long-Term Management and Storage of Elemental Mercury Supplemental Environmental Impact Statement (Draft Mercury Storage SEIS)*, DOE makes the following assumptions regarding the availability of surplus mercury for storage:

- All or a portion of DOE's surplus mercury inventory of approximately 1,200 metric tons (1,300 tons) currently in storage at the Y–12 National Security Complex (Y–12) is being considered for transfer to the long-term mercury storage facility.

- The remaining chlor-alkali facilities would close by 2020, yielding approximately 1,100 metric tons (1,210 tons) of mercury that would be shipped to the long-term mercury storage facility over the first 7 years of operation.[2]

- Mining would yield approximately 4,900 metric tons (5,400 tons) of mercury during the 40-year period of analysis that would be shipped to the long-term mercury storage facility.

- Reclamation and recycling facilities would yield approximately 2,800 metric tons (3,090 tons) of mercury during the 40-year period of analysis that would be shipped to the long-term mercury storage facility.

[2] Olin Corporation has announced that its chlor-alkali plants in Tennessee and Georgia will be consolidated and converted to mercury-free technology by the end of 2012 (Pavey 2012). The fate of this mercury is uncertain and may still be eventually shipped to a DOE facility(ies) for long-term management and storage; therefore, the quantities of mercury analyzed in this *Draft Mercury Storage SEIS* remain unchanged.

DOE makes the following assumptions regarding the quantities of mercury and when this mercury would be shipped to the long-term mercury storage facility:[3]

- First 2 Years of Operation: A total of approximately 950 metric tons (1,050 tons) would be delivered per year from Y–12 (if the decision is made to transfer the Y–12 mercury inventory to the new storage facility), chlor-alkali facilities, mines, and reclamation and recycling facilities.
- Third Through Seventh Year of Operation: A total of approximately 350 metric tons (390 tons) would be delivered per year from chlor-alkali facilities, mines, and reclamation and recycling facilities.
- Eighth Through Fortieth Year of Operation: A total of approximately 190 metric tons (210 tons) would be delivered per year from mines and reclamation and recycling facilities.

DOE makes the following assumptions regarding the transportation of mercury:

- A fully loaded truck can carry 9 pallets of 49 3-L flasks or 14 1-MT containers, and a fully loaded railcar can carry 24 pallets of 49 3-L flasks or 54 1-MT containers.
- Mercury from Y–12 would be shipped in 3-L flasks, mercury from chlor-alkali facilities would be shipped in 1-MT containers, and mercury from mines and reclamation and recycling facilities would be shipped in 3-L flasks and/or 1-MT containers.

Based on the above-mentioned assumptions and assuming fully loaded trucks or railcars, the number of shipments that would be required for each transportation scenario is listed below. However, it can be reasonably expected that some shipments would be smaller and not necessarily on fully loaded trucks. Truck Scenarios 1 and 2 and the Railcar Scenario are defined in Appendix D, Section D.2.2, of this *Draft Mercury Storage SEIS*. These scenarios are summarized below.

Truck Scenario 1: Fully loaded trucks.

- First 2 Years of Operation: It is expected that 66 truck deliveries would be made per year from Y–12, chlor-alkali facilities, mines, and reclamation and recycling facilities.
- Third Through Seventh Year of Operation: It is expected that 26 truck deliveries would be made per year from chlor-alkali facilities, mines, and reclamation and recycling facilities.
- Eighth Through Fortieth Year of Operation: It is expected that 14 truck deliveries would be made per year from mines and reclamation and recycling facilities.

Truck Scenario 2: Partially loaded trucks.

- First 2 Years of Operation: It is expected that 79 truck deliveries would be made per year from Y–12, chlor-alkali facilities, mines, and reclamation and recycling facilities.
- Third Through Seventh Year of Operation: It is expected that 39 truck deliveries would be made per year from chlor-alkali facilities, mines, and reclamation and recycling facilities.
- Eighth Through Fortieth Year of Operation: It is expected that 27 truck deliveries would be made per year from mines and reclamation and recycling facilities.

[3] For purposes of analysis, the January 2011 *Long-Term Management and Storage of Elemental Mercury Environmental Impact Statement* assumes a 40-year operational period with the first year starting in 2013 and the fortieth year, in 2052. An operational start date is not known at this time; however, the period of analysis remains 40 years. For example, if the mercury storage facility(ies) were to start operations in 2014, the last year of operations would likewise shift to 2053, and so forth.

Railcar Scenario: Fully loaded railcars.

- First 2 Years of Operation: It is expected that 23 rail deliveries would be made per year from Y–12, chlor-alkali facilities, mines, and reclamation and recycling facilities.
- Third Through Seventh Year of Operation: It is expected that 8 rail deliveries would be made per year from chlor-alkali facilities, mines, and reclamation and recycling facilities.
- Eighth Through Fortieth Year of Operation: It is expected that 5 rail deliveries would be made per year from mines and reclamation and recycling facilities.

C.2 MERCURY STORAGE FACILITY

C.2.1 Introduction

The *U.S. Department of Energy Interim Guidance on Packaging, Transportation, Receipt, Management, and Long-Term Storage of Elemental Mercury* (DOE 2009) serves as a basis for developing the design and operational parameters for a new mercury storage facility. For some criteria, construction and operations data for similar storage facilities were used to supplement the information taken from DOE (2009).

The DOE mercury storage facility would include the following four major physical areas that would provide the necessary functions for receipt, inspection, and long-term storage of mercury (DOE 2009):

- **Receiving and Shipping Area.** This area would include dedicated space(s) for the receipt, inspection, and handling of mercury containers. It would allow for truck docking, offloading, inspection, and transfer of received mercury to the facility. It would also allow for inspection, packaging, marking, manifesting, and truck docking and loading for shipments of secondary waste out of the DOE storage facility. It would be adjacent to the Handling and Storage Areas.
- **Handling Area.** This area would include dedicated space(s) for acceptance/verification of incoming containers and for work involving potential contamination, including (1) safely handling and cleaning palletized or individual containers that have external mercury contamination, and/or (2) repackaging mercury from containers that have failed inspection. This area is needed for non-routine and emergency response activities for leaking flasks and/or containers. The area would be enclosed and have filtered ventilation. All exhausted air would pass through a sulfur filter to remove mercury vapors.
- **Storage Area.** This area would include dedicated space for the storage of mercury containers. Composing the bulk of the facility, this enclosed area would have ample storage and aisle space for careful, tracked placement and retrieval of all containers (e.g., 3-L and 1-MT capacity). The area would be well lit, with appropriate ventilation, spill containment, and fire protection measures. Although sufficient forced ventilation would be provided in all Storage Areas, conditioned air would not be required. Note that the Storage Area(s) may be constructed in a modular fashion to accommodate mercury inventories as they become available for storage.
- **Office Administration Area.** This area would include the management, operations, training, and all other administration functions supporting the overall mercury program. Examples include the storage and maintenance of records, waste verification documents, shipping papers, and databases. It should not be located within a hazardous area and would preferably be separated from the other three facility areas.

Key features of a Resource Conservation and Recovery Act–permitted facility used for the storage of elemental mercury include the following:

- **Location and Siting.** The selection of siting for construction of a new facility or evaluation of an existing facility would consider environmentally sensitive locations or conditions such as the existence of floodplains, wetlands, groundwater, seismic zones, karst soils or other unstable terrain, local weather phenomena, or incompatible land use.

- **Security.** At a minimum, facility security would meet the requirements for a DOE Property Protected Area, as outlined in DOE Manual 470.4-2A, *Physical Protection*. The facility would be located in an area under the control and authority of DOE and would prevent inadvertent or deliberate unauthorized access to the facility and the Storage Area(s). The facility would have a perimeter barbed-wired fence to control unauthorized access. Remote surveillance may also be employed, where necessary.

- **Containment.** The Storage Areas of the facility would be designed to properly contain any release of mercury. This would include the use of spill trays, properly sloped floors, and floors constructed to be impervious to liquid mercury releases. The facility walls and ceiling would be constructed of sufficient quality and design to shield the stored mercury from weather elements and ensure that mercury is not entrained in stormwater runoff.

- **Ventilation.** The Handling Area would be ventilated through the use of a high-negative draw system for removing high-concentration vapors from mercury "sources" (e.g., container residues, open containers, small spills). The exhaust air would pass through a sulfur filter to remove mercury vapor and be discharged to the outside. A wall-mounted air conditioning unit would be available for maintaining interior temperatures below 70 degrees Fahrenheit during times when mercury is being handled to keep its volatility low. The Storage Area would be ventilated using low-vacuum, high-volume, industrial-sized roof- or wall-mounted fans sized to provide multiple air exchanges over a short period of time and to evacuate low-concentration vapors that may accumulate in the storage spaces over time. These fans would operate on an as-needed basis prior to and during occupancy.

- **Fire Protection.** The facility would be outfitted with fire detection systems such as smoke and heat detectors, as well as a permanent fire suppression system. The fire suppression system would be a conventional wet- or dry-charge water sprinkler system augmented with readily accessible fire extinguishers.

- **Emergency Response.** The Handling Area would be designed for responding to small spills that might occur or for transferring mercury from corroding or leaking containers or from containers that have failed inspection upon arrival at the facility to new containers prior to placing them in storage. Emergency response procedures would be developed for larger releases of mercury.

- **Monitoring.** The facility would conduct mercury vapor monitoring for the detection of any unplanned releases of mercury or deterioration of flask or container integrity. Weekly inspections of containers in long-term storage would incorporate air sampling.

- **Record-Keeping.** Training records, waste receipts, inspection reports, laboratory analysis, response plans, monitoring data, etc., would be maintained in the Office Administration Area.

C.2.2 Physical Description

Construction of a new storage facility is being evaluated at all Waste Isolation Pilot Plant (WIPP) Vicinity reference locations considered in this *Draft Mercury Storage SEIS*. Figure C–4 provides a potential conceptual layout for a generic, full-size new mercury storage facility. Figure C–5 provides detail for the Receiving and Shipping Area and Handling Area. The WIPP Vicinity reference locations would require new permits for the construction and operation of a long-term mercury storage facility. These permits would be subject to approval by the applicable regulatory agency.

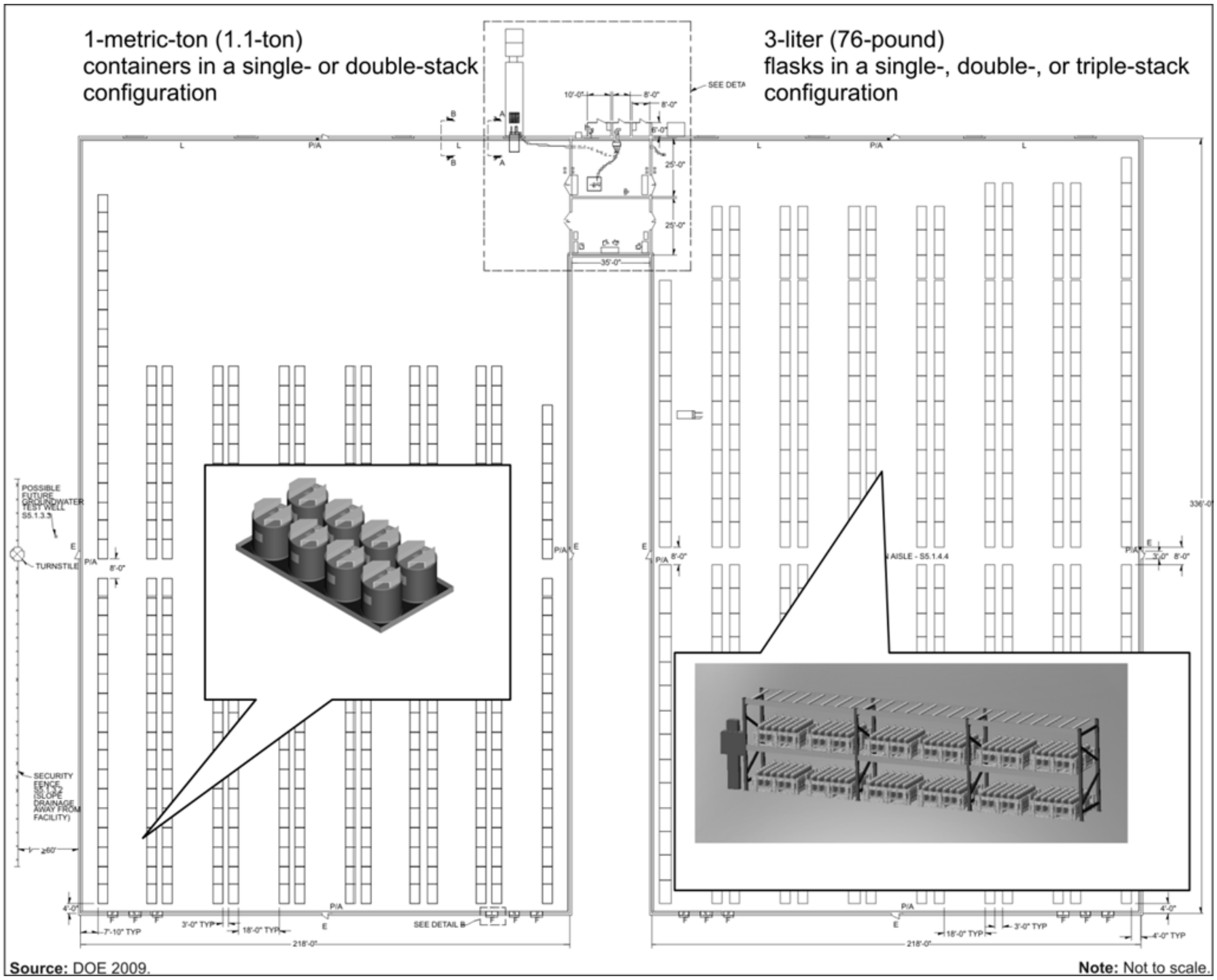


Figure C–4. Conceptual Layout for a New Mercury Storage Facility

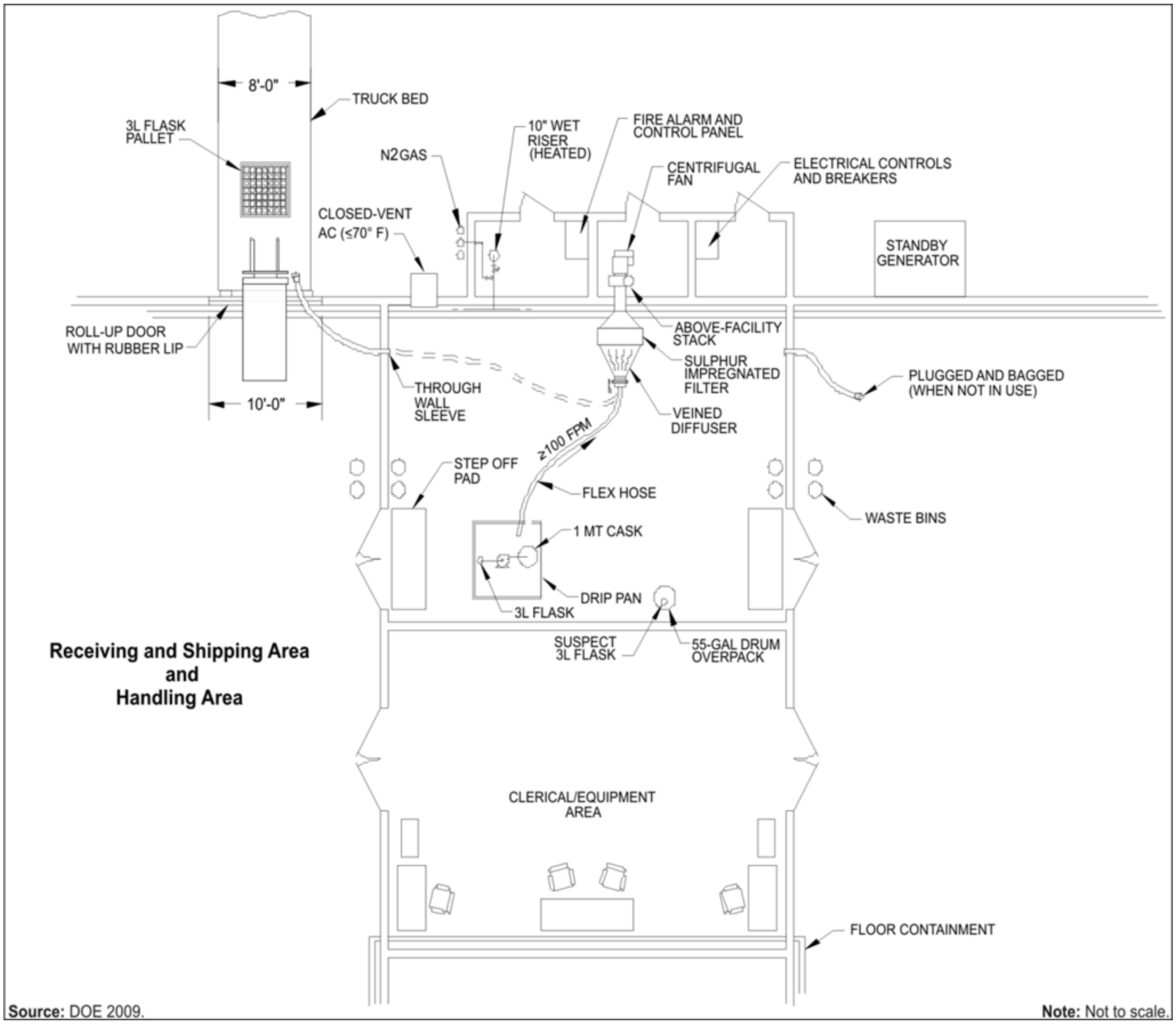


Figure C–5. Conceptual Schematic for Receiving and Shipping Area and Handling Area of a New Mercury Storage Facility

Table C–1 provides general physical data for the construction of a generic, new facility for the storage of elemental mercury.

Table C–1. Data for a Mercury Storage Facility – New Construction

Parameter	New Facility[a]
Facility Footprint	20,500 square meters (220,600 square feet)
Permitted for Storage of Hazardous Waste Under Resource Conservation and Recovery Act	Yes; would be permitted.
Building Dimensions (length × width)	154×102 meters (506×336 feet)
Ceiling Height	6.1 meters (20 feet)
Number of Buildings	1
Total Space Dedicated to Storage	13,610 square meters (146,500 square feet)
Building Construction	Structural steel frame on reinforced-concrete slab and sheet metal shell; epoxy-sealed floor.
Floor Thickness	30 centimeters (12 inches)
Rail Access	Yes, with exception of Grand Junction Disposal Site location.
Access/Security	Security measures would prevent inadvertent or deliberate unauthorized access to the facility and Storage Area(s). Examples would include physical barriers such as perimeter barbed-wire fence, remote interior and exterior surveillance, and/or security personnel.
Potentially Required Building Modifications	New facility would be designed and built to desired specifications.

[a] Data for new facility construction would be similar regardless of location.
Source: DOE 2009.

C.2.3 Construction Data

Resource commitments for new facility construction would be similar regardless of location and are presented in Table C–2. DOE expects that construction of a new mercury storage facility would require approximately 6 months to complete.

Table C–2. Resource Commitments for Construction of a New Mercury Storage Facility[a]

Resource	Quantity
Land Use	
Land disturbance	3.1 hectares (7.6 acres)
Labor	
Man hours	18,500
Materials	
Concrete	4,755 cubic meters (6,220 cubic yards)
Gravel (crushed stone)	3,875 cubic meters (5.070 cubic yards)
Asphalt	670 cubic meters (872 cubic yards)
Steel	2,700 metric tons (2,970 tons)
Epoxy sealant	2,400 liters (6,330 gallons)
Utilities	
Water (non-potable)	1,230,000 liters (325,000 gallons)
Water (potable)	40,900 liters (10,800 gallons)
Diesel	193,000 liters (51,000 gallons)
Gasoline	0 liters (0 gallons)
Electricity	0 megawatt-hours
Waste	
Nonhazardous construction debris	270 cubic meters (355 cubic yards)
Nonhazardous liquid waste (sanitary wastewater)	9,850 liters (2,600 gallons)

[a] Duration of construction would be 6 months.
Source: DOE 2009.

The construction of a new facility would generate air emissions from the use of heavy equipment and the disturbance of soils from grading and site preparation. Typical heavy equipment that might be used would include dump trucks, cement trucks, dozers, graders, spreaders, compactors, cranes, etc. Air emissions from vehicle exhaust would be dependent on frequency of use, fuel efficiency, and fuel type. Particulate air emissions would be dependent on the amount of exposed land and the duration of exposure. Based on the relevant factors and an estimated construction period of 6 months, expected air emissions are listed in Table C–3.

Table C–3. Air Emissions During Construction of a New Mercury Storage Facility[a]

Pollutant	Total Emissions (metric tons)	Total Emissions (tons)
Carbon monoxide	3.01	3.32
Nitrogen dioxide	14.0	15.4
Sulfur dioxide	0.00475	0.00524
Particulate matter (with a diameter of 10 micrometers or less)	16.6	18.3
Carbon dioxide	520	573
Total organic compounds	1.14	1.26
Ammonia	0.022	0.0242
Benzene	0.00296	0.00326
1,3-Butadiene	0.0001124	0.000137
Formaldehyde	0.00374	0.00412
Toluene	0.00130	0.00143
Xylene	0.000903	0.000995

[a] Duration of construction would be 6 months.
Source: EPA 1995; USACE 2007.

Minimal site excavation would be required for the construction of a new facility. Excavation up to 60 centimeters (24 inches) may be required for site preparation and pouring the concrete foundation. Small trenches may also be required for installation of utilities or connection with existing utilities and installation of concrete footers; depths for this could be 0.6 meters (2 feet) wide and 1.2 meters (4 feet) deep. Any excess soil would be incorporated and contoured into the existing landscape. It is assumed that any new construction would take place in an uncontaminated area.

C.2.4 Operations Data

Resource commitments for operations of a mercury storage facility for the storage of up to 10,000 metric tons (11,000 tons) of elemental mercury are presented in Table C–4. It is conservatively assumed that security personnel would guard the facility 24 hours per day, 7 days per week, although this level of security may not be necessary. Based on this assumption, site security for a standalone facility is estimated to be 350,400 man hours over the 40-year period of analysis. Considering a full-time equivalent worker works 2,080 hours per year, security would be 4 1/4 full-time equivalents. Security personnel would only be required during normal working hours for receipt and handling of mercury shipments and would be reduced to 83,200 man hours over the 40-year period of analysis. Other operations personnel would include administrative staff, labor for the receipt, inspection, and handling of incoming mercury shipments, facility maintenance, and industrial hygiene and occupational safety experts. This required operations staff would be 3 3/4 full-time equivalents for the first 7 years and 1 1/8 full-time equivalents thereafter.

Table C–4. Resource Commitments for Operation of a New Mercury Storage Facility[a]

Resource	Quantity
Land Use	
Land occupied	3.1 hectares (7.6 acres)
Labor	
Man hours	482,220 (215,020)[b]
Utilities	
Water (non-potable)	Negligible
Water (potable)	3,540,000 liters (935,000 gallons)
Diesel	24,200 liters (6,400 gallons)
Gasoline	Negligible
Electricity	10,100 megawatt-hours
Waste	
Hazardous solid waste (55-gallon drums)	910
Nonhazardous liquid waste (sanitary wastewater)	2,360,000 liters (623,000 gallons)

[a] Values presented are totals for the 40-year period of analysis.

[b] Parenthetical value represents reduced security personnel for those candidate sites that already reside within a secure Federal complex (i.e., the Hanford Site, Hawthorne Army Depot, Idaho National Laboratory, and the Savannah River Site).

Source: DOE 2009.

The long-term mercury storage facility will not treat or process mercury. The facility will only be designed to store mercury in high-integrity, tight containers. However, it may become necessary to respond to small spills or repackage mercury from failed containers. The Handling Area, where repackaging mercury into new containers would be performed, would be negatively ventilated and the exhaust air would be filtered to remove airborne mercury emissions. The binding chemical that would most likely be used to remove mercury from the air would be sulfur. Filters would be replaced on a regular schedule to maintain optimum mercury removal efficiency. Therefore, air emissions vented from the Handling Area to the outside air are expected to be negligible. Mercury vapor might accumulate in the Storage Area(s) during normal operations from storage containers or residual surface contamination and could subsequently be vented to the outside air through the exhaust fans. However, as discussed in Chapter 4, Section 4.2.9, and Appendix D, air emissions from normal operations are projected to remain well below actionable concentrations for human health exposure.

C.3 REFERENCES

DOE (U.S. Department of Energy), 2009, *U.S. Department of Energy Interim Guidance on Packaging, Transportation, Receipt, Management, and Long-Term Storage of Elemental Mercury*, Office of Environmental Management, Washington, DC, November 13.

EPA (U.S. Environmental Protection Agency), 1995, *Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources*, 5th ed., Research Triangle Park, North Carolina, January.

Pavey, R., 2012, "Olin Prepares for Mercury Free Future After 47 Years," *The Augusta Chronicle*, July 15.

USACE (U.S. Army Corps of Engineers), 2007, *Construction Equipment Ownership and Operating Expense Schedule, Region I*, EP 11110-1-8, Vol. I, July.

U.S. Department of Energy Directives

DOE Manual 470.4-2A, *Physical Protection*, July 23, 2009.

APPENDIX D
HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT ANALYSIS

APPENDIX D
HUMAN HEALTH AND
ECOLOGICAL RISK ASSESSMENT ANALYSIS

> This appendix provides a summary of the discussion presented in Chapter 4, Section 4.2.9, and Appendix D of the January 2011 *Long-Term Management and Storage of Elemental Mercury Environmental Impact Statement* and includes new data specific to conducting the risk assessments for the Waste Isolation Pilot Plant Vicinity reference locations. This summary includes an overview of input data, assumptions, toxicity of mercury, and the approach to evaluating risk.

D.1 INTRODUCTION

As described in Chapter 1 of this *Draft Long-Term Management and Storage of Elemental Mercury Supplemental Environmental Impact Statement (Draft Mercury Storage SEIS)*, the Mercury Export Ban Act of 2008 (P.L. 110-414) requires that the Secretary of Energy designate a facility or facilities of the U.S. Department of Energy (DOE) (which shall not include the Y–12 National Security Complex [Y–12] or any other portion or facility of the DOE Oak Ridge Reservation) for the purpose of long-term management and storage of elemental mercury[1] generated within the United States.

The alternatives that are analyzed in this appendix are listed below.

- Waste Isolation Pilot Plant (WIPP) Vicinity Section 10
- WIPP Vicinity Section 20
- WIPP Vicinity Section 35

For further description of these alternatives, see Chapter 2, Section 2.3, and Appendix C of this supplemental environmental impact statement (SEIS).

D.2 OVERVIEW OF INPUT DATA AND ASSUMPTIONS

The input data and assumptions are described in Appendix D of the January 2011 *Long-Term Management and Storage of Elemental Mercury Environmental Impact Statement (Mercury Storage EIS)*, as updated in Appendices B and E of this SEIS.[2] Some of those input data and assumptions are restated here for the convenience of the reader and augmented where appropriate with data specific to the WIPP Vicinity reference locations.

D.2.1 Quantity of Mercury to Be Shipped

Mercury would be received as 99.5 percent or greater pure elemental mercury from a variety of sources, tabulated in Table D–1.

Additional detail on the estimated quantities of elemental mercury is provided in Appendix D, Section D.1, of the January 2011 *Mercury Storage EIS*. The starting point for Table D–1 is Chapter 1, Table 1–1, which provides an estimate of between 8,500 and 9,700 metric tons (8,000 and 10,700 tons) for the total amount of mercury that may be shipped to the chosen receiving site based on a 40-year period of analysis. For the purposes of this analysis, the amount was rounded up to

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[1] Unless the context indicates otherwise, elemental mercury is referred to hereafter simply as "mercury" in this supplemental environmental impact statement.

[2] Since publication of the January 2011 *Mercury Storage EIS*, DOE has published revised Protective Action Criteria for exposure to mercury vapor. This has resulted in changes to the definition of severity levels (i.e., magnitude of impacts) for assessing acute-inhalation exposures to the public under certain accident scenarios. Appendices B and E of this SEIS update parts of Chapter 4 and Appendix D of the January 2011 *Mercury Storage EIS*. The impact analyses for the WIPP Vicinity reference locations discussed in this SEIS have incorporated the revised criteria.

10,000 metric tons (11,000 tons). This is consistent with the *U.S. Department of Energy Interim Guidance on Packaging, Transportation, Receipt, Management, and Long-Term Storage of Elemental Mercury (Interim Guidance)* (DOE 2009).[3] However, the data in Table 1–1 should not be interpreted as commitments on DOE's part (e.g., to accept mercury from Peru via New York or to move mercury from Y–12 or to the exact dates of shipments from Y–12 and the chlor-alkali facilities). They are merely intended to be a reasonable set of numbers that can be used in a screening risk assessment. Changes since the publication of the January 2011 *Mercury Storage EIS* may mean that less mercury than was contemplated at the time would actually be shipped to the mercury storage facility. However, 10,000 metric tons remains an upper bound that is kept in this *Draft Mercury Storage SEIS* to facilitate comparisons with the other sites that are analyzed in the January 2011 *Mercury Storage EIS*.

Table D–1. Dispatching Sites, Years, and Quantities of Elemental Mercury

Site	Years of Shipments[a]	Total Mass (metric tons)
Y–12 National Security Complex	1st – 2nd	1,206
Chlor-Alkali Facilities		
Ashta Chemical, Ashtabula, Ohio	1st – 7th	108
PPG, New Martinsville, West Virginia	1st – 7th	244
Olin, Charleston, Tennessee[b]	1st – 7th	478
Olin, Augusta, Georgia[b]	1st – 7th	271
Reclamation and Recycling Facilities, Mining, Shipments into Port of New York		
Mining (Carlin, Nevada)	1st – 40th	3,687
Mining (from Peru via Port of New York)	1st – 40th	1,236
Philadelphia region (Bethlehem Apparatus)	1st – 40th	1,939
Chicago region (D.F. Goldsmith)	1st – 40th	831
Total	1st – 40th	10,000

a For purposes of analysis, the January 2011 *Long-Term Management and Storage of Elemental Mercury Environmental Impact Statement* assumes a 40-year operational period with the first year starting in 2013 and the fortieth year, in 2052. An operational start date is not known at this time; however, the period of analysis remains 40 years. For example, if the mercury storage facility(ies) were to start operations in 2014, the last year of operations would likewise shift to 2053, and so forth.

b Olin Corporation has announced that its chlor-alkali plants in Tennessee and Georgia will be consolidated and converted to mercury-free technology by the end of 2012 (Pavey 2012). The fate of this mercury is uncertain and may still be eventually shipped to a DOE facility(ies) for long-term management and storage; therefore, the quantities of mercury analyzed in this *Long-Term Management and Storage of Elemental Mercury Supplemental Environmental Impact Statement* remain unchanged.

Note: To convert metric tons to tons, multiply by 1.1023.

Key: Bethlehem Apparatus=Bethlehem Apparatus Company, Inc.; D.F. Goldsmith=D.F. Goldsmith Chemical and Metal Corporation.

[3] The analysis in this appendix is intended to be consistent with the *Interim Guidance*.

D.2.2 Assumptions About Transportation Analysis

Offsite accidents could occur during transportation to the chosen storage site. The following are the assumptions governing the transportation analysis (some of these assumptions overlap those about the facility):

- The following three transportation scenarios are considered:
  - **Truck Scenario 1**: Full truck shipments.
  - **Truck Scenario 2**: Truck shipments are at 50 percent capacity (doubling the number of truck shipments) from reclamation and recycling (R&R) facilities, gold mines, and the Port of New York, but full truck loads from Y–12 and chlor-alkali facilities; Truck Scenario 2 also accommodates the possibility that there may be shipments of pallets containing less than 49 flasks.
  - **Railcar Scenario**: Shipments by full railcars.
  - No transportation scenarios other than by rail or truck are considered.
- All mercury from Y–12 would be transported in 3-liter (3-L) (0.8-gallon) (34.6-kilogram [76-pound]) flasks. Mercury from chlor-alkali facilities would be transported in 1-metric-ton (1-MT) containers. The overall proportion of mercury in 1-MT containers to that in 3-L flasks would be 60:40 (DOE 2009). Mercury from mining or R&R facilities in the United States could be transported in either 3-L flasks or 1-MT containers. Mercury from mining in Peru would be transported in 3-L flasks (Brooks et al. 2007).

- Packaging of the mercury at the point of origin, transportation to the R&R facilities or to a U.S. port, any processing and repackaging at the R&R facilities, and subsequent loading onto trucks or railcars are not analyzed in this *Draft Mercury Storage SEIS* on the grounds that all of these activities would be carried out anyway, irrespective of the final disposition of the elemental mercury. Elemental mercury would be transported either by road or rail. No other mode of transportation would be considered.

- Y–12 shipments would occur in the first 2 years of operations. Chlor-alkali shipments would be spread across the first 7 years of operations. R&R shipments would be spread across the entire 40 years of operations.[4] Shipments from Peru would be imported through the Port of New York and would also be spread across 40 years. For the purposes of analysis, it is assumed that all mercury from mining in the United States would be shipped from Carlin, Nevada, also over a period of 40 years. Carlin is located near most of the major gold mines in northern Nevada; the state generates approximately 80 percent of U.S.-mined gold.

- As stated above, mercury from Y–12 would be shipped to the DOE storage facility in 3-L (0.8-gallon) flasks containing 34.6 kilograms (76 pounds) of elemental mercury. In total, 1,208,000 kilograms in 34,906 flasks would be shipped.

- As noted above, each flask would contain 34.6 kilograms (76 pounds) of elemental mercury. In addition, the total mass of the empty flask could vary with flask type. The *Interim Guidance*, for example, lists flasks varying in weight from 3.4 to 6.3 kilograms (7.5 to 13.9 pounds). For the purposes of this analysis, container type T-13, with a mass of 4.1 kilograms (9.0 pounds), is taken to be representative. Therefore, the weight of a loaded flask would be 34.6 + 4.1, or

[4] The results of the risk analysis are not sensitive to the precise details of the temporal distribution of shipments. The analysis makes use of the annual average over 40 years only.

38.7 kilograms (about 85 pounds). For a discussion of the sensitivity of the analysis to this assumption, see Appendix D, Section D.6.1.3, of the January 2011 *Mercury Storage EIS*.

- Flasks would be transported in box pallets that each contains an array of 7 × 7 flasks. The dimensions of each pallet would be 1.44 by 1.44 meters (56 by 56 inches) (DOE 2009). One pallet would contain 34.6 × 49, or 1,695 kilograms (approximately 3,738 pounds), of elemental mercury. The total mass of the loaded flasks in a pallet would be 38.7 kilograms per flask × 49 flasks, or 1,896 kilograms (approximately 4,181 pounds). The mass of the pallet and a spill tray must be added to this figure. It is assumed that these would add 100 kilograms (about 220 pounds) to the weight of the flasks, so the total weight of a loaded pallet would be 1,996 kilograms, rounded up to 2,000 kilograms (4,400 pounds) or 2 metric tons (2.2 tons).

- A 1-MT container should not weigh more than 1,250 kilograms (2,750 pounds) when loaded with 1,100 kilograms (2,400 pounds) of mercury (DOE 2009). Therefore, when loaded with 1 metric ton (about 1.1 tons) (about 1,000 kilograms [2,200 pounds]), it should not weigh more than 1,160 kilograms (2,550 pounds). During transportation, it would be sitting in a spill tray that can contain the full 1 metric ton of mercury; this tray would be approximately 10 centimeters (4 inches) less than the height of the container so that a forklift would be able to remove the 1-MT container using the lifts on top of it. The approximate dimensions of such a container are 0.62 by 0.62 by 0.41 meters (24 by 24 by 16 inches). The assembly of 1-MT container, spill tray, and pallet is assumed to weigh 100 kilograms (about 220 pounds) more than the container itself, i.e., 1,260 kilograms (2,770 pounds).

- It is assumed that the capacity of a truck is 18,180 kilograms (40,000 pounds) (DLA 2004a: Section 2.3.1.1). Therefore, one truck could ship either (18,180 kilograms/ 2,000 kilograms per pallet) = 9.09 (rounded down to 9) pallets of 49 flasks or (18,180 kilograms/ 1,260 kilograms per 1-MT container) = 14.4 (rounded down to 14) 1-MT containers. The effective floor area of a truck is 2.4 meters (8 feet) wide by 15 meters (48 feet) long. A pallet's dimensions (1.44 by 1.44 meters [56 by 56 inches or 4.67 by 4.67 feet]) would allow a row of pallets 1 wide and 10 long to be loaded into the truck, which is more than the weight limit of 9 pallets. The total of 14 1-MT containers that the truck would accommodate is also limited by weight rather than by area.

- The capacity of a railcar is approximately 68 metric tons (75 tons) (DLA 2004b). Therefore, the railcar could, in principle, ship up to (68,000 kilograms/2,000 kilograms per pallet) = 34 pallets of 49 flasks. However, the Defense Logistics Agency's (DLA's) *Final Mercury Management Environmental Impact Statement* (DLA 2004a:Section 2.3.1.1) shows that the effective usable floor area is 3 meters (10 feet) wide by 18 meters (59 feet) long, sufficient to accommodate two rows, each row with 12 pallets of 49 flasks, i.e., 24 pallets. Therefore, the railcar is limited by area to 24 pallets of 49 flasks. The railcar can accommodate (68,000 kilograms/1,260 kilograms per 1-MT container) = 54 1-MT containers; in this case, the total is not limited by available space.

- It is assumed that 70 percent of R&R mercury would be shipped from the greater Philadelphia region (assuming geographic coordinates of Bethlehem Apparatus Company, Inc.) and 30 percent from the greater Chicago region (assuming geographic coordinates for D.F. Goldsmith Chemical and Metal Corporation) to a DOE facility. See Section D.1 of the January 2011 *Mercury Storage EIS* for an explanation of these percentages.

Table D–2 summarizes the amounts of mercury that would be transported from each of the locations listed in the assumptions above, with the corresponding total expected numbers of 7- by 7-pallets and 1-MT containers transported over 40 years.

Table D–2. Estimate of Amounts of Mercury to be Transported

Site	Years of Shipments[a]	Total Mass (metric tons)[b]	Number of Pallets[c]	Number of 1-Metric-Ton Containers[d]	Number of Trucks[e]	Number of Railcars[f]
Y–12 National Security Complex	1st – 2nd	1,206	713	0	80	30
Chlor-Alkali Facilities						
Ashta Chemical, Ashtabula, Ohio	1st – 7th	108	0	108	8	2
PPG, New Martinsville, West Virginia	1st – 7th	244	0	244	18	5
Olin, Charleston, Tennessee	1st – 7th	478	0	478	35	9
Olin, Augusta, Georgia	1st – 7th	271	0	271	20	6
Reclamation and Recycling Facilities, Mining, Shipments into Port of New York – Truck Scenario 1 (full truck shipments)						
Mining (Carlin, Nevada)	1st – 40th	3,687	526	2,798	259	74
Mining (via Port of New York)	1st – 40th	1,236	731	0	82	31
Philadelphia region (Bethlehem Apparatus)	1st – 40th	1,939	277	1,472	137	40
Chicago region (D.F. Goldsmith)	1st – 40th	831	119	631	60	17
Reclamation and Recycling Facilities, Mining, Shipments into Port of New York – Truck Scenario 2 (50 percent capacity truck shipments), Railcar Scenario (full rail car shipments)						
Mining (Carlin, Nevada)	1st – 40th	3,687	526	2,798	518	74
Mining (via Port of New York)	1st – 40th	1,236	731	0	164	31
Philadelphia region (Bethlehem Apparatus)	1st – 40th	1,939	277	1,472	274	40
Chicago region (D.F. Goldsmith)	1st – 40th	831	119	631	120	17

[a] For purposes of analysis, the January 2011 *Long-Term Management and Storage of Elemental Mercury Environmental Impact Statement* assumes a 40-year operational period with the first year starting in 2013 and the fortieth year, in 2052. An operational start date is not known at this time; however, the period of analysis remains 40 years. For example, if the mercury storage facility(ies) were to start operations in 2014, the last year of operations would likewise shift to 2053, and so forth.
[b] Average mass transported per year during the 40-year period of analysis: 250 metric tons.
[c] Average number of pallets shipped per year during the 40-year period of analysis: 59.
[d] Average number of 1-metric-ton containers shipped per year during the 40-year period of analysis: 150.
[e] Average number of trucks per year during the 40-year period of analysis: approximately 18 (Truck Scenario 1) or 31 (Truck Scenario 2).
[f] Average number of railcars per year during the 40-year period of analysis: approximately 5.
Note: To convert metric tons to tons, multiply by 1.1023.
Key: Bethlehem Apparatus=Bethlehem Apparatus Company, Inc.; D.F. Goldsmith=D.F. Goldsmith Chemical and Metal Corporation.

In general, the probability of a transportation accident or fatality during a specified operation (such as transportation from one site to another) is calculated by multiplying the number of miles traveled during the operation by a standard factor derived from empirical statistics, which is expressed in terms of the number of accidents per mile, the number of fatalities per mile, or the number of releases of hazardous material per mile. This transportation risk assessment considers a series of assumptions for three types of accidents:

- *Accidents that cause a spill of mercury that subsequently evaporates (no fire):* The frequency of such accidents is derived from the above-mentioned empirical factor of releases per mile.
- *Accidents that cause a major fire that is sufficient to evaporate some of the mercury:* The frequency of such accidents is derived from the above-mentioned empirical factor of accidents per mile, multiplied by the probability that, given an accident, a major fire would occur.
- *Accidents that cause fatalities due to mechanical impact (i.e., accidents that are unrelated to the fact that the cargo is mercury)*: The predicted frequency of such accidents is derived from the above-mentioned empirical factor of fatalities per mile.

To calculate the frequency of occurrence of transportation accidents, certain input data are required. The input data include the definition of the transportation route, the estimation of the number of miles traveled, and the empirical accident factors and conditional probabilities discussed above.

The basic probabilities applied in the transportation risk analysis for accident, fatality, and release rates for truck and rail were calculated using data obtained from the U.S. Department of Transportation Federal Motor Carrier Safety Administration and the Federal Railroad Administration, respectively. Both the truck and rail data are from the years 2004 to 2007. The rates calculated for rail are in terms of railcar miles. The conditional probability of a fire, given a truck accident, is less than 1 percent, and given a rail accident, is 1 percent; therefore, the bounding conditional probability for both of these cases is assumed to be 1 percent (Fischer et al. 1987). Table D–3 summarizes the basic probabilities used in the transportation analysis.

Table D–3. Basic Probabilities Used in the Transportation Risk Analysis

Description	Value
Truck accident with no mercury spill and no fire	6.5×10^{-7} per truck mile
Truck accident with mercury spill (no fire)	8.5×10^{-8} per truck mile
Probability of fire after truck accident	0.01[a]
Truck accident with fire and release of mercury	6.5×10^{-9} per truck mile
Truck accident with mechanically induced fatality (no fire)	2.3×10^{-8} per truck mile
Rail accident with no mercury spill and no fire	2.6×10^{-7} per railcar mile
Rail accident with mercury spill (no fire)	1.2×10^{-9} per railcar mile
Probability of fire after rail accident	0.01
Rail accident with fire and release of mercury	2.6×10^{-9} per railcar mile
Rail accident with mechanically induced fatality	1.6×10^{-8} per railcar mile

[a] To obtain the probability per mile of a mercury spill with fire, this factor of 0.01 is applied to the probability per mile of a truck accident with no mercury spill and no fire, not to the probability per mile of a truck accident with mercury spill (no fire). This is likely conservative.

Source: Fischer et al. 1987; FMCSA 2006:39, 2007, 2008:49, 2009a, 2009b; FRA 2009; Saricks and Tompkins 1999.

D.2.3 Assumptions About the Mercury Storage Facility

If one of the WIPP Vicinity reference locations is the chosen site, a new storage facility will be built on one of three plots, as described in Chapter 2, Section 2.3, and shown in Figures 2–6 and 2–7.

The Mercury Export Ban Act of 2008 does not indicate specific features required for the storage facility (or facilities) that would be used to store elemental mercury. Such buildings may be either newly constructed or existing structures. If one of the WIPP Vicinity reference locations is the chosen site, there will be new construction. However, the *Interim Guidance* (DOE 2009) establishes the basic requirements for safe storage of mercury, including preliminary design elements of a suitable new facility.

The analysis in this *Draft Mercury Storage SEIS* assumes that such a facility would be constructed or modified so as to be consistent with the *Interim Guidance,* which envisages that a storage facility would consist of the following four areas (not necessarily all in the same building):

- Receiving and Shipping Area—this physical area would include dedicated space(s) for the receipt, inspection, acceptance, handling, and shipment of containers.

- Handling Area—this physical area would include dedicated space(s) for work involving potential contamination, including (1) safely handling and cleaning palletized or individual flasks that have external mercury contamination and/or leaking mercury, (2) reflasking failed 3-L flasks identified during the inspections for acceptance, and (3) safely managing leaking 1-MT containers (see Section D.2.4 for a discussion of mercury containers). This area is needed for non-routine and emergency response activities in the event of leaking flasks and containers.

- Storage Area—this physical area would include dedicated space(s) for the storage and monitoring of mercury containers.

- Office Administration Area—this physical area would include dedicated space(s) for the storage and maintenance of records, waste acceptance criteria, accountability criteria, shipping papers, and databases.

The *Interim Guidance* further assumes that any DOE mercury storage facility (or facilities) would have the following characteristics:

- Resource Conservation and Recovery Act–regulated and –permitted to receive discarded elemental mercury generated in the United States

- Naturally ventilated (that is, not air conditioned)

- Adaptable to a modular design

- Operated for DOE by a contractor

The *Interim Guidance* also provides the following: (1) a conceptual scale view of the overall operational area needed for storage of up to 10,000 metric tons (11,000 tons) of elemental mercury, based on a rough assessment of a 60:40 percent breakdown by approximately 6,000 1-MT and 116,000 3-L flasks, respectively, with 3-L flasks on pallets and racks and (2) an estimate of up to 14,000 square meters (150,000 square feet) for a "comfortably-sized layout."

The storage facility would have features that would reduce the risk to the environment and maximize the efficiency of container inspection, including at least three boundaries between the mercury and the environment, including the following:

- *The container*: all containers accepted into the facility would meet DOE acceptance criteria to ensure structural integrity.

- *The spill containment tray* that is under all the containers (see Section D.2.4 for details). If a container fails, the mercury would be contained and should be quickly discovered and cleaned up.

- *The solid concrete floor*, which would be coated so as to be impermeable to mercury and water. Therefore, there is negligible risk that spillages inside the storage building would penetrate the floor and sink into the ground.

- *Perimeter curbing* or other building design features that would prevent spilled mercury from flowing out of the building.

Table D–4 summarizes the data used for new construction at the WIPP Vicinity reference locations.

Table D–4. Physical Data for a Mercury Storage Facility – New Construction

Parameter	New Facility
Facility footprint	205,536 square feet
Dimensions (length × width)	506 × 336 feet
Building height	20 feet
Number of buildings	1
Total storage space	146,496 square feet
Building construction	Structural steel frame on reinforced-concrete slab and sheet metal shell; epoxy-sealed floor.
Access/security	Manned security 24 hours per day, 7 days per week, with perimeter barbed-wire fence; remote interior and exterior surveillance.

Note: To convert square feet to square meters, multiply by 0.092903; feet to meters, by 0.3048.

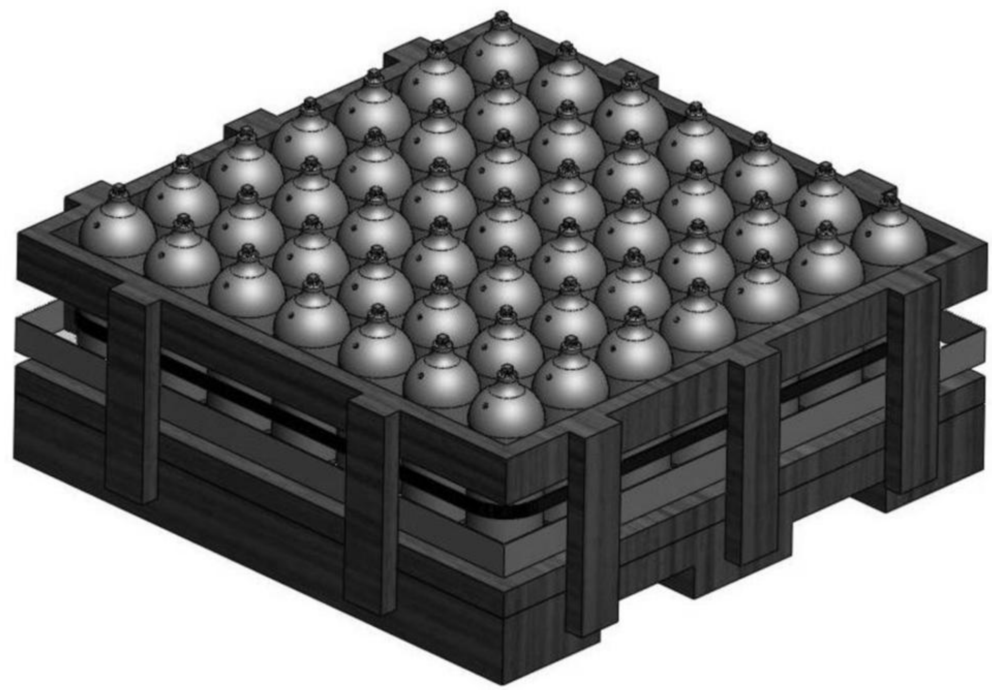
D.2.4 Assumptions About Mercury Containers

Upon arrival at the mercury storage facility(ies), a visual inspection would be performed to detect any obvious problems that may have occurred while on the truck or railcar. If the initial inspections and manifest documentation are acceptable, then the mercury would be moved to the Shipping and Receiving Area, where additional visual inspections would be performed to check for leaks, structural integrity of pallets and containers, approved container types, corrosion, etc. The mercury would then be moved to the Handling Area for any additional verification that it meets waste acceptance criteria (e.g., 99.5 percent purity). The containers and pallets that pass the acceptance/verification process would be placed into long-term storage and location data would be recorded. Mercury received into the storage facility would be in elemental form with a purity of 99.5 volume percent or greater. The mercury would be free of any radiological components. The remaining 0.5 percent content should not be capable of corroding carbon steel or stainless steel (elemental mercury has been proven not to corrode carbon steel or stainless steel) (DOE 2009).

The mercury is expected to arrive at the facility in either 3-L (0.8-gallon) (34.6-kilogram [76-pound]) or 1-MT (1.1-ton) containers. The following are assumptions about the storage containers:

- After the containers are accepted, they would be separated in the facility by size (3-L or 1-MT).
- The 3-L flasks would each contain 34.6 kilograms (76 pounds) of elemental mercury.
- Although the *Interim Guidance* discusses several different types of 3-L flasks, varying in empty mass between 3.4 and 6.3 kilograms (7.5 and 13.9 pounds), a representative mass of 4.1 kilograms (9.0 pounds) has been assumed for the present analysis. Appendix D, Section D.6.1.3, of the January 2011 *Mercury Storage EIS* provides a discussion of the sensitivity of the results to this assumption. If the heaviest flasks were used, estimated frequencies of crashes under Truck Scenario 1 would increase by about 12.5 percent (heavier pallets would mean fewer pallets per trip and therefore more truck trips). This increase means that there would be a slight non-conservatism in the calculations. However, since it is unlikely that all of the elemental mercury would be shipped in the heaviest flasks, this non-conservatism is not further investigated here. The effect on rail transportation would be much smaller and there would be no effect on Truck Scenario 2, in which the truck would be only half full.

- The 3-L flasks would be both transported and stored in box pallets that contain an array of 7 by 7 flasks, as shown in Figure D–1; the dimensions of each pallet would be 1.44 by 1.44 meters (56 by 56 inches).



Source: DOE 2009.

Figure D–1. 7- by 7-Array of 3-Liter Flasks

- The *Interim Guidance* states, "The 3-L containers are preferred to be sent in box pallets that comply with the following: …(4) the pallet may be constructed of painted steel, untreated hardwood with fire protective paint applied, treated hardwood, or other materials that have equivalent load capacity, fire resistance, degradation rate (e.g., expected life), and would not require disposal as hazardous waste." The case chosen for study in this *Draft Mercury Storage SEIS* is use of wooden pallets because this case conservatively maximizes the amount of flammable material that would be available to vaporize elemental mercury in the event of a fire.

- The 7- by 7-pallets of 3-L flasks would stand in a metal spill tray capable of holding the contents of 10 percent (approximately five) of the flasks in the pallet.

- In the facility, the 3-L flasks in box pallets may be placed onto seismically rated storage racks and stacked two or three high. The height of the rack would not exceed 3.7 meters (12 feet). See Figure D–2.

- The racks would require a 3-degree slope toward the aisle to allow leaked mercury to flow toward the edge of the spill tray to assist in quickly locating failed flasks. The walls of the spill tray would be sufficiently high to contain the contents of five flasks at the indicated angle. The *Interim Guidance* states that overpacking the 3-L flasks into drums is not recommended for transportation or long-term storage.

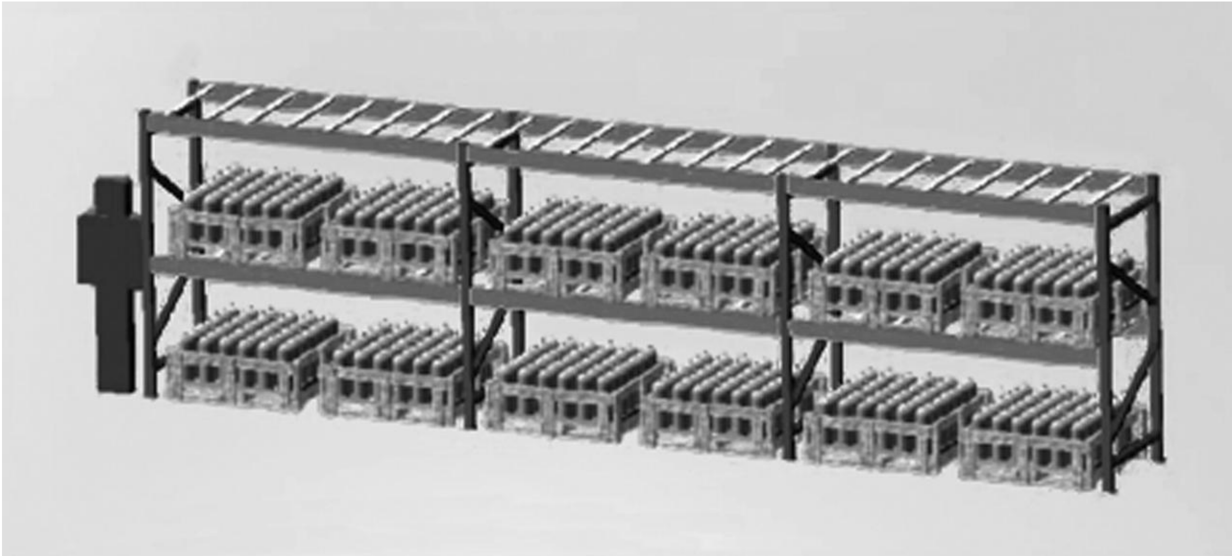
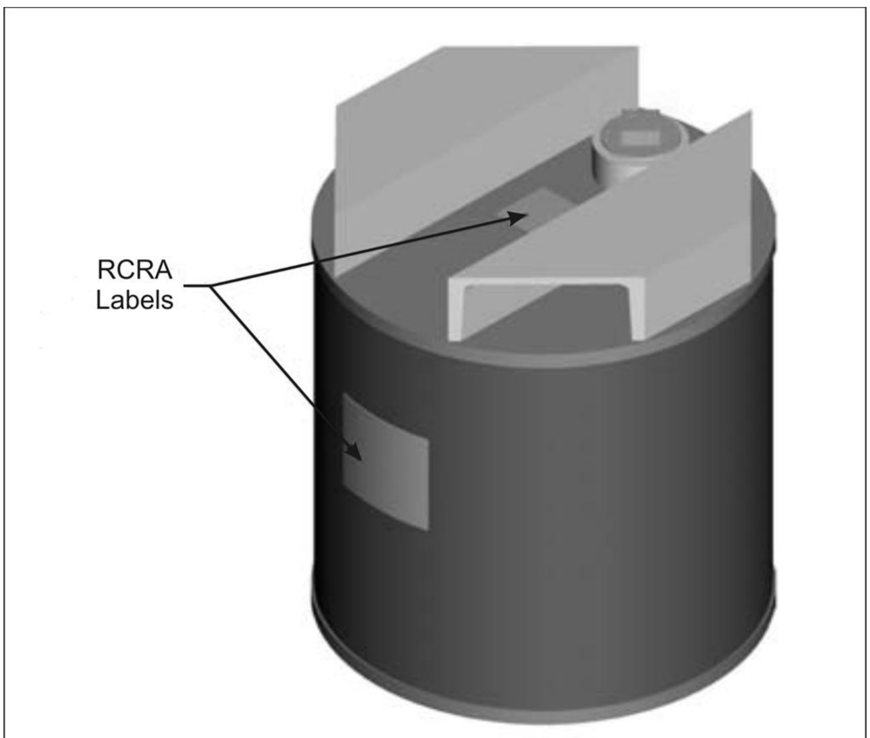


Figure D–2. 3-Liter Flasks in Box Pallets on a Seismically Rated Rack

- The 1-MT container should not be filled with more than approximately 1.1 metric tons (1.2 tons) (1,090 kilograms [2,400 pounds]) of liquid mercury and must provide a minimum head space of 15 percent after maximum fill. The gross weight of the full container should not exceed 1.25 metric tons (1.4 tons) (1,250 kilograms [2,750 pounds]). For the purposes of this analysis, it is assumed that each 1-MT container contains exactly 1 metric ton (about 1.1 tons) (about 1,000 kilograms [2,200 pounds]) of elemental mercury and weighs 1.16 metric tons (about 1.3 tons) (1,160 kilograms [2,550 pounds]). A typical 1-MT container with Resource Conservation and Recovery Act labeling is shown in Figure D–3.



Key: RCRA=Resource Conservation and Recovery Act.

Figure D–3. 1-Metric-Ton Container

- The 1-MT containers are expected to be sent on pallets, one container per pallet. The pallet should have a built-in spill tray capable of containing 1 metric ton of mercury. The spill tray side walls should be approximately 10 centimeters (4 inches) lower than the height of the container to allow for a forklift to remove the container.

- Upon arrival at the storage facility, the 1-MT containers would be removed from their pallets and set into spill trays on the floor of the facility.

- The 1-MT containers could be stored single or double stacked on the floor in spill trays; Figure D–4 shows a single-stack configuration with eight 1-MT containers. The spill tray would be designed to contain the full contents of one 1-MT container. The single-stack configuration was assumed for the purposes of analysis.

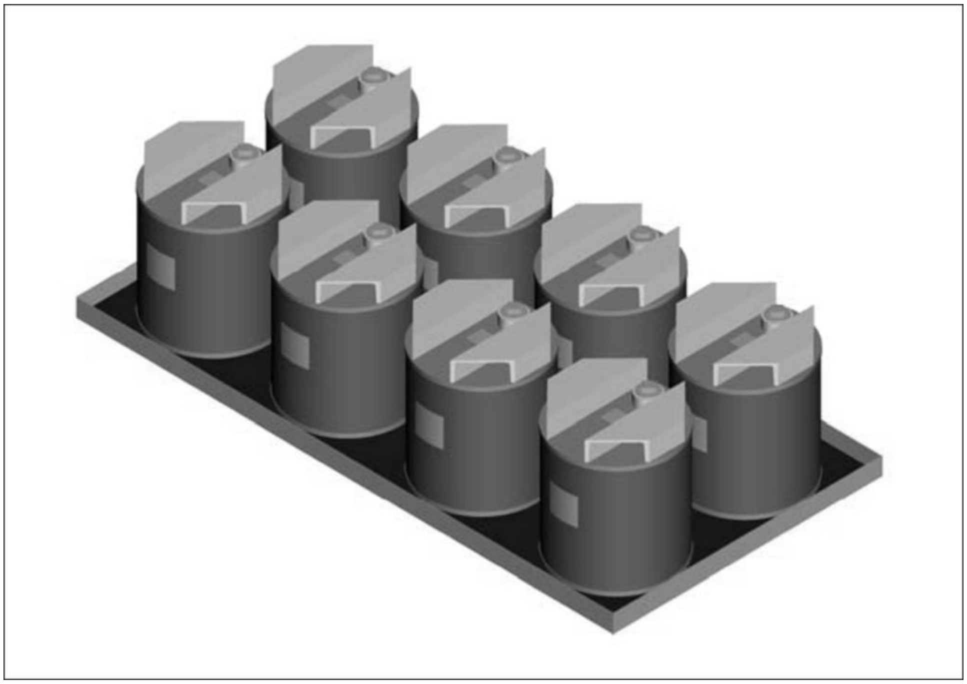


Figure D–4. 1-Metric-Ton Containers in a Spill Tray

D.3 OVERVIEW OF MERCURY TOXICITY AND RISK

The methodology and approach for conducting the risk analyses are described in Appendix D of the January 2011 *Mercury Storage EIS*, as updated in Appendices B and E of this SEIS.[5] The methodology and approach are summarized here for the convenience of the reader and augmented where appropriate with data specific to the WIPP Vicinity reference locations.

[5] Since publication of the January 2011 *Mercury Storage EIS*, DOE has published revised Protective Action Criteria for exposure to mercury vapor. This has resulted in changes to the definition of severity levels (i.e., magnitude of impacts) for assessing acute-inhalation exposures to the public under certain accident scenarios. Appendices B and E of this SEIS update parts of Chapter 4 and Appendix D of the January 2011 *Mercury Storage EIS*. The impact analyses for the WIPP Vicinity reference locations discussed in this SEIS have incorporated the revised criteria.

D.3.1 Toxic Effects of Mercury

This study considers three forms of mercury:[6] (a) elemental mercury, which is the form in which mercury would be stored and transported; (b) inorganic/divalent mercury,[7] which is the form into which elemental mercury can be converted if it is involved in a fire;[8] and (c) methylmercury, which can potentially be formed if elemental mercury or inorganic mercury becomes mixed with soil or sediment.[9] The U.S. Environmental Protection Agency (EPA) , in its *Mercury Study Report to Congress* (EPA 1997a, 1997b, 1997c), provides exhaustive descriptions of the potential effects of these forms of mercury on humans. Appendix D, Sections D.3.1 through D.3.3, of the January 2011 *Mercury Storage EIS* provide a summary of that information; a condensed version is presented below.

The principal route of exposure to elemental mercury is by inhalation. Once absorbed through the lungs, it is readily distributed throughout the body and may cause a range of adverse neurological effects at low exposure levels, such as (a) tremors; (b) emotional liability; (c) insomnia; (d) muscle weakness, twitching, and atrophy; (e) headaches; and (f) impairment of cognitive function. Elemental mercury may also result in adverse renal effects and pulmonary dysfunction.

In contrast to elemental mercury, ingestion of inorganic mercury salts with subsequent absorption through the gastrointestinal tract is an important route of exposure. Adverse effects of exposure to inorganic mercury include kidney disease, peripheral and motor neurotoxicity, and renal impairment.

Methylmercury is a highly toxic substance that is readily absorbed through the gastrointestinal tract. As is well known, the principal concern is ingestion of methylmercury in fish. Once in the body, it readily passes into the adult and fetal brain, where it accumulates and is subsequently converted to inorganic mercury. Consequently, the nervous system is considered to be the critical target organ system for methylmercury toxicity. The nervous system of developing organisms is considered of special concern.

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[6] The consequences of exposure to mercury depend on the form of mercury. See Appendix D, Section D.1.1.2, of the January 2011 *Mercury Storage EIS*, for further discussion. For a more-detailed primer on the forms of mercury, see GreenFacts (2004).

[7] Mercury can exist in three oxidation states (EPA 1997a:2-2): elemental (Hg^0), mercurous (Hg_2^{2+}), and mercuric (Hg^{2+}). Mercurous compounds are unstable in the environment. In this SEIS, Hg^{2+} is referred to interchangeably as "inorganic" or "divalent" mercury; both terms are shorthand for inorganic mercury compounds. See Appendix D, Section D.1.1.2, of the January 2011 *Mercury Storage EIS* for further discussion.

[8] The potential formation of divalent mercury in a fire is extremely important for the assessment of risk in this SEIS. Elemental mercury (i.e., the form in which the mercury would be stored) has a very small dry deposition velocity and is only slightly affected by precipitation scavenging (i.e., washout by rain or snow). However, divalent mercury has a significant dry deposition velocity and is quite effectively removed by precipitation. Therefore, the only scenarios in this SEIS that lead to deposition on the ground from a vapor cloud are the fire scenarios. See Appendix D, Section D.7.3.3, of the January 2011 *Mercury Storage EIS* for further discussion.

[9] Methylmercury is used as a surrogate for all organomercuric compounds, as is the case in the U.S. Environmental Protection Agency's *Mercury Study Report to Congress* (EPA 1997b). See Appendix D, Section D.1.1.2, of the January 2011 *Mercury Storage EIS* for further discussion.

Human Receptors

The purpose of the human health analysis in this SEIS is to assess the risk of exposure of various human receptors to levels of mercury in its various forms that could cause health effects, as described in the foregoing paragraphs. Three human receptors are considered:

- Involved workers – those inside the storage building or working on unloading mercury trucks or railcars
- Noninvolved workers – those nearby but still on site
- Members of the public/public receptors

Assessment of Risk

Risk under any specific accident scenario is generally expressed as a function of two quantities: the predicted frequency of occurrence of the scenario and the predicted severity of the consequences. For the purposes of this analysis, the matrix shown in Figure D–5 was used to assess the magnitude of the risk.

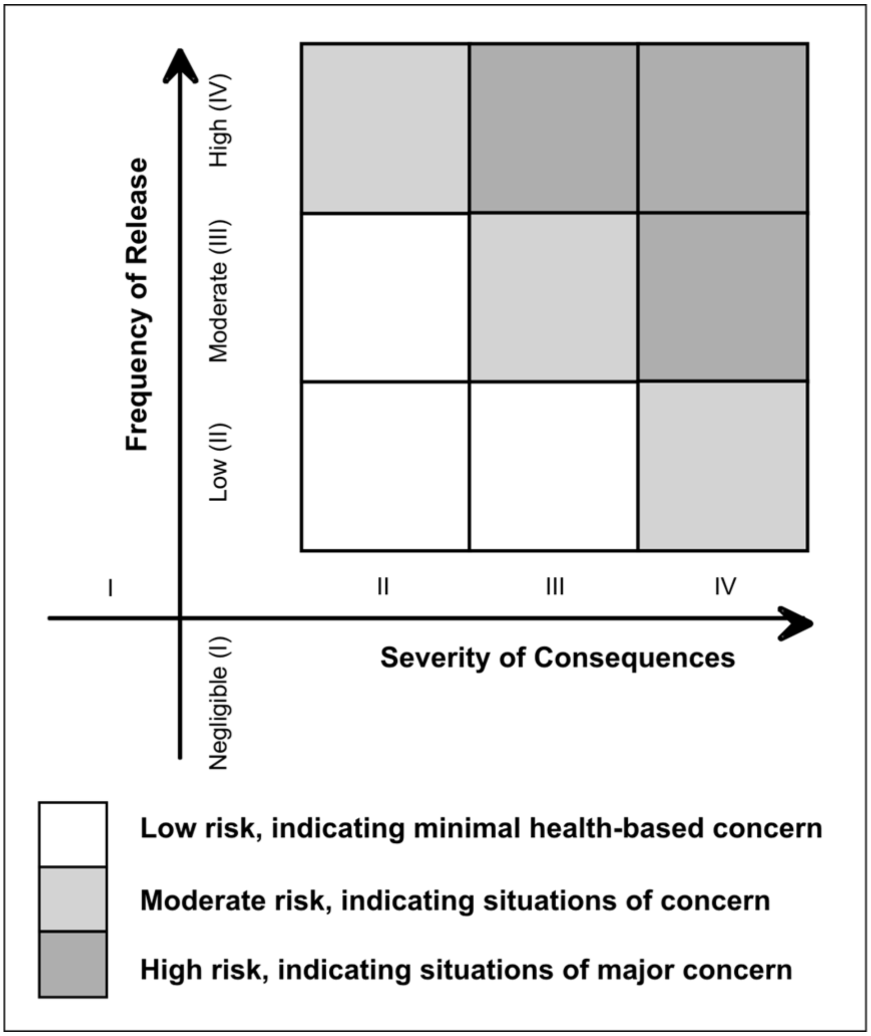

Figure D–5. Risk (Frequency and Consequence) Ranking Matrix

The derivation of the frequencies (*f*) of the scenarios that were considered for this risk assessment is provided in Appendix D, Section D.1.1.1, of the January 2011 *Mercury Storage EIS*. The predicted frequencies are then assigned to one of four bands:

- Frequency Level (FL)-IV (high) – more than or equal to once in 100 years ($f \geq 10^{-2}$ per year)
- FL-III (moderate) – less than once in 100 years to once in 10,000 years (10^{-2} per year $> f \geq 10^{-4}$ per year)
- FL-II (low) – less than once in 10,000 years to once in 1 million years (10^{-4} per year $> f \geq 10^{-6}$ per year)
- FL-I (negligible) – less than once in 1 million years ($f < 10^{-6}$ per year)

The form of the risk matrix and the definition of the FLs are consistent with guidance provided by DOE (DOE Standard 3009-94) in its *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Documented Safety Analyses*.

The definition of Severity Levels (SLs) I through IV for human receptors is described in detail in Appendix D, Section D.1.1, of the January 2011 *Mercury Storage EIS* (as updated in Appendix E, Section E.2, of this *Draft Mercury Storage SEIS*). It is necessary to assign these levels for several cases: (a) acute-inhalation exposures to the public, (b) acute-inhalation exposures to workers, (c) chronic-inhalation exposures to the public and workers, (d) exposures to mercury deposited on the ground, and (e) consumption of methylmercury in fish. How these SLs are assigned is discussed in Section D.1.1.2 of the January 2011 *Mercury Storage EIS* (as updated in Appendix E, Section E.2, of this *Draft Mercury Storage SEIS*).

The assignment of ***SLs for acute inhalation*** (i.e., inhalation of elemental mercury or inorganic mercury) is discussed in detail in Sections D.1.1.2.1 and D.1.1.2.3 of the January 2011 *Mercury Storage EIS* (as updated in Appendix E, Section E.2, of this *Draft Mercury Storage SEIS*). The SLs are related to EPA's Acute Exposure Guideline Levels (AEGLs), DOE's Protective Action Criteria (PACs) and Temporary Emergency Exposure Limits (TEELs), and the American Conference of Governmental Industrial Hygienists' (ACGIH's) threshold limit values, as summarized in Table D–5.

Table D–5. Definition of Consequence Severity Bands for Acute Inhalation of Elemental Mercury and Inorganic Mercury – Public Receptors[a]

Acute-Inhalation Consequence Severity Level	Corresponding Airborne Concentrations of Elemental Mercury	Expected Health Effects
Inhalation Severity Level IV	≥ AEGL-3 (see Table D–6)	Potential for lethality as concentration increases above AEGL-3
Inhalation Severity Level III	< AEGL-3 and ≥ AEGL-2 (see Table D–6)	Potential for severe, sublethal, irreversible health effects
Inhalation Severity Level II	< AEGL-2 and (a) ≥ PAC-1 ($t_d \leq 1$ hour) (b) ≥ ACGIH TLV 8-hour TWA ($t_d > 1$ hour)	Potential for transient health effects, reversible on cessation of exposure
Inhalation Severity Level I	(a) < PAC-1 ($t_d \leq 1$ hour) (b) < ACGIH TLV 8-hour TWA ($t_d > 1$ hour)	Negligible-to-very-low consequences

a Exposure period up to 8 hours.

b PAC-1=0.15 mg/m^3 (DOE 2012); ACGIH-0=0.025 mg/m^3 (OSHA 2012).

Key: ≥ =greater than or equal to; <=less than; ACGIH=American Conference of Governmental Industrial Hygienists; AEGL=Acute Exposure Guideline Level; mg/m^3=milligrams per cubic meter; PAC=Protective Action Criterion; t_d=duration of exposure; TLV=threshold limit value; TWA=time-weighted average.

As described below, there are three AEGLs. They represent threshold exposure limits for the general public and are applicable to emergency exposure periods ranging from 10 minutes to 8 hours. It is believed that the recommended exposure levels protect the general population, including infants and children and other individuals who may be susceptible. However, although the AEGL values represent threshold levels for the general public, it is recognized that individuals, subject to unique or idiosyncratic responses, could experience the effects described at concentrations below the corresponding AEGL. The three AEGLs have been defined as follows:

AEGL-1 is the airborne concentration above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

AEGL-2 is the airborne concentration above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.

AEGL-3 is the airborne concentration above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.

Airborne concentrations below AEGL-1 represent exposure levels that can produce mild and progressively increasing but transient and nondisabling odor, taste, and sensory irritation or certain asymptomatic, nonsensory effects.

EPA's proposed AEGLs for elemental mercury are shown in Table D–6.

Table D–6. Proposed EPA Values for Mercury Vapor AEGLs

Exposure	10 minutes	30 minutes	60 minutes	4 hours	8 hours
Guideline					
AEGL-1[a]	NR	NR	NR	NR	NR
AEGL-2	3.1 mg/m^3	2.1 mg/m^3	1.7 mg/m^3	0.67 mg/m^3	0.33 mg/m^3
AEGL-3	16 mg/m^3	11 mg/m^3	8.9 mg/m^3	2.2 mg/m^3	2.2 mg/m^3

[a] Table D–5 uses Protective Action Criterion 1 and the American Conference of Governmental Industrial Hygienists' threshold limit value for 8-hour time-weighted average as a surrogate AEGL-1. The reasons for doing so are described in Appendix B, Section B.2, of this SEIS. In short, EPA has yet to publish values for the AEGL-1 for elemental mercury.

Note: Reported values are in milligrams per cubic meter, not parts per million. AEGLs for durations of exposure other than those explicitly listed in this table are obtained by linear interpolation.

Key: AEGL=Acute Exposure Guideline Level; EPA=U.S. Environmental Protection Agency; mg/m^3=milligrams per cubic meter; NR=not recommended (due to insufficient data).

Source: EPA 2009a.

Note that AEGL-1 has not been defined for mercury. In such cases, DOE recommends the use of PACs, otherwise known as TEELs (DOE 2008). There are three levels of PACs and three levels of TEELs:

PAC-3/TEEL-3 is the airborne concentration (expressed as parts per million [ppm] or milligrams per cubic meter) of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.

PAC-2/TEEL-2 is the airborne concentration (expressed as ppm or milligrams per cubic meter) of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting, adverse health effects or an impaired ability to escape.

> **PAC-1/TEEL-1** is the airborne concentration (expressed as ppm or milligrams per cubic meter) of a substance above which it is predicted that the general population, including susceptible individuals, could experience discomfort, irritation, or certain asymptomatic, nonsensory effects. However, these effects are not disabling and are transient and reversible upon cessation of exposure.

Each PAC or TEEL is assigned a single concentration for a single exposure time (1 hour). PACs or TEELs are intended to be used when AEGLs or their predecessors, Emergency Response Planning Guidelines (ERPGs), are not available. As discussed in Appendix B, it was judged that the following is conservative as a "surrogate AEGL-1:" the boundary between SL-II and SL-I is equal to the PAC-1 (TEEL-1) of 0.15 milligrams per cubic meter for durations of exposure up to 1 hour and equal to the ACGIH threshold limit value for an 8-hour time-weighted average of 0.025 milligrams per cubic meter for durations of exposure exceeding 1 hour. This latter assumption is highly conservative.

Appendix D, Section D.1.1.2.3, of the January 2011 *Mercury Storage EIS* also explains why Table D–5 applies to inorganic/divalent mercury as well as to elemental mercury. AEGLs and PACs/TEELs for methylmercury were not used in this study because the accident scenarios considered are such that they can only lead to inhalation of elemental mercury or inorganic mercury. Methylmercury can only be formed after deposition of the inorganic mercury on the ground or on water and mixing with soil or sediment.

One important consideration is that the AEGLs are intended for one-time exposures only. Therefore, it is necessary to consider the possibility that these levels would not be protective if the same individual were exposed twice. Appendix D, Section D.4.6, of the January 2011 *Mercury Storage EIS* (as updated in Appendix E, Section E.2, of this *Draft Mercury Storage SEIS*) shows that, even with conservative assumptions, the acute-inhalation risks from exposure to two accidental spills of mercury over the period of 40 years assumed for this analysis would be negligible, even taking into account the revised PAC-1 of 0.15 milligrams per cubic meter; this issue is not discussed further in this SEIS.

For workers, the National Institute for Occupational Safety and Health has published a benchmark for acute exposures that are immediately dangerous to life or health (IDLH) (CDC 2009). For mercury, this is 10 milligrams per cubic meter (see Appendix D, Table D–19, of the January 2011 *Mercury Storage EIS*). The IDLH represents the maximum concentration of a substance in air from which healthy workers can escape without loss of life or irreversible health effects under conditions of a maximum 30-minute exposure time.

In principle, it would be possible to develop an SL scheme, tied to the IDLH, similar to that in Table D–5. Unfortunately, there are no IDLH equivalents of the three AEGLs. However, the IDLH approximately equals AEGL-3 for a 30-minute exposure (11 milligrams per cubic meter; see Table D–6). It therefore seems reasonable to adopt the same acute-inhalation SLs for workers as for members of the public. One could make a case that this is conservative because workers are generally expected to be healthy while the AEGLs are crafted to include susceptible members of the public. Therefore, Table D–5 applies to workers as well as to the public.

For ***chronic-inhalation exposures to humans inside a building***, it is assumed that, during normal operations, involved workers would never be exposed to airborne concentrations of mercury vapor above the ACGIH's time-weighted average/threshold limit value (TWA/TLV) of 0.025 milligrams per cubic meter of mercury vapor (OSHA 2012). Referring to Figure D–5, this defines the threshold between SL-I and SL-II. The analysis performed for this SEIS shows that involved worker exposures would always be below this threshold, assuming a combination of ventilation, inspection, monitoring, and use of personal protective equipment, as recommended by the *Interim Guidance* (DOE 2009). Therefore, there is no need to define the thresholds for SL-III and SL-IV.

In addition, measurements taken at facilities in which the DLA has stored mercury for many decades show that, under the storage conditions expected at the candidate sites, mercury vapor concentrations inside the building would not exceed the TWA/TLV. Appendix D, Section D.4.1.1, of the January 2011 *Mercury Storage EIS* reports on mercury vapor concentrations observed over several months in 2001 and 2002 in mercury storage warehouses at the DLA's Somerville Depot (Shim, Hsieh, and Watts 2002). The only occasions on which concentrations above 0.025 milligrams per cubic meter were encountered occurred during overpacking of flasks in drums, which is not expected during the 40-year period of analysis of the proposed new storage building. In addition, the measurements showed that many of the higher observed levels arose from residual contamination of the floor, which would not be the case in a new storage facility. In addition, once the mercury had been overpacked and placed in a warehouse that had not previously been used for storage, the average mercury vapor concentration[10] taken over various periods from 2 days to a week was 0.00012 milligrams per cubic meter, with a peak of 0.00032 milligrams per cubic meter.

For ***chronic-inhalation exposures to humans outside buildings***, EPA has published a reference concentration (RfC) of 0.0003 milligrams per cubic meter (EPA 2002). The consequences of exposures below this level are negligible, so, in terms of the SLs in Figure D–5, the RfC marks the boundary between SL-I and SL-II. The analysis performed for this SEIS shows that all chronic-inhalation exposure scenarios lead to predicted airborne exposures to both the noninvolved worker and the general public in the SL-I range. Therefore, there is no need to define thresholds for SL-III and SL-IV.

Appendix D, Section D.4.1.2, of the January 2011 *Mercury Storage EIS* reviews observed concentrations near DLA mercury storage warehouses (Shim, Hsieh, and Watts 2002) and confirms that these observations are consistent with the prediction that long-term exposure to elemental mercury vapor during normal operations is well below EPA's RfC of 3.0×10^{-4} milligrams per cubic meter.

Appendix D, Section D.1.1.2.6, of the January 2011 *Mercury Storage EIS* discusses a value for the level of ***deposited mercury*** that can be used to define the boundary between SL-I and SL-II based on an extensively studied real-life case, that of the remediation of East Fork Poplar Creek in Oak Ridge, Tennessee, and its floodplain (ATSDR 2009a, 2009b; ORNL 2009). Mercury was discharged into the creek from 1950 to 1963 as a result of operations involving separations of lithium isotopes at Y–12 in support of the hydrogen bomb project. Note that this discharge was not a result of elemental mercury storage at Y–12. The Agency for Toxic Substances and Disease Registry made a finding, based on mercuric chloride, that a cleanup level of 180 milligrams of mercury per kilogram of soil is protective of public health. This is based on a "worst-case" scenario involving young children who live close to East Fork Poplar Creek and play in the East Fork Poplar Creek floodplain. This scenario is considered the worst case because it involves the most sensitive population (young children) exposed to the most highly absorbable forms of inorganic mercury (mercuric chloride and elemental mercury). The most probable route of exposure to inorganic mercury would be swallowing dust and dirt.

Based on the foregoing case, it is judged that the boundary between SL-I (negligible-to-very-low consequences) and SL-II (onset of adverse consequences due to ingestion of inorganic mercury) is 180 milligrams per kilogram of inorganic mercury. Beyond that, no guidance has been found as to what level would cause irreversible health effects or fatalities. However, the analysis performed for this SEIS shows that there are no scenarios in which mercury would be deposited (either by dry or wet deposition) at levels above 180 milligrams per kilogram, so there is no need to define the thresholds for SL-III and SL-IV.

[10] The sampling times for the concentrations were either 30 seconds (Lumex monitor) or a few minutes (Tekran monitor), so the concentrations discussed above show that the 8-hour TWA was not exceeded.

One highly publicized concern is that of ***the accumulation of methylmercury in fish***, which would be subsequently consumed by humans. The EPA criterion for methylmercury in fish is 0.3 milligrams of methylmercury per kilogram of fish tissue, wet weight (EPA 2009b). This is the concentration in fish tissue that should not be exceeded based on a total fish and shellfish consumption-weighted rate of 0.0175 kilograms of fish per day (EPA 2001), which is essentially a national average. Consumption of methylmercury in amounts less than this criterion is expected to have negligible effects on human health. Therefore, the EPA criterion is taken to be the boundary between SL-I and SL-II for health effects resulting from the average American's consumption of fish.

There are certain individuals or communities that would consume more fish than 0.0175 kilograms per day. According to EPA (1997d), a subsistence fisherman would on average consume 0.059 kilograms per day, while the 95th percentile of fish consumption for subsistence fishermen is 0.170 kilograms per day (approximately 62 kilograms per year). These consumption amounts could be relevant, for example, to certain scenarios in which mercury is spilled near or within tribal reservations where fish is an important part of the diet. These higher consumption rates would require lower concentrations of 0.09 and 0.03 milligrams of methylmercury per kilogram of fish tissue, wet weight, for the respective boundaries between SL-I and SL-II.

No information is available that would provide a basis for a choice of boundaries between SL-II and SL-III and between SL-III and SL-IV.

The definitions of consequence SLs are summarized in Table D–7.

Table D–7. Summary of Definitions of Consequence Severity Levels

Severity Level	Acute-Inhalation Exposures – Involved and Noninvolved Workers and Public Receptors[a]		Chronic-Inhalation Exposures – Involved Workers[b]		Chronic-Inhalation Exposures – Noninvolved Workers and Public Receptors[b]		Exposure to Deposited Mercury – All Human Receptors		Exposure to Methylmercury Accumulated in Fish – All Human Receptors	
	Level Definition	**Consequence**	**Level Definition**	**Consequence**	**Level Definition**	**Consequence**	**Level Definition**	**Consequence**	**Level Definition**	**Consequence**
IV	≥ AEGL-3	Potential for lethality as concentration increases above AEGL-3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
III	< AEGL-3 and ≥ AEGL-2	Potential for severe, sublethal, irreversible health effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
II	< AEGL-2 and ≥ PAC-1 (t_d ≤ 1 hour) or ≥ACGIH TLV 8-hour TWA (t_d > 1 hour)	Potential for reversible health effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
I	<PAC-1 (t_d ≤ 1 hour) or <ACGIH TLV 8-hour TWA (t_d > 1 hour)	Potential for negligible-to-very-low health consequences	< ACGIH's 8-hour TWA/TLV 0.025 mg/m^3	Negligible	< EPA RfC 0.0003 mg/m^3	Negligible	< ATSDR-approved cleanup level (180 mg/kg) for East Fork Poplar Creek	Negligible	Methyl-mercury limit in fish tissue (mg/kg) < 0.3 <0.09 <0.03	Negligible National average Average, subsistence fisherman 95th percentile, subsistence fisherman

[a] Applies to both elemental mercury vapor and inorganic mercury.

[b] Elemental mercury vapor inhalation.

Key: ≥ =greater than or equal to; < =less than; ≤ =less than or equal to; ACGIH=American Conference of Governmental Industrial Hygienists; AEGL=Acute Exposure Guideline Level; ATSDR=Agency for Toxic Substances and Disease Registry; EPA=U.S. Environmental Protection Agency; mg/kg=milligrams per kilogram; mg/m^3=milligrams per cubic meter; N/A=not applicable; PAC=Protective Action Criterion; RfC=reference concentration; t_d=duration of exposure; TLV=threshold limit value; TWA=time-weighted average.

D.3.2 Factors Strongly Influencing the Risks Associated with the Proposed Action

There are a number of reasons for expecting the risks associated with the transport and storage of elemental mercury to be low; these are described below.

Elemental mercury has been stored and transported safely for many years. There is a long history of mercury storage at sites holding the Defense National Stockpile Center (DNSC) inventory. Up until February 2012, 4,436 metric tons (4,890 tons) were safely stored at three depots: New Haven, Indiana; Somerville, New Jersey; and Warren, Ohio. Formerly, 699 metric tons (770 tons) of this inventory was held at Y–12, but this portion was moved to Warren in early 2005 (BWXTymes 2005). DLA completed the successful transfer of all 4,436 metric tons (4,890 tons) of defense-related elementary mercury to Hawthorne Army Depot, in Hawthorne, Nevada, for long-term management and storage; the last shipment was completed in February 2012 (DLA 2012).

In the course of preparation of the DLA *Final Mercury Management Environmental Impact Statement* (DLA 2004a, 2004b), information was gathered from site visits, phone calls, and various documents. The inspection reports for the mercury storage areas were reviewed for information about past releases of mercury. No mercury has reportedly escaped from any of the warehouses, and there is no known member of the public that has been affected at any of the existing storage locations. Decades of experience in maintaining the stockpile of mercury indicate that spills of mercury resulting in environmental contamination have not occurred, and that that normal (accident-free) operating conditions can be maintained at the storage facilities. The storage facilities are built to ensure containment of the mercury under most conditions. Spilled mercury is not known to overrun the spill trays (that can hold the contents of several flasks) or containment berms or penetrate the concrete floors and reach any surface-water or groundwater sources before cleanup.

In addition, Oak Ridge National Laboratory examined 3-L flasks removed from the DNSC inventory (DOE 2009). It is known that mercury does not react with steel containers at ambient temperatures; this was confirmed by metallurgical analysis of 3-L flasks from the DNSC inventory. Thus, containers in static storage in a well-maintained facility should have a long lifetime.

The vapor pressure of mercury at typical ambient temperatures is very low. As noted in Appendix D, Section D.7.1.3, of the January 2011 *Mercury Storage EIS*, the assumed temperature of any spillage of elemental mercury is 20 degrees Celsius (°C) (68 degrees Fahrenheit [°F] or 293 Kelvin). At that temperature, its saturated vapor density is only 14 milligrams per cubic meter.[11] This is equivalent to a release of pure elemental mercury vapor that has already been diluted by five orders of magnitude (i.e., mixed with 100,000 times its mass of air). Hence, a relatively small amount of additional dilution is required to bring the concentration down to the benchmarks such as the 30-minute AEGL-3 of 11 milligrams per cubic meter or the 60-minute AEGL-2 of 1.7 milligrams per cubic meter. It is for this reason that the human health risks predicted under all scenarios involving the evaporation of a spill of elemental mercury are in the negligible-to-low range at all sites.

For releases of elemental mercury vapor, the dry deposition velocity and the scavenging rate[12] are essentially zero. It is only during fire scenarios that elemental mercury is converted into forms that have non-zero dry deposition velocities or scavenging rates (see Appendix D, Section D.7.3.3, of the January 2011 *Mercury Storage EIS*). Therefore, for spills of elemental mercury with no accompanying

[11] Even at a conservatively high temperature of 40 °C (104 °F or 313 Kelvin), the saturated vapor pressure is only 65.9 milligrams per cubic meter, still approximately five orders of magnitude more dilute than a pure release of elemental mercury vapor.

[12] The scavenging rate is a measure of how rapidly rainfall can remove mercury from a plume. It is defined and discussed in Appendix D, Section D.7.3.3, of the January 2011 *Mercury Storage EIS*.

fires, there is no need to be concerned about any pathways that result from deposition onto the ground or into water bodies from airborne plumes.

For releases of elemental mercury vapor leaking from the storage building or accidentally released nearby, there is substantial dilution in the building wake.[13] New construction such as that envisaged at the WIPP Vicinity reference locations is sufficiently large that mixing in the turbulent building wake would dilute the elemental mercury concentrations to levels well below PAC-1/TEEL-0 (see Appendix D, Section D.7.2.1, of the January 2011 *Mercury Storage EIS*).

For fires accompanied by a spill of mercury, substantial plume rise is always predicted. This means that there is considerable initial dilution as the plume rises. Therefore, predicted close-in airborne concentrations and deposited levels of mercury under the plume are very low, and the peaks occur at various distances downwind that depend on the specific weather conditions, by which time considerable dilution in addition to that caused by plume rise dilution has already taken place.

D.4 REFERENCES

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[13] The building wake is a volume of highly turbulent air immediately downwind of the building. Any release of mercury vapor from or adjacent to the building would be thoroughly mixed into this wake and extensively diluted before traveling downwind. Appendix D, Section D.7.2.1, of the January 2011 *Mercury Storage EIS* describes how to calculate concentrations in the wake.

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APPENDIX E
UPDATES TO THE
JANUARY 2011 *MERCURY STORAGE EIS*

APPENDIX E
UPDATES TO THE JANUARY 2011 *MERCURY STORAGE EIS*

> This appendix updates the occupational and public health and safety, socioeconomics, and environmental justice data and analysis presented in the January 2011 *Long-Term Management and Storage of Elemental Mercury Environmental Impact Statement (Mercury Storage EIS)*. The data and analysis for occupational and public health and safety presented in the January 2011 *Mercury Storage EIS* were based on Protective Action Criteria that have been revised. The data and analysis for socioeconomics and environmental justice presented in the January 2011 *Mercury Storage EIS* in Chapter 3, "Affected Environment," and Chapter 4, "Environmental Consequences," were based on 2000 census data, whereas the data and analysis presented in this appendix are based on 2010 census data. These updates are provided to ensure an appropriate comparison between the seven candidate sites evaluated in the January 2011 *Mercury Storage EIS* and the three additional candidate sites evaluated in this *Draft Long-Term Management and Storage of Elemental Mercury Supplemental Environmental Impact Statement*. Environmental documentation that has become available since publication of the January 2011 *Mercury Storage EIS* has been reviewed, and no other changes to the affected environment as presented in the January 2011 *Mercury Storage EIS* were found to be necessary. Therefore, the environmental impact analyses for all other resource areas at the seven candidate sites evaluated in the January 2011 *Mercury Storage EIS*, as well as the No Action Alternative, remain unchanged.

E.1 INTRODUCTION

This appendix updates data and analysis on occupational and public health and safety, socioeconomics, and environmental justice associated with implementation of each of the alternatives considered in the January 2011 *Long-Term Management and Storage of Elemental Mercury Environmental Impact Statement (Mercury Storage EIS)*. As presented in Chapter 1 of this *Draft Long-Term Management and Storage of Elemental Mercury Supplemental Environmental Impact Statement (Draft Mercury Storage SEIS)*, the U.S. Department of Energy's (DOE's) proposed action is to select a suitable location for the long-term management and storage of elemental mercury generated in the United States. The seven candidate sites evaluated in the January 2011 *Mercury Storage EIS* as alternatives for long-term mercury[1] storage are as follows: Grand Junction Disposal Site (GJDS), Hanford Site (Hanford), Hawthorne Army Depot, Idaho National Laboratory (INL), Kansas City Plant (KCP), Savannah River Site (SRS), and Waste Control Specialists, LLC, site (WCS). Additionally, the Y–12 National Security Complex (Y–12) at the Oak Ridge Reservation is evaluated as a No Action Alternative. Section E.2 of this appendix updates the occupational and public health and safety analysis for the candidate sites in the January 2011 *Mercury Storage EIS*. Section E.3 of this appendix updates the socioeconomic and environmental justice analysis for the candidate sites in the January 2011 *Mercury Storage EIS*. Section E.4 of this appendix lists the available environmental documentation that has been reviewed to ascertain that no changes have occurred to other resource areas at the candidate sites since the January 2011 *Mercury Storage EIS* was published that would necessitate additional updates to the affected environment descriptions or analyses.

E.2 UPDATES TO OCCUPATIONAL AND PUBLIC HEALTH AND SAFETY ANALYSIS

The updated occupational and public health and safety analysis in this appendix supersedes parts of the analysis in the January 2011 *Mercury Storage EIS*. As discussed in Appendix B, Section B.2, of this draft SEIS, the definition of severity levels (SLs) (i.e., magnitude of impacts) for assessing acute-inhalation exposures to the public under certain accident scenarios has changed; however, the methodology and approach to conducting occupational and public health and safety analysis remain otherwise unchanged and are described in Appendix D of the January 2011 *Mercury Storage EIS.*

[1] Unless the context indicates otherwise, elemental mercury is referred to hereafter simply as "mercury" in this supplemental environmental impact statement.

The environmental consequences for the Waste Isolation Pilot Plant (WIPP) Vicinity reference locations for occupational and public health and safety incorporate the changes to the definition of SLs and are presented in this draft SEIS in Chapter 4, Section 4.2.9.

Changes to occupational and public health and safety analyses associated with the candidate sites in the January 2011 *Mercury Storage EIS* are as follows: (1) references to the Protective Action Criterion 1 (PAC-1) value of 0.3 milligrams per cubic meter and Temporary Emergency Exposure Limit 0 (TEEL-0); (2) definition of SLs; (3) the earthquake with a building collapse; (4) transportation accidents without fire; (5) transportation accidents with fire; (6) multiple exposures; and (7) intentional destructive acts with fire. In summary, the revised PAC-1 value only affects the calculated distances to which SL-II may impact members of the public for exposures of 1 hour or less. The risks associated with all accident scenarios affected by the revised PAC-1 value, including those on site and during transportation and those with and without fire, remain unchanged for all of the candidate sites. Since the American Conference of Governmental Industrial Hygienists' (ACGIH's) threshold limit value (TLV) for an 8-hour time-weighted average (TWA) of 0.025 milligrams per cubic meter is the same as the value previously used as a surrogate value for TEEL-0, the impact analyses for exposures exceeding 1 hour also remain unchanged.

Updated tables and text for Chapter 4 and Appendix D of the January 2011 *Mercury Storage EIS* are as follows, with changes indicated in **bold type**.

References to PAC-1 and TEEL-0:

The PAC-1 value of "0.3 milligrams per cubic meter" is now **"0.15 milligrams per cubic meter"** and "TEEL-0" is now **"ACGIH TLV 8-hour TWA"** (value remains the same as 0.025 milligrams per cubic meter); the original text is found in Chapter 4 on page 4–10 and in Appendix D on pages D–10 and D–58 of the January 2011 *Mercury Storage EIS*.

Definition of Severity Levels:

Table E–1, below, updates Table 4–1 on page 4–9 and Table D–2 on page D–11 of the January 2011 *Mercury Storage EIS*.

Table E–1. Definition of Consequence Severity Bands for Acute Inhalation of Elemental Mercury, Public Receptors[a]

Acute-Inhalation Consequence Severity Level	Corresponding Airborne Concentrations of Elemental Mercury	Expected Health Effects
Inhalation Severity Level IV	≥ AEGL-3 (see Table D–5)	Potential for lethality as concentration increases above AEGL-3
Inhalation Severity Level III	< AEGL-3 and ≥ AEGL-2 (see Table D–5)	Potential for severe, sublethal, irreversible health effects
Inhalation Severity Level II	< AEGL-2 and (a) ≥ PAC-1[b] ($t_d \leq$ 1 hour) (b) ≥ **ACGIH TLV 8-hour TWA**[b] (t_d > 1 hour)	Potential for transient health effects, reversible on cessation of exposure
Inhalation Severity Level I	(a) < PAC-1 ($t_d \leq$ 1 hour) (b) < **ACGIH TLV 8-hour TWA** (t_d > 1 hour)	Negligible-to-very low consequences

a Exposure period up to 8 hours.

b **PAC-1 = 0.15 mg/m^3(DOE 2012a); ACGIH TLV 8-hour TWA = 0.025 mg/m^3 (OSHA 2012).**

Key: ≥=greater than or equal to; >=greater than; <=less than; ACGIH=American Conference of Governmental Industrial Hygienists; AEGL=Acute Exposure Guideline Level; mg/m^3=milligrams per cubic meter; PAC=Protective Action Criterion; t_d=duration of exposure; TLV=threshold limit value; TWA=time-weighted average.

Earthquake with Building Collapse:

Updated text to revise that found in Appendix D, Section D.4.2.4, on page D–60 of the January 2011 *Mercury Storage EIS* is as follows, and Table E–2 updates Table D–27 on page D–61 of the January 2011 *Mercury Storage EIS*.

> *This calculation predicts that the maximum downwind distance from new construction to which a concentration could exceed SL-IV would be less than 100 meters (330 feet); SL-III could be exceeded to a distance of about 200 meters (660 feet); and SL-II could be exceeded to a distance of about **790 meters (2,600 feet)**. There are similar results for existing buildings. Distances for all sites are shown in Table D–27 (as updated by Table E–2).*

Table E–2. Distances to the Closest Site Boundary or Public Receptor Compared with Calculated Distances – Outdoor Earthquake Scenario

Site	Distance	Direction	Notes	Predicted Distance (meters)		
				SL-II	SL-III	SL-IV
GJDS[a]	30 meters	North and west	Fence line	**790**	200	<100
Nearest resident to GJDS 4 kilometers away.						
Hanford Site (200 Areas)[a]	3.5 km	West	Site boundary	**790**	200	<100
Hawthorne Army Depot[b]	3.7 km	Southwest	Site boundary	**1,010**	250	<100
INL (INTEC)[a]	13.4 km	South	Site boundary U.S. Routes 20 and 26	**790**	200	<100
INL (RWMC)[b]	5.8 km	South	Site boundary U.S. Routes 20 and 26	**860**	210	<100
KCP[c]	350 meters	South	Site boundary	**200**	<100	<100
Nearest resident to KCP 350 meters away.						
SRS (E Area)[a]	8 km	West	South Carolina Highway 125	**790**	200	<100
WCS[a]	67 meters	East	Fence line	**790**	200	<100
Nearest resident to WCS 5.4 kilometers away.						
Y–12[b]	360 meters	North	Fence line	**250**	<100	<100
Nearest resident to Y–12 890 meters away.						

[a] New construction in predicted distances calculation. Rural site.
[b] Existing building in predicted distances calculation. Rural site.
[c] Existing building in predicted distances calculation. Urban site.

Note: To convert meters to feet, multiply by 3.281; kilometers to miles, by 0.6214.

Key: <=less than; GJDS=Grand Junction Disposal Site; INL=Idaho National Laboratory; INTEC=Idaho Nuclear Technology and Engineering Center; KCP=Kansas City Plant; km=kilometer; RWMC=Radioactive Waste Management Complex; SL=severity level; SRS=Savannah River Site; WCS=Waste Control Specialists, LLC, site; Y–12=Y–12 National Security Complex.

Transportation Accidents Without Fire:

Updated text to revise that found in Chapter 4, Section 4.2.9.1.5, on pages 4–17 and 4–18 and in Appendix D, Section D.4.3.1, on pages D–62 and D–63 of the January 2011 *Mercury Storage EIS* is as follows:

> *For exposures occurring via evaporation from a spill of elemental mercury with no fire during a transportation accident, the fraction of the mercury being carried by the truck or railcar that would be spilled is highly uncertain. It is extremely unlikely that all flasks or all 1-MT [1-metric-ton] containers would be breached. However, to be conservative, it is assumed that such a catastrophic release could take place. The largest amount of mercury that can be carried in a truck or railcar is that contained in 54 1-MT containers. Assuming that all of this mercury is spilled and spreads until the pool is at its capillary depth (so conservative as to be essentially inconceivable in an outdoor spill), the predicted rate of evaporation given a windspeed* u *of 4.5 m/s [meters per second] would be* 7.35×10^{-5} *kg/s [kilograms per second], with the evaporation rates for a different windspeed* u *being scaled by the factor* $(u/4.5)^{0.8}$ *(see Section D.7.1.2). Running this through the Gaussian model and ranging over all possible combinations of atmospheric stability class and windspeed, the predicted maximum distances to the airborne toxic benchmarks for GJDS (for example) are as follows: SL-IV, less than 100 meters (330 feet); SL-III, less than 100 meters (330 feet); and SL-II, about* ***230 meters (750 feet)****. As a result, a specific individual could not be exposed to concentrations that are greater than SL-I if he or she lives more than about* ***230 meters (750 feet)*** *from a crash. Conservatively, that specific individual could only be exposed above SL-I if the crash occurs along a* ***460-meter (1,500-foot)*** *stretch of road, and then only if he or she lives by the roadside. The length of roadway on which a crash could occur and affect a specific individual is estimated by drawing a circle with a* ***230-meter (750-foot)*** *radius centered on the individual. The relevant length of roadway is that which lies inside the circle. The maximum possible relevant length is two radii (i.e.,* ***460 meters or 1,500 feet****) if the individual lives immediately next to the roadway. This is a small fraction of any of the routes. For GJDS, the average length of a truck trip is 2,000 kilometers (1,260 miles);* ***460 meters (1,500 feet)*** *is approximately* ***0.00023*** *of this. The frequency of occurrence of a truck crash with spill on the routes to GJDS is 0.0031 per year; see Table D–14 (Scenario 2). The product of the function of the route and the frequency of the occurrence is approximately* $\mathbf{7.1 \times 10^{-7}}$ ***per year****, a negligible frequency. Under Truck Scenario 1 and the Railcar Scenario, the corresponding frequencies would also be negligible. Therefore, the risk to an individual member of the public from transportation spills onto the ground en route to GJDS without a fire would be negligible under all transportation scenarios. The same results apply to all of the other sites.*

Transportation Accidents with Fire:

Table E–3 updates Table 4–5 on page 4–20 and Table D–31 on page D–66 of the January 2011 *Mercury Storage EIS*.

Table E–3. Predicted Range of Distances (meters) Downwind to Which Acute Airborne Severity Levels Are Exceeded – Crashes with Fires

Type of Accident	Atmospheric Stability Class/Windspeed	PAC-1 (SL-II)	AEGL-2 (SL-III)	AEGL-3 (SL-IV)
Truck crash	A/1.5 m/s	**<100–3,500**	<100–130	Nowhere
	D/4.5 m/s	**<100–25,000**	Nowhere	Nowhere
	F/1.5 m/s	<100–>40,000[a]	500–1,200	Nowhere
Railcar crash	A/1.5 m/s	**<100–3,700**	130–830	Nowhere
	D/4.5 m/s	**<100–30,000**	550–2,300	Nowhere
	F/1.5 m/s	<100–>40,000[a]	350–2,050	Nowhere

[a] The limit of validity of the dispersion model is 40,000 meters (approximately 25 miles).

Note: To convert meters to feet, multiply by 3.281.

Key: <=less than; >=greater than; AEGL=Acute Exposure Guideline Level; m/s=meters per second; PAC=Protective Action Criterion; SL=severity level.

Multiple Exposures:

Updated text to revise that found in Appendix D, Section D.4.6, on page D–72 of the January 2011 *Mercury Storage EIS* is as follows:

> *The highest frequency of truck accidents with spills and no fires is 0.0041 per year (see Table D–14). The corresponding value of P(2:40) is 0.0114, where P(2:40) is the probability of two accidents in 40 years. It is conceivable that two exposures in the SL-I range could add up to an exposure in the SL-II range. From Section E.2.1.3, the distance to which an exposure at the SL-II level might occur is **230 meters (750 feet)**. Additional calculations show that the corresponding distance to which an exposure at the SL-II/2 level might occur is **330 meters (1,080 feet)**. Using the same reasoning as in Section D.4.3.1, the probability that a second crash will occur within **330 meters** of an individual who was affected at the PAC-1/2 and potentially bring the total exposure level up to PAC-1 or more is **0.00033** (taking GJDS as a representative example). Therefore, the probability with which a second crash might take place within **330 meters** of an individual affected at level PAC-1/2 or higher is 0.0114 × **0.00033** = approximately **3.8×10^{-6}** over a period of 40 years. To apply this probability to the risk matrix, it is necessary to establish the relationship between a frequency, such as 10^{-6} per year – the upper boundary of the FL-I [Frequency Level I] range – and the corresponding probability over a period of 40 years. By simple multiplication by 40, the upper bound on the FL-I range over a period of 40 years is 4.0×10^{-5}, so that the probability of 3.8×10^{-6} over 40 years calculated above is in the FL-I range and the corresponding risk would be negligible. Similar reasoning leads to negligible risk of two accidents with exposure in the SL-II range leading to a cumulative exposure in the SL-III range, and two accidents with exposures in the SL-III range leading to a cumulative exposure in the SL-IV range.*

Intentional Destructive Acts with Fire:

Table E–4 updates Table 4–8 on page 4–23 and Table D–34 on page D–73 of the January 2011 *Mercury Storage EIS*.

Table E–4. Predicted Range of Distances (meters) Downwind to Which Acute Airborne Severity Levels Are Exceeded – IDA Fires

Atmospheric Stability Class/Windspeed	ACGIH TLV 8-hour TWA (SL-II)	AEGL-2 (SL-III)	AEGL-3 (SL-IV)
A/1.5 m/s	<100–9,000	370–780	Nowhere
D/4.5 m/s	<100–>40,000[a]	Nowhere	Nowhere
F/1.5 m/s	<100–>40,000[a]	100–5,700	680–870

[a] The limit of validity of the dispersion model is 40,000 meters (approximately 25 miles).

Note: To convert meters to feet, multiply by 3.281.

Key: <=less than; >=greater than; **ACGIH=American Conference of Governmental Industrial Hygienists**; AEGL=Acute Exposure Guideline Level; IDA=intentional destructive act; m/s=meters per second; SL=severity level; **TLV=threshold limit value; TWA=time-weighted average**.

Other Changes:

Updated text to revise that found in Chapter 4, Section 4.3.9.2.2, on page 4–45 of the January 2011 *Mercury Storage EIS* for the GJDS location is as follows:

> *The maximum downwind distance to which a concentration greater than AEGL-3 [Acute Exposure Guideline Level 3] could be exceeded at GJDS is predicted to be less than 100 meters (330 feet) (the model is not valid at distances shorter than 100 meters [330 feet]); AEGL-2 could be exceeded downwind to a distance of about 200 meters (660 feet); and PAC-1 could be exceeded to a distance of about* ***790 meters (2,600 feet)****.*

Updated text to revise that found in Chapter 4, Section 4.4.9.2, on page 4–62 of the January 2011 *Mercury Storage EIS* for the Hanford location is as follows:

> *The atmospheric dispersion calculations show that, for this spill, the maximum distance downwind to which a concentration greater than AEGL-3 could be exceeded is less than 100 meters (330 feet); for AEGL-2, the corresponding distance is approximately 200 meters (660 feet); and for PAC-1, it is* ***790 meters (2,600 feet)****.*

Updated text to revise that found in Chapter 4, Section 4.5.9.2, on page 4–78 of the January 2011 *Mercury Storage EIS* for the Hawthorne Army Depot location is as follows:

> *The atmospheric dispersion calculations show that, for this spill, the maximum distance downwind to which a concentration greater than AEGL-3 could be exceeded is less than 100 meters (330 feet); for AEGL-2, the corresponding distance is about 250 meters (820 feet); and for PAC-1, it is approximately* ***1,010 meters (3,310 feet)****.*

Updated text to revise that found in Chapter 4, Section 4.6.9.2, on page 4–97 of the January 2011 *Mercury Storage EIS* for the INL location is as follows:

> *For a member of the public in the case of an outside earthquake spill at RWMC [Radioactive Waste Management Complex], the atmospheric dispersion calculations show that the maximum distance downwind to which a concentration greater than AEGL-3 could be exceeded is less than 100 meters (330 feet); for AEGL-2, the corresponding distance is about 210 meters (690 feet); and for PAC-1, it is approximately* ***860 meters (2,820 feet)****. At INTEC [Idaho Nuclear*

> *Technology and Engineering Center], the maximum distance downwind to which a concentration greater than AEGL-3 could be exceeded is less than 100 meters (330 feet); for AEGL-2, the corresponding distance is approximately 200 meters (660 feet); and for PAC-1, it is* ***790 meters (2,600 feet)****.*

Updated text to revise that found in Chapter 4, Section 4.7.9.2, on page 4–113 of the January 2011 *Mercury Storage EIS* for the KCP location is as follows:

> *For a member of the public in the case of an outside earthquake spill, the atmospheric dispersion calculations show that the maximum distance downwind to which a concentration greater than AEGL-3 could be exceeded is less than 100 meters (330 feet); for AEGL-2, the corresponding distance is also less than 100 meters (330 feet); and for PAC-1, it is about* ***200 meters (660 feet)****.*

Updated text to revise that found in Chapter 4, Section 4.8.9.2, on page 4–130 of the January 2011 *Mercury Storage EIS* for the SRS location is as follows:

> *For a member of the public in the case of an outside earthquake spill, the atmospheric dispersion calculations show that the maximum distance downwind to which a concentration greater than AEGL-3 could be exceeded is less than 100 meters (330 feet); for AEGL-2, the corresponding distance is about 200 meters (660 feet); and for PAC-1, it is* ***790 meters (2,600 feet)****.*

Updated text to revise that found in Chapter 4, Section 4.9.9.2, on page 4–147 of the January 2011 *Mercury Storage EIS* for the WCS location is as follows:

> *For a member of the public in the case of an outside earthquake spill, the atmospheric dispersion calculations show that the maximum distance downwind to which a concentration greater than AEGL-3 could be exceeded is less than 100 meters (330 feet); for AEGL-2, the corresponding distance is about 200 meters (660 feet); and for PAC-1, it is* ***790 meters (2,600 feet).***

E.3 UPDATES TO SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE ANALYSIS

The updated socioeconomics and environmental justice analysis in this appendix supersedes the analysis in the January 2011 *Mercury Storage EIS*, as indicated in Table E–5. The methodology and approach to conducting socioeconomics and environmental justice analysis remain otherwise unchanged and are described in Appendix B, Sections B.10 and B.11, of the January 2011 *Mercury Storage EIS*; however, updates to Tables B–13, B–14, and B–15 from the January 2011 *Mercury Storage EIS* were prepared based upon the 2010 census data. Updated tables are presented in Appendix B of this draft SEIS.

The affected environment for the WIPP Vicinity reference locations for socioeconomics and environmental justice is presented in this draft SEIS in Chapter 3, Sections 3.2.10 and 3.2.11. The environmental consequences for the WIPP Vicinity reference locations for socioeconomics and environmental justice are presented in this draft SEIS in Chapter 4, Sections 4.2.11 and 4.2.12.

Table E–5. Section Updates for Socioeconomics and Environmental Justice Analyses

Candidate Site		January 2011 *Mercury Storage EIS* Section	*Mercury Storage SEIS* Updated Section
Y–12 National Security Complex (No Action) Tennessee	Affected Environment	3.9.10	E.3.2.1.1
		3.9.11	E.3.2.1.2
	Environmental Consequences	4.2.11	E.3.2.2.1
		4.2.12	E.3.2.2.2
Grand Junction Disposal Site Colorado	Affected Environment	3.2.10	E.3.3.1.1
		3.2.11	E.3.3.1.2
	Environmental Consequences	4.3.11	E.3.3.2.1
		4.3.12	E.3.3.2.2
Hanford Site 200-West Area Washington	Affected Environment	3.3.10	E.3.4.1.1
		3.3.11	E.3.4.1.2
	Environmental Consequences	4.4.11	E.3.4.2.1
		4.4.12	E.3.4.2.2
Hawthorne Army Depot Nevada	Affected Environment	3.4.10	E.3.5.1.1
		3.4.11	E.3.5.1.2
	Environmental Consequences	4.5.11	E.3.5.2.1
		4.5.12	E.3.5.2.2
Idaho National Laboratory INTEC and RWMC Idaho	Affected Environment	3.5.10	E.3.6.1.1
		3.5.11	E.3.6.1.2
	Environmental Consequences	4.6.11	E.3.6.2.1
		4.6.12	E.3.6.2.2
Kansas City Plant Missouri	Affected Environment	3.6.10	E.3.7.1.1
		3.6.11	E.3.7.1.2
	Environmental Consequences	4.7.11	E.3.7.2.1
		4.7.12	E.3.7.2.2
Savannah River Site E Area South Carolina	Affected Environment	3.7.10	E.3.8.1.1
		3.7.11	E.3.8.1.2
	Environmental Consequences	4.8.11	E.3.8.2.1
		4.8.12	E.3.8.2.2
Waste Control Specialists, LLC Texas	Affected Environment	3.8.10	E.3.9.1.1
		3.8.11	E.3.9.1.2
	Environmental Consequences	4.9.11	E.3.9.2.1
		4.9.12	E.3.9.2.2

Key: INTEC=Idaho Nuclear Technology and Engineering Center; RWMC=Radioactive Waste Management Complex.

E.3.1 Summary Comparison of Candidate Site Updates

Updating the environmental justice analysis previously presented in the January 2011 *Mercury Storage EIS* from 2000 to 2010 census data resulted in some changes to the data associated with those candidate sites previously analyzed. Specifically, residential populations within the 16-kilometer (10-mile) and 3.2-kilometer (2-mile) regions of influence (ROIs) changed, as well as the number of census blocks that contain either a minority or low-income population for some of the candidate sites within these ROIs. Table E–6 provides a summary comparison of changes to environmental justice data presented in the January 2011 *Mercury Storage EIS* as updated in this appendix.

Table E–6. Summary Comparison of Changes to Environmental Justice Data

Candidate Site	Census Data	Residential Population 16-km (10-mile)	Minority or Low-Income Populations Within 16-km (10-mile) ROI	Residential Population 3.2-km (2-mile)	Minority or Low-Income Populations Within 3.2-km (2-mile) ROI
Y–12 National Security Complex (No Action) Tennessee	2000	101,939 (7.6% minority) (7.9% low-income)	1 minority and 1 low-income census block group (out of 89 blocks).	3,093 (27% minority) (14% low-income)	3 minority and no low-income census block groups (out of 9 blocks).
	2010	117,490 (11% minority) (9.5% low-income)	1 minority only, 2 low-income only, and 1 that is both a minority and low-income census block group (out of 92 blocks).	3,862 (33% minority) (28% low-income)	1 minority only and 1 that is both a minority and low-income census block group (out of 7 blocks).
Grand Junction Disposal Site Colorado	2000	2,119 (15% minority) (11% low-income)	No minority or low-income census block groups.	138 (13% minority) (12% low-income)	No minority or low-income census block groups.
	2010	2,823 (14% minority) (11% low-income)	No minority or low-income census block groups.	194 (12% minority) (10% low-income)	No minority or low-income census block groups.
Hanford Site 200-West Area Washington	2000	0	No minority or low-income census block groups.	0	No minority or low-income census block groups.
	2010	147 (38% minority) (18% low-income)	2 minority only census block groups and 1 that is both a minority and low-income census block group (out of 4 blocks).	0	No minority or low-income census block groups.
Hawthorne Army Depot Nevada	2000	3,561 (20% minority) (10% low-income)	No minority or low-income census block groups.	0	No minority or low-income census block groups.
	2010	2,583 (23% minority) (15% low-income)	1 that is both a minority and low-income census block group (out of 4 blocks).	169 (23% minority) (20% low-income)	1 that is both a minority and low-income census block group (out of 2 blocks).
Idaho National Laboratory – INTEC Idaho	2000	201 (13% minority) (19% low-income)	No minority or low-income census block groups.	0	No minority or low-income census block groups.
	2010	205 (11% minority) (15% low-income)	No minority or low-income census block groups.	0	No minority or low-income census block groups.

Table E–6. Summary Comparison of Changes to Environmental Justice Data *(continued)*

Candidate Site	Census Data	Residential Population 16-km (10-mile)	Minority or Low-Income Populations Within 16-km (10-mile) ROI	Residential Population 3.2-km (2-mile)	Minority or Low-Income Populations Within 3.2-km (2-mile) ROI
Idaho National Laboratory – RWMC Idaho	2000	255 (12% minority) (25% low-income)	No minority or low-income census block groups.	0	No minority or low-income census block groups.
	2010	175 (9.8% minority) (18% low-income)	No minority or low-income census block groups.	0	No minority or low-income census block groups.
Kansas City Plant Missouri	2000	700,041 (31% minority) (10% low-income)	172 minority only, 2 low-income only, and 74 that are both minority and low-income census block groups (out of 671 blocks).	28,184 (42% minority) (11% low-income)	16 minority only and 1 that is both a minority and low-income census block group (out of 41 blocks).
	2010	705,513 (36% minority) (13% low-income)	157 minority only, 5 low-income only, and 88 that are both minority and low-income census block groups (out of 659 blocks).	26,192 (52% minority) (20% low-income)	16 minority only and 6 that are both minority and low-income census block groups (out of 39 blocks).
Savannah River Site E Area South Carolina	2000	8,178 (36% minority) (17% low-income)	4 minority and no low-income census block groups (out of 14 blocks).	0	No minority or low-income census block groups.
	2010	6,691 (38% minority) (20% low-income)	4 minority and 1 low-income census block groups (out of 15 blocks).	0	No minority or low-income census block groups.
Waste Control Specialists, LLC Texas	2000	2,900 (40% minority) (17% low-income)	1 minority and no low-income census block groups (out of 8 blocks).	20 (27% minority) (6% low-income)	No minority or low-income census block groups.
	2010	3,322 (47% minority) (12% low-income)	2 minority and no low-income census block groups (out of 8 blocks).	27 (35% minority) (7.8% low-income)	No minority or low-income census block groups.

Key: INTEC=Idaho Nuclear Technology and Engineering Center; km=kilometer; ROI=region of influence; RWMC=Radioactive Waste Management Complex.

E.3.2 Y–12 National Security Complex

E.3.2.1 Affected Environment

E.3.2.1.1 Socioeconomics

Socioeconomic variables at Y–12 are associated with community growth and development within the Y–12 ROI that could potentially be affected, directly or indirectly, by project-related changes. Included are economic characteristics, the region's demography, housing, and local transportation.

Y–12 is located on the Oak Ridge Reservation in eastern Tennessee, approximately 29 kilometers (18 miles) west of the city of Knoxville. Approximately 90 percent of people employed at Y–12 reside in four counties: Anderson, Knox, Loudon, and Roane (DOE 2008:4-404). Therefore, these four counties are identified as the ROI in this socioeconomics analysis. Y–12 employs approximately 6,000 persons (DOE 2009).

E.3.2.1.1.1 Regional Economic Characteristics

From 2000 to 2011, the labor force of the ROI increased by approximately 16.9 percent from 280,986 to 328,363. During this period, the unemployment rate of the ROI increased from 3.4 percent to 7.3 percent. The unemployment rate in the ROI peaked during 2009, at 8.5 percent. By July 2012, the unemployment rate of the ROI was 7.1 percent, which was lower than the unemployment rate for Tennessee (8.3 percent) (BLS 2012).

E.3.2.1.1.2 Demographic and Housing Characteristics

In 2010, the estimated population of the four-county ROI was 610,092. From 2000 to 2010, the ROI population grew by 12 percent, compared with 11.5 percent growth throughout the state of Tennessee (DOC 2001a, 2011a). Young children and pregnant women are considered to be among the most vulnerable populations to mercury poisoning. The percentage of the ROI population under the age of 18 was 22 percent; women ages 18 to 39 composed 15 percent (DOC 2011a). There were 277,107 housing units in the ROI in 2010 (DOC 2011b), 62 percent of which were owner-occupied, 29 percent were renter-occupied, and 9.5 percent were vacant (DOC 2011b, 2011c).

E.3.2.1.1.3 Environmental Justice

Under Executive Order 12898, DOE is responsible for identifying and addressing any disproportionately high and adverse impacts on minority and low-income populations. Minority persons are those who identify themselves as American Indian or Alaska Native, Asian, Black or African American, Hispanic or Latino (of any race), Native Hawaiian or other Pacific Islander, or multiracial (CEQ 1997). Persons who report that their income is less than the Federal poverty threshold are designated as low-income.

A 16-kilometer (10-mile) radius was chosen as the ROI for this analysis to provide a reasonable estimate of the potentially affected population surrounding the facility. An additional ROI of those residing within an approximately 3.2-kilometer (2-mile) radius of each candidate site was used as a subset of the 16-kilometer ROI to guard against inadvertently diluting represented minority and low-income populations most likely to experience any potentially adverse impacts associated with mercury storage.

The 16-kilometer (10-mile) radius surrounding Y–12 encompasses parts of five Tennessee counties: Anderson, Knox, Loudon, Morgan, and Roane. Figure E–1 shows populations residing in the five-county area, as reported in the 2000 and 2010 censuses (DOC 2001a, 2011d). In this figure, lightly shaded bars show populations in 2000, and the darker bars show those in 2010. From 2000 to 2010, the population of the five-county area increased by approximately 12 percent to 632,079. Over this period, the total minority population increased by approximately 47 percent to 86,199, and the low-income population increased by approximately 23 percent to 85,461 (DOC 2001a, 2001b, 2011d, 2011e).

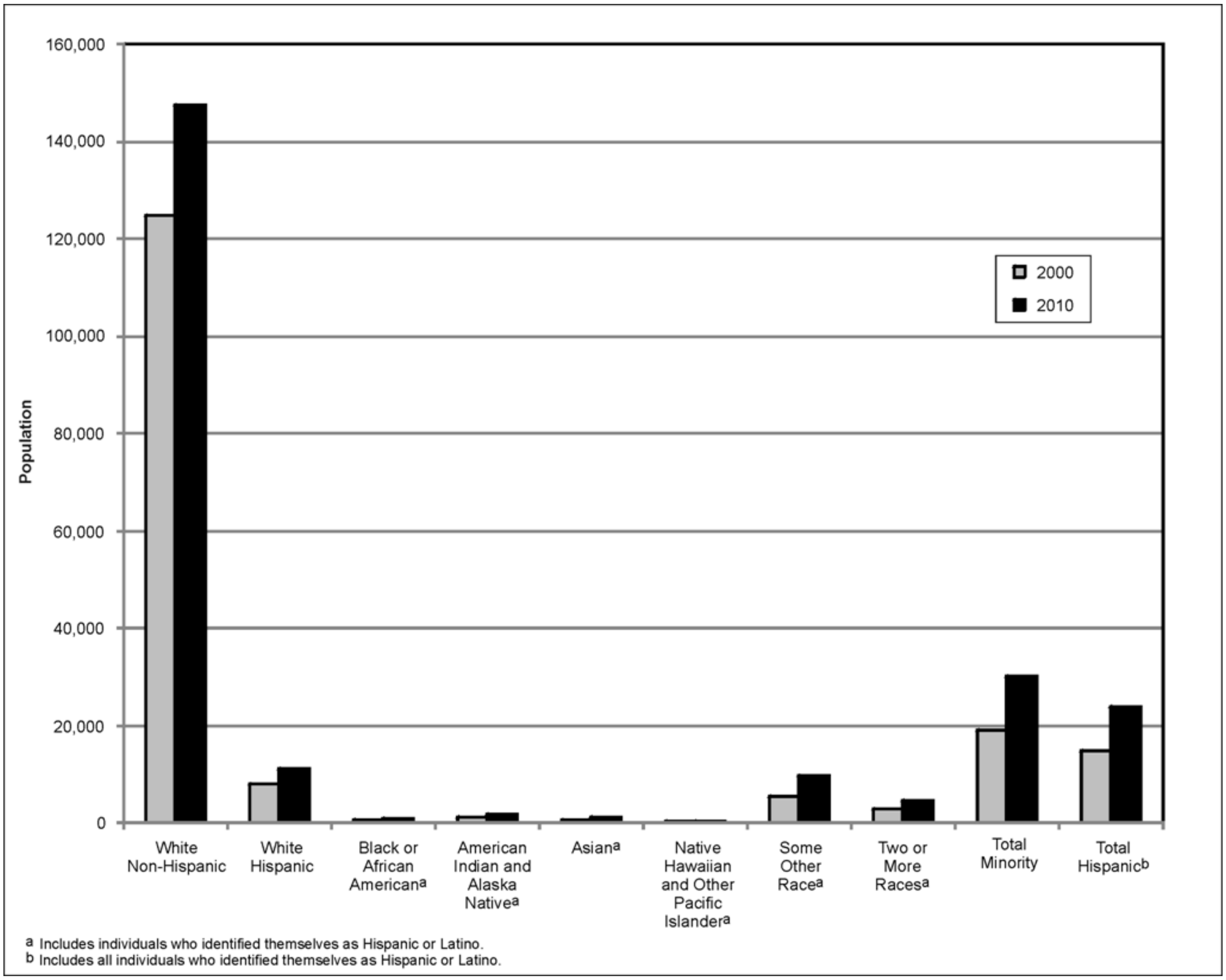

Figure E–1. Populations Residing Within the Five-County Area Surrounding Y–12 National Security Complex

Demographic data from the 2010 census show that the total minority population residing in the five-county area composed approximately 14 percent of the total population. The Black or African American population residing in the five-county area composed approximately 51 percent of the area's total minority population, while those self-identified as "two or more races" composed approximately 13 percent of the area's total minority population. Persons who declared that they are of Hispanic or Latino origin are included in the "total Hispanic" population, regardless of race. They composed approximately 3.3 percent of the total population and approximately 24 percent of the total minority population residing in the five-county area in 2010 (DOC 2011d).

In 2010, 117,490 people lived within 16 kilometers (10 miles) of Y–12 (DOC 2011d). This area included an estimated 11 percent minority and 9.5 percent low-income population. By comparison, the five-county area included a 14 percent minority and 14 percent low-income population, and the state included a 24 percent minority and 17 percent low-income population. There are 92 census block groups located within the 16-kilometer radius surrounding Y–12. Of this total, one contained a minority population, two contained a low-income population, and one contained both a minority and low-income population. As described in Appendix B, Section B.11.1, of the January 2011 *Mercury Storage EIS* and updated in Appendix B of this draft SEIS, minority and low-income populations or communities are identified by comparing block-group data to the surrounding state- and county-level data to determine if the minority or low-income population percentage is meaningfully greater than that of the general population.

In 2010, 3,862 people lived within approximately 3.2 kilometers (2 miles) of Y–12 (DOC 2011d). This area included an estimated 33 percent minority and 28 percent low-income population. There are seven census block groups located within this ROI; one contained a minority population, none contained a low-income population, and one contained both a minority and a low-income population.

Figure E–2 shows the proximity of the identified minority and low-income communities to Y–12.

Figure E–3 shows the cumulative populations living at a given distance from Y–12.

E.3.2.2 Environmental Consequences

Under the No Action Alternative, DOE would not designate and operate a facility(ies) for the long-term management and storage of elemental mercury generated within the United States, as further described in Chapter 2, Section 2.4.1, of the January 2011 *Mercury Storage EIS*. Elemental mercury would continue to be generated, including from chlor-alkali facilities, the gold-mining industry, and waste reclamation and recycling facilities. As identified in Chapter 1, Table 1–1, of this draft SEIS, the vast majority of mercury would be generated by reclamation and recycling facilities and the gold-mining industry. Under the No Action Alternative, this mercury would have to be stored indefinitely at multiple non-DOE facilities. It could be argued that the biggest impact of the No Action Alternative would be widely dispersed storage. The potential benefit of Federal action would be long-term storage and management of this material in one centralized location, as opposed to continued, dispersed storage by multiple private entities. Excess elemental mercury in storage that could not be sold would be stored in accordance with law. Non-DOE storage facilities may be constructed and some non-DOE storage sites may need to modify their storage capacity by constructing additional storage space. Such storage would not necessarily occur at the sites identified as potential sources of excess mercury. This storage service might be provided by a commercial waste management company(ies). In brief, such facilities vary in location, size, geographic distribution, natural and human environments, and in the nature of their operations. Therefore, the potential for and nature of environmental impacts from implementing the No Action Alternative at such sites would be highly speculative.

The approximately 1,200 metric tons (1,330 tons) of DOE mercury currently stored in some 35,000 3-liter (34.6-kilogram [76-pound]) flasks at Y–12 would continue to be managed and stored in this location. No new construction would be required.

E.3.2.2.1 Socioeconomics

The No Action Alternative is discussed in Chapter 4, Section 4.2, of the January 2011 *Mercury Storage EIS*. Under the No Action Alternative, some non-DOE storage sites may require new construction or need to modify their storage capacity by constructing additional storage space. Any analysis of impacts on socioeconomics at non-DOE storage sites would be highly speculative at this time. Elemental mercury would remain in storage at Y–12. Labor resources associated with mercury storage at Y–12 would remain at less than 0.05 full-time equivalent workers (DLA 2004:4-26). Therefore, no incremental socioeconomic or related transportation impacts would occur at Y–12.

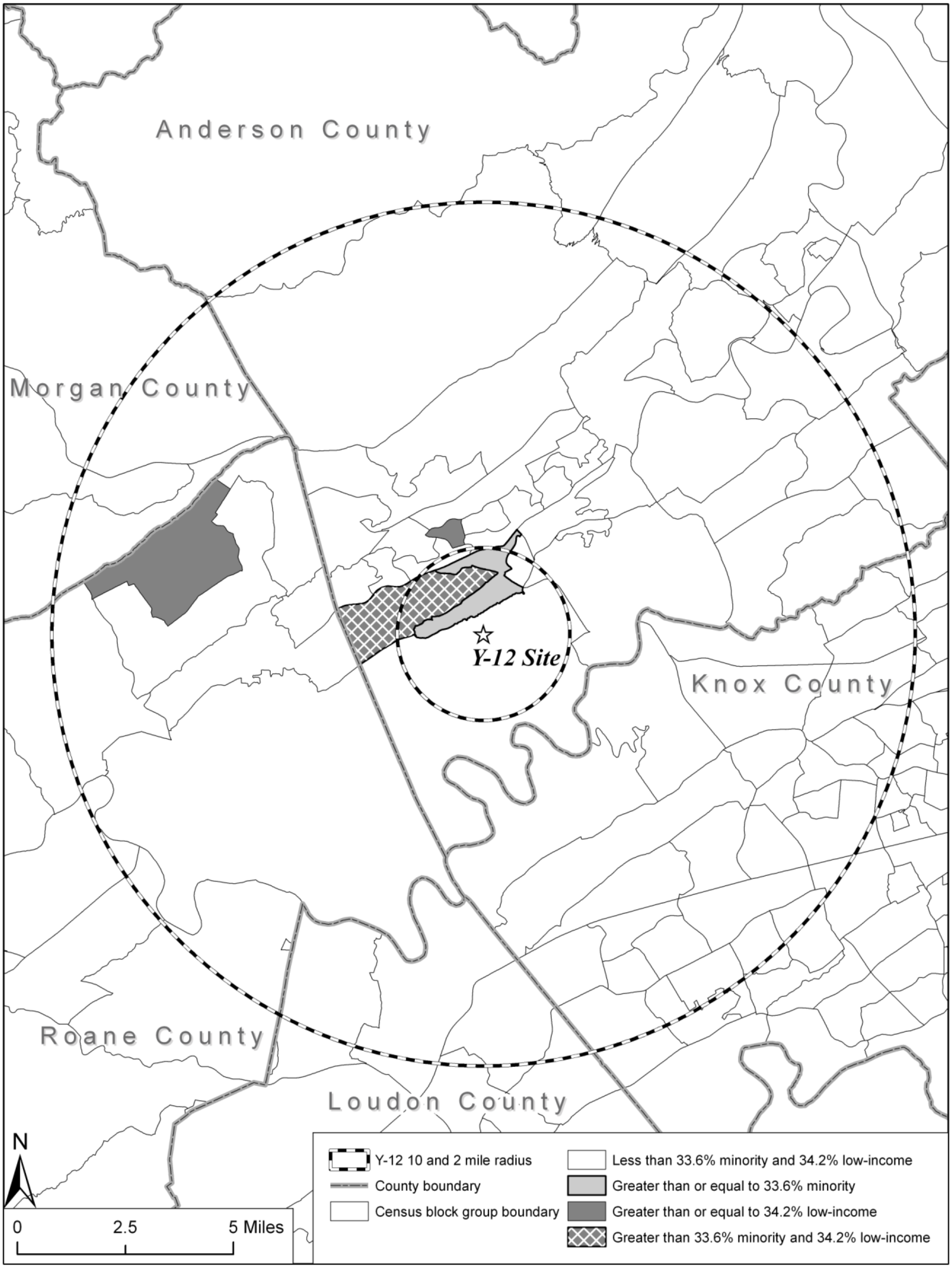

Figure E–2. Block Groups Containing Minority and Low-Income Populations Surrounding Y–12 National Security Complex

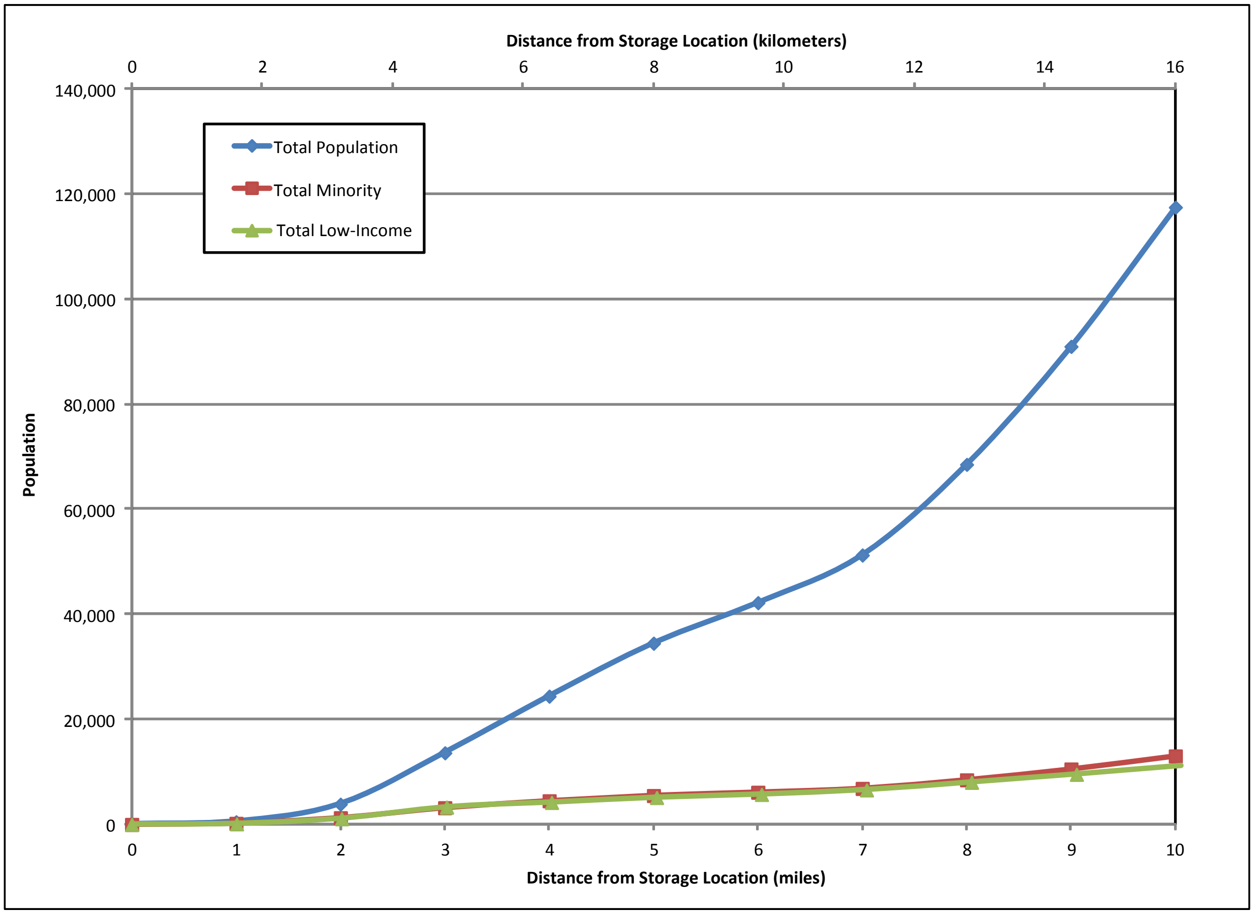

Figure E–3. Populations Residing Within 16 Kilometers (10 Miles) of the Storage Location at the Y–12 National Security Complex

E.3.2.2.2 Environmental Justice

The population of one of the block groups within the 16-kilometer (10-mile) radius surrounding Y–12 was identified as minority, the population of two of the block groups was identified as low-income, and the population of one block group was identified as both minority and low-income. The population of one of the block groups within the 3.2-kilometer (2-mile) radius surrounding Y–12 was identified as a minority population and the population of one block group was identified as both minority and low-income (see Figure E–2).

As discussed in Chapter 4, Section 4.2, of the January 2011 *Mercury Storage EIS*, implementing the No Action Alternative would result in negligible offsite human health and ecological risks from mercury emissions during normal operations and accidents. Therefore, no disproportionately high and adverse effects on minority or low-income populations would occur at Y–12 under the No Action Alternative.

E.3.3 Grand Junction Disposal Site

E.3.3.1 Affected Environment

E.3.3.1.1 Socioeconomics

GJDS is located approximately 29 kilometers (18 miles) southeast of the city of Grand Junction, Colorado. Approximately 90 percent of people employed in this area are assumed to reside in Mesa County based on the local employment data compiled by the U.S. Census Bureau (DOC 2009).

Therefore, Mesa County has been identified as the ROI in this socioeconomics analysis. The disposal site employs approximately seven people during the several weeks every year that it is open to receive uranium mill tailings. During the remainder of the year, routine inspections are expected to require less than one full-time employee (GJDS 2009).

E.3.3.1.1.1 Regional Economic Characteristics

From 2000 to 2011, the labor force of Mesa County increased by approximately 34 percent from 59,016 to 79,048. During this period, the unemployment rate of the ROI increased from 3.3 percent to 9.6 percent. The unemployment rate in the ROI peaked during 2010 at 10.7 percent. By July 2012, the unemployment rate for the county was 9.3 percent, which was higher than the unemployment rate for Colorado (7.8 percent) (BLS 2012).

E.3.3.1.1.2 Demographic and Housing Characteristics

In 2010, the estimated population of Mesa County was 146,723. From 2000 to 2010, the population of the county grew by 26 percent, compared with 17 percent growth in Colorado (DOC 2001a, 2011a). Young children and pregnant women are considered to be among the most vulnerable populations to mercury poisoning. The percentage of the population within the county under the age of 18 was 24 percent; women ages 18 to 39 composed 14 percent (DOC 2011a). There were 62,644 housing units in the county in 2010 (DOC 2011b), 66 percent of which were owner-occupied, 27 percent were renter-occupied, and 7.3 percent were vacant (DOC 2011b, 2011c).

E.3.3.1.2 Environmental Justice

A 16-kilometer (10-mile) radius was chosen as the ROI for this analysis to provide a reasonable estimate of the potentially affected population surrounding the facility. An additional ROI of those residing within an approximately 3.2-kilometer (2-mile) radius of each candidate site was used as a subset of the 16-kilometer (10-mile) ROI to guard against inadvertently diluting represented minority and low-income populations most likely to experience any potentially adverse impacts associated with mercury storage.

The 16-kilometer (10-mile) radius surrounding the candidate storage location at GJDS encompasses parts of two counties in Colorado: Mesa and Delta. Figure E–4 shows populations residing in the two-county area, as reported in the 2000 and 2010 censuses (DOC 2001a, 2011d). In this figure, lightly shaded bars show populations in 2000, and the darker bars show those in 2010. From 2000 to 2010, the population of the two-county area increased by approximately 23 percent to 177,675. Over this period, the total minority population increased by approximately 58 percent to 30,046, and the low-income population increased by approximately 42 percent to 21,252 (DOC 2001a, 2001b, 2011d, 2011e).

Demographic data from the 2010 census show that the total minority population residing in the two-county area composed approximately 17 percent of the total population. The White Hispanic population residing in the two-county area composed approximately 38 percent of the area's total minority population, while those self-identified as "some other race" (meaning those who provided write-in entries such as Mexican, Puerto Rican, or Cuban) composed approximately 32 percent of the ROI's total minority population. Persons who declared that they are of Hispanic or Latino origin are included in the "total Hispanic" population, regardless of race. They composed approximately 13 percent of the total population and approximately 80 percent of the total minority population residing in the two-county area in 2010 (DOC 2011d).

In 2010, approximately 2,823 people lived within 16 kilometers (10 miles) of GJDS. This area included an estimated 14 percent minority and 11 percent low-income population. By comparison, Mesa and Delta Counties included a 17 percent minority and 13 percent low-income population, and Colorado included a 30 percent minority and 12 percent low-income population (DOC 2011d, 2011e). There are five census block groups located within the 16-kilometer radius surrounding GJDS, none of which contained a minority or low-income population. As described in Appendix B, Section B.11.1, of the January 2011 *Mercury Storage EIS* and updated in Appendix B of this draft SEIS, minority and low-income populations or communities are identified by comparing block-group data to the surrounding state- and county-level data to determine if the minority or low-income population percentage is meaningfully greater than that of the general population.

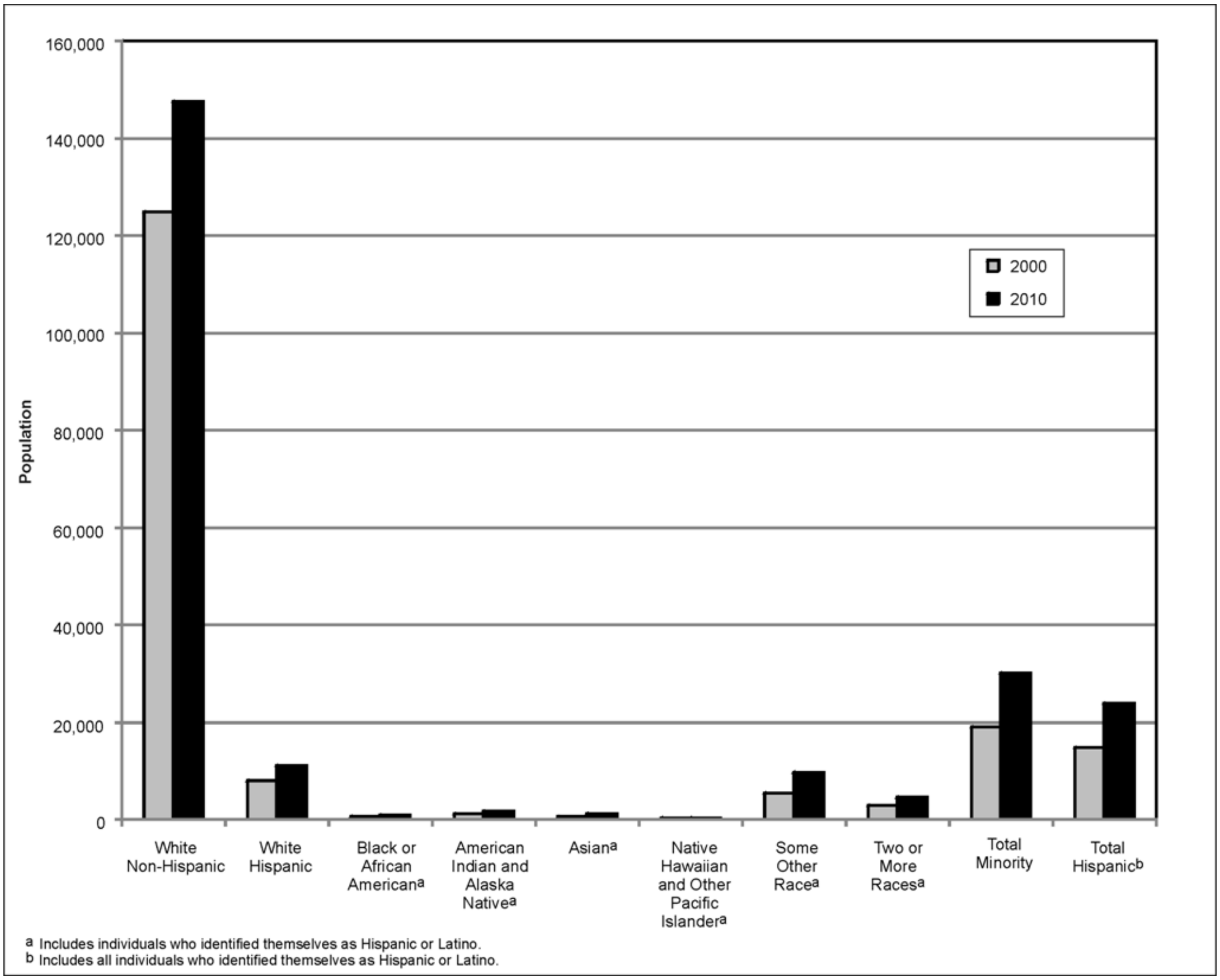

Figure E–4. Populations Residing Within the Two-County Area Surrounding the Grand Junction Disposal Site

In 2010, 194 people lived within approximately 3.2 kilometers (2 miles) of GJDS. This area included an estimated 12 percent minority and 10 percent low-income population (DOC 2011d, 2011e). There is only one census block group located within this ROI, and it did not contain a minority or low-income population.

Figure E–5 shows the cumulative populations living at a given distance from the site.

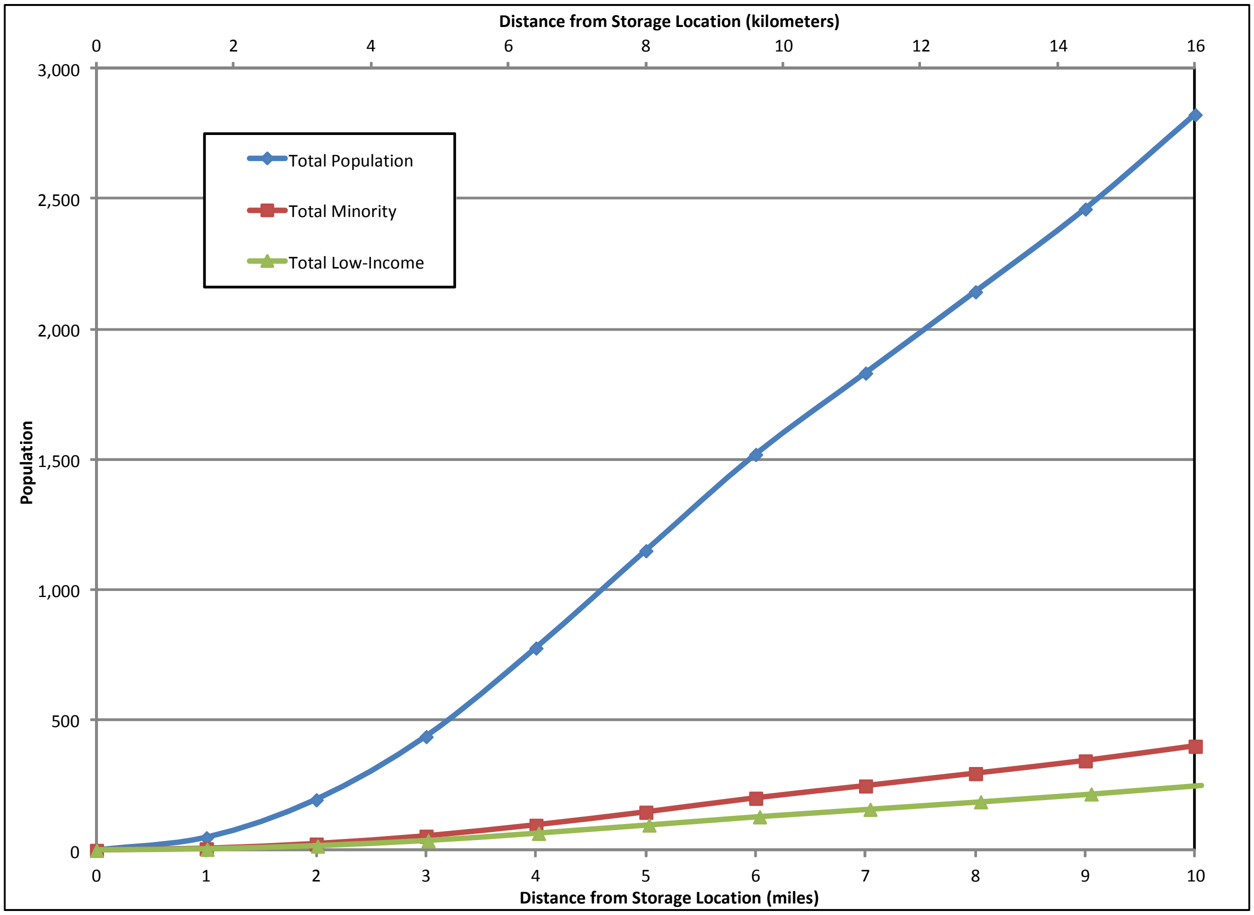

Figure E–5. Populations Residing Within 16 Kilometers (10 Miles) of the Storage Location at the Grand Junction Disposal Site

E.3.3.2 Environmental Consequences

Under this alternative, a new mercury storage facility would be constructed at DOE's GJDS. GJDS occupies 146 hectares (360 acres) located in Mesa County, Colorado, 29 kilometers (18 miles) southeast of Grand Junction, Colorado, as further described in Chapter 2, Section 2.4.2, of the January 2011 *Mercury Storage EIS*.

E.3.3.2.1 Socioeconomics

Employment during construction is expected to average 18 people for approximately 6 months. Operation of the facility is estimated to require approximately 8 individuals for routine maintenance and support activities during the first 7 years, when higher volumes of shipments are expected, and approximately 5 to 6 individuals thereafter, resulting in an increase of the full-time equivalent workforce at GJDS by a factor of 3 to 4 during construction and roughly doubling the workforce at GJDS during operations. In spite of this projected increase in jobs supporting construction and operations at GJDS and associated indirect employment, this alternative would have a negligible impact on socioeconomic conditions (i.e., overall employment and population trends) in the ROI because the largest estimated increase in employment would only increase the ROI workforce by approximately 0.01 percent.

Construction-related transportation, including employee vehicle trips and equipment and materials shipments, is not expected to adversely impact traffic conditions on roads leading to the site. It is assumed that there would be approximately 1.5 employees per vehicle, and every vehicle is counted twice to account for round trips. It is estimated that average construction transportation of 45 vehicles a day could increase the average annual daily traffic count on U.S. Route 50 by less than 0.5 percent. Impacts on traffic during construction would be negligible.

Transportation impacts during the operations phase would include employee vehicle trips and shipments of elemental mercury for storage. Appendix C, Section C.1, of this draft SEIS provides an estimate of the number of shipments by truck. The additional vehicles due to facility operations are not expected to noticeably increase traffic volumes on roads leading to the site. The greatest impact would be during the first 2 years of operations, when it is estimated that approximately 11 vehicles a day could increase the average annual daily traffic count on U.S. Route 50 by approximately 0.1 percent. At the peak of operations, it is estimated that up to 79 shipments of elemental mercury would be made in a year. Approximately 96 percent of the additional vehicles would be attributed to employee transportation. Impacts on traffic during operations would be negligible.

E.3.3.2.2 Environmental Justice

None of the block groups within either the 16-kilometer (10-mile) or the 3.2-kilometer (2-mile) radius surrounding GJDS contain a minority or low-income population. Therefore, no disproportionately high and adverse effects on minority or low-income populations are expected.

E.3.4 Hanford Site

E.3.4.1 Affected Environment

E.3.4.1.1 Socioeconomics

Hanford is located along the Columbia River in southeastern Washington. Approximately 90 percent of the people employed at Hanford reside in Franklin and Benton Counties (Duncan 2007). Therefore, Franklin and Benton Counties have been identified as the ROI in this socioeconomics analysis. In fiscal year 2006, Hanford employed 9,759 persons.

E.3.4.1.1.1 Regional Economic Characteristics

From 2000 to 2011, the labor force of the ROI increased by approximately 36 percent from 99,026 to 134,627. During this period, the unemployment rate of the ROI increased from 5.5 percent to 7.9 percent. By July 2012, the unemployment rate for the ROI was 8.2 percent, which was lower than the unemployment rate for Washington State (8.5 percent) (BLS 2012).

E.3.4.1.1.2 Demographic and Housing Characteristics

In 2010, the estimated population of the two-county ROI was 253,340. From 2000 to 2010, the ROI population grew by 32 percent, compared with 14 percent growth throughout the state of Washington (DOC 2001a, 2011a). Young children and pregnant women are considered to be among the most vulnerable populations to mercury poisoning. The percentage of the ROI population under the age of 18 was 29 percent; women ages 18 to 39 composed 15 percent (DOC 2011a). There were 93,041 housing units in the ROI in 2010 (DOC 2011b), 64 percent of which were owner-occupied, 31 percent were renter-occupied, and 4.8 percent were vacant (DOC 2011b, 2011c).

E.3.4.1.2 Environmental Justice

The 16-kilometer (10-mile) radius surrounding the candidate storage location in the 200-West Area at Hanford encompasses parts of two counties in Washington: Benton and Grant. Figure E–6 shows populations residing in the two-county area, as reported in the 2000 and 2010 censuses. In this figure, lightly shaded bars show populations in 2000, and the darker bars show those in 2010. In the decade between 2000 and 2010, the total population of Benton and Grant Counties increased by approximately

18 percent to 264,297; the minority population increased by approximately 37 percent to 82,794; and the low-income population increased by 38 percent to 38,082 (DOC 2001a, 2001b, 2011d, 2011e).

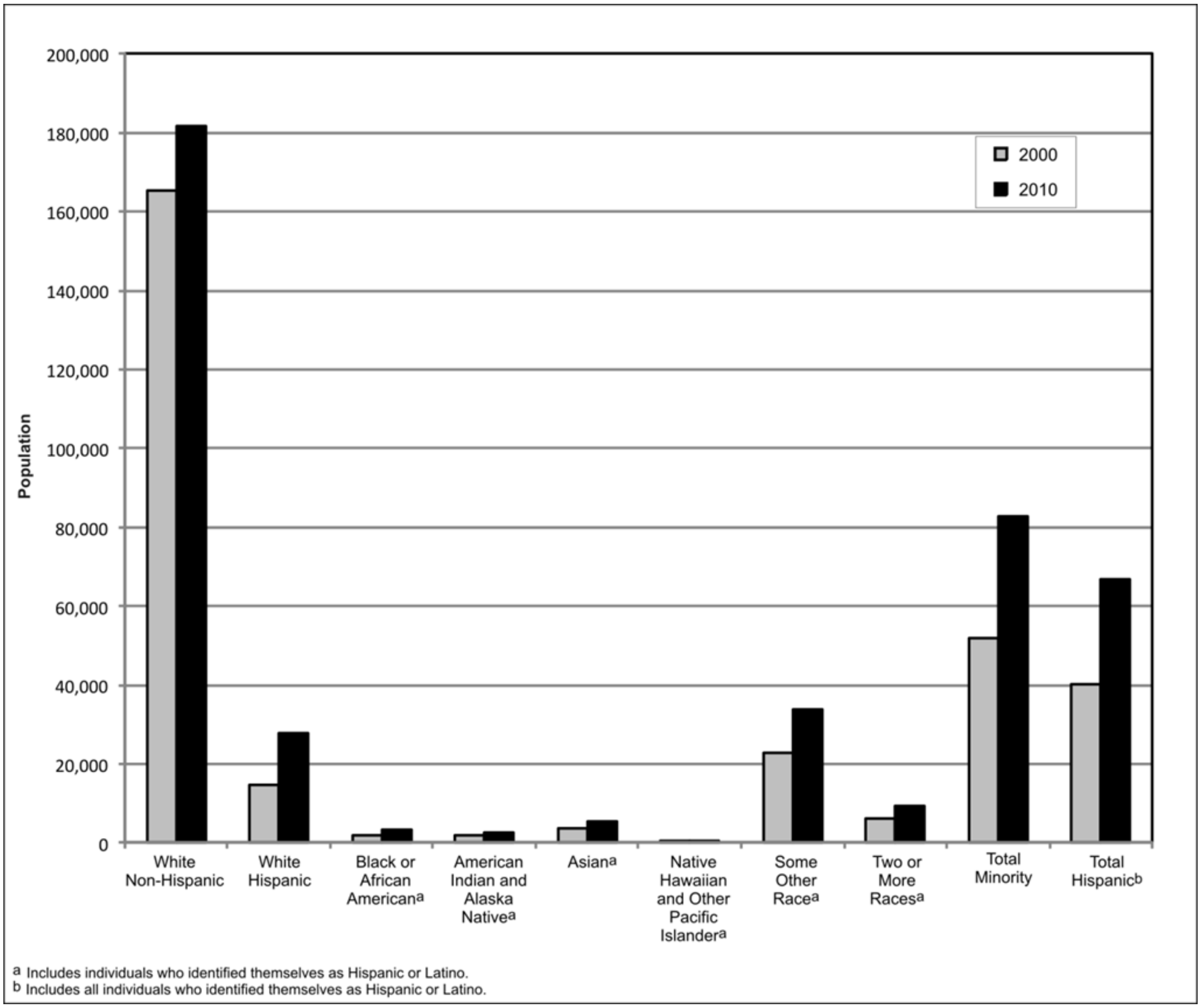

Figure E–6. Populations Residing Within the Two-County Area Surrounding the 200-West Area at the Hanford Site

Demographic data from the 2010 census show that the total minority population residing in the two-county area composed approximately 31 percent of the total population. The White Hispanic population residing in the two-county area composed approximately 34 percent of the area's total minority population, while those self-identified as "some other race" (meaning those who provided write-in entries such as Mexican, Puerto Rican, or Cuban) composed approximately 41 percent of the area's total minority population. Persons who declared that they are of Hispanic or Latino origin are included in the "total Hispanic" population, regardless of race. They composed approximately 81 percent of the total minority population and approximately 25 percent of the total population residing in the two-county area around Hanford in 2010 (DOC 2011d).

In 2010, 147 people lived within 16 kilometers (10 miles) of the 200-West Area at Hanford (DOC 2011d). This area included an estimated 38 percent minority and 18 percent low-income population. By comparison, the two-county area included a 31 percent minority and 15 percent low-income population, and Washington included a 27 percent minority and 12 percent low-income population (DOC 2011d, 2011e). There are four census block groups located within the 16-kilometer (10-mile) radius surrounding the 200-West Area at Hanford, two of which contained a minority population only and one that contained both a minority and low-income population. As described in Appendix B, Section B.11.1, of the January 2011 *Mercury Storage EIS* and updated in Appendix B of this draft SEIS, the minority and low-income populations or communities are identified by comparing block-group data to the surrounding state- and county-level data to determine if the minority or low-income population percentage is meaningfully greater than that of the general population. No one resides within approximately 3.2 kilometers (2 miles) of the 200-West Area at Hanford.

Figure E–7 shows the proximity of the identified minority and low-income communities to the 200-West Area at Hanford.

Figure E–8 shows the cumulative populations living at a given distance from the 200-West Area at Hanford.

There are two American Indian reservations in proximity to the Hanford region. The Yakama Reservation is located approximately 48 kilometers (30 miles) southwest of the 200-West Area, and the Umatilla Reservation is located 113 kilometers (70 miles) southeast of the 200-West Area.

E.3.4.2 Environmental Consequences

Under this alternative, a new mercury storage facility would be constructed at DOE’s Hanford Site. Hanford occupies 151,775 hectares (approximately 375,040 acres) along the Columbia River in the southeastern portion of the state of Washington. Within this site, the new mercury storage facility would be built in the 200-West Area adjacent to the Central Waste Complex, as further described in Chapter 2, Section 2.4.3, of the January 2011 *Mercury Storage EIS*.

E.3.4.2.1 Socioeconomics

Under this alternative, a new facility for long-term storage of elemental mercury would be constructed in the 200-West Area. Employment during construction is expected to average 18 people for approximately 6 months. Operation of the facility is estimated to require approximately 8 individuals for routine maintenance and support activities during the first 7 years, when higher volumes of shipments are expected, and approximately 5 to 6 individuals thereafter, resulting in a possible increase of the existing Hanford workforce of less than 0.1 percent and an increase in the ROI workforce of approximately 0.004 percent. Neither construction nor operation of a new facility is expected to generate substantial direct or indirect employment. Thus, negligible impacts on socioeconomic conditions (i.e., overall employment and population trends) in the ROI would result from implementing this alternative.

Construction-related transportation, including employee vehicle trips and equipment and materials shipments, is not expected to adversely impact traffic conditions on roads leading to the site. It is assumed that there would be approximately 1.5 employees per vehicle, and every vehicle is counted twice to account for round trips. It is estimated that average construction transportation of 45 vehicles a day could increase the average annual daily traffic counts by as little as 1 percent, if utilizing State Route 240, to as much as 5 percent, if utilizing State Route 24. It is likely that these additional vehicles would use a combination of routes; thus, the additional load would not be concentrated on one route. Fifty-three percent of these vehicles would be attributed to employee transportation. Impacts on traffic during construction would be minor.

Figure E–7. Block Groups Containing Minority and Low-Income Populations Surrounding the 200-West Area at the Hanford Site

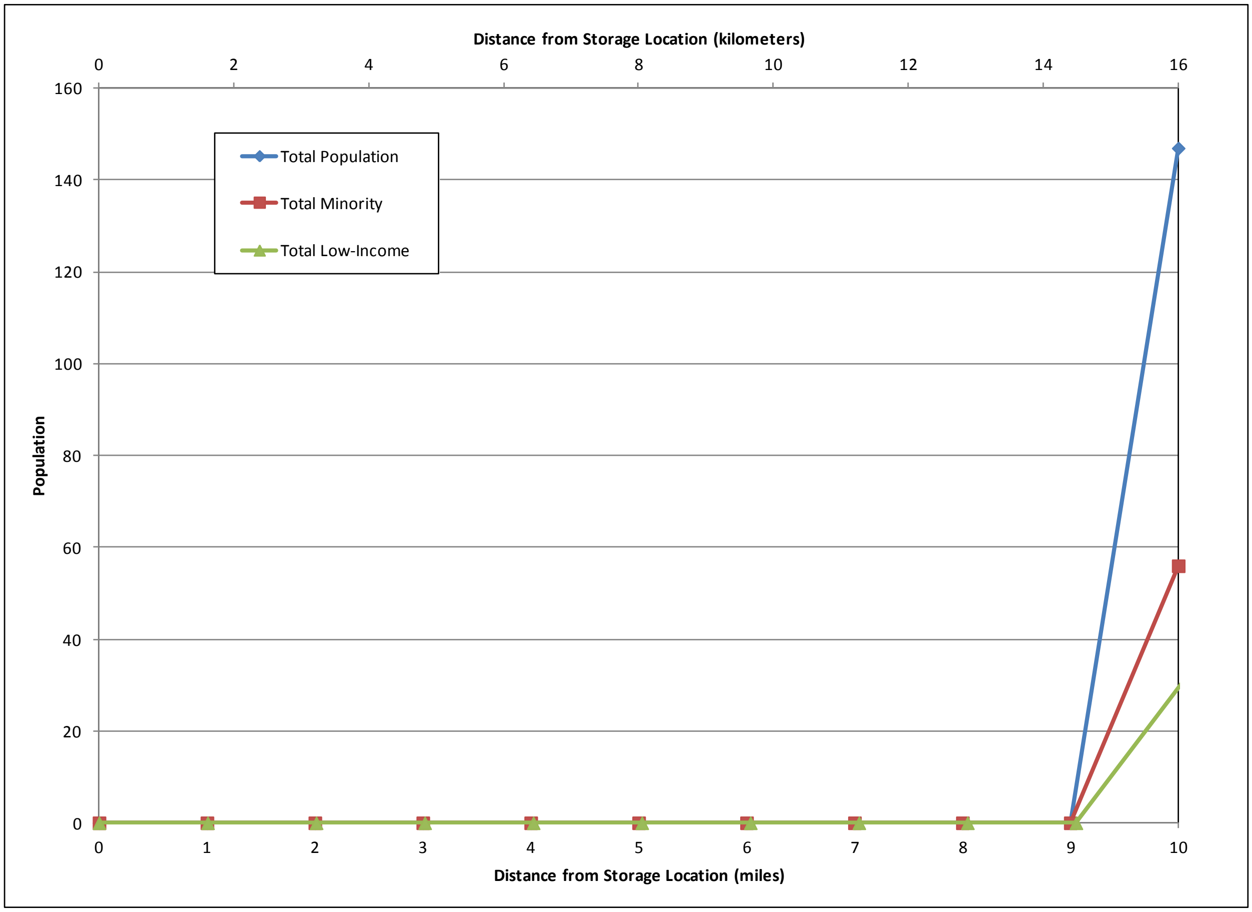

Figure E–8. Populations Residing Within 16 Kilometers (10 Miles) of the Storage Location at the 200-West Area at the Hanford Site

Transportation impacts during the operations phase would include employee vehicle trips and shipments of elemental mercury to the site for storage. Appendix C, Section C.1, of this draft SEIS provides an estimate of the number of shipments by truck. The additional vehicles due to facility operations are not expected to noticeably increase traffic volumes on roads leading to the site. The greatest impact would be during the first 2 years of operations, when it is estimated that approximately 11 vehicles a day could increase the average annual daily traffic counts by as little as 0.2 percent, if utilizing State Route 240, to slightly over 1 percent, if utilizing State Route 24. At the peak of operations, it is estimated that up to 79 shipments of elemental mercury would be made in a year. Approximately 96 percent of the additional vehicles would be attributed to employee transportation. Impacts on traffic during operations would be negligible to minor.

E.3.4.2.2 Environmental Justice

Two of the block groups within the 16-kilometer (10-mile) radius surrounding the proposed storage site at Hanford contain a minority population only and one of the block groups contains both a minority and low-income population. There are no populations identified within the 3.2-kilometer (2-mile) radius surrounding the storage site. As discussed in Chapter 3, Section 3.3.1.1, and Chapter 4, Section 4.4.1, of the January 2011 *Mercury Storage EIS*, the land use designations surrounding the 200-West Area include Preservation, Conservation (Mining), Recreation, Industrial-Exclusive, and Research and Development (see Figure 3–3 of the January 2011 *Mercury Storage EIS*); there would be no impacts on land use as a result of implementing the Hanford alternative. Impacts on air quality under this alternative would be negligible, as discussed in Section 4.4.4.2 of the January 2011 *Mercury Storage EIS*. No impacts on ecological resources would occur under this alternative, as discussed in Section 4.4.5 of the January 2011

Mercury Storage EIS. Construction of a new storage facility would occur in previously disturbed lands and there are no known traditional cultural properties located within the 200 Areas; therefore, the probability of discovering American Indian archaeological sites would be negligible. Thus, there would be negligible impacts on American Indian cultural resources, as discussed in Section 4.4.6.3 of the January 2011 *Mercury Storage EIS*. A negligible change in socioeconomic conditions would result under this alternative, as discussed above in Section E.3.4.2.1. As discussed in Section 4.4.9 of the January 2011 *Mercury Storage EIS*, implementing the Hanford alternative would result in negligible offsite human health risks from mercury emissions during normal operations and facility accidents. As discussed in Section 4.4.9.3 of the January 2011 *Mercury Storage EIS*, transportation accidents are predicted to pose a negligible-to-low human health risk following dry deposition onto the ground or into water bodies. The 200 Area at Hanford is located in an area proximal to block groups identified as both minority and low-income communities, as described in Section E.3.4.1.2. The analysis of the Hanford alternative identified the presence of minority and low-income communities adjacent to potential transportation routes. The transportation accident analysis is discussed in Section 4.4.9.3 and Appendix D, Section D.4.5, of the January 2011 *Mercury Storage EIS*.

In addition, under transportation accident scenarios in which a fire occurs, it is possible for nearby downwind surface-water bodies to become contaminated, raising concerns for populations where fish is an important part of the diet. Chapter 4, Section 4.5.9.3.3, of the January 2011 *Mercury Storage EIS* discusses the possibility of accumulation of mercury in fish under such scenarios. Three fish consumption rates were analyzed: the national average consumption rate, the average subsistence fisherman consumption rate, and the 95th percentile subsistence fisherman consumption rate (see Section 4.2.9.1.1 of the January 2011 *Mercury Storage EIS*). Such consumption rates could be representative of a low-income or American Indian subsistence fishing population. Under the Truck Scenarios, the risks to human receptors that consume fish at one of the three rates would be negligible. Under the Railcar Scenario, the risk to the 95th percentile subsistence fisherman would be negligible to low. American Indian reservations have not been identified within the 16-kilometer (10-mile) ROI surrounding the 200-West Area of Hanford; however, as discussed in Section E.3.4.1.2, there are low-income and minority communities present in the ROI. Although the risk is negligible to low, if a transportation accident that resulted in fish contamination were to occur, it would be advisable as a mitigation measure to monitor the levels of methylmercury in fish to ensure that subsistence fishermen do not consume amounts of methylmercury that might cause adverse health effects. Subsequent to mandated reporting of any such release by the shipper of the elemental mercury, the appropriate state environmental agency would be responsible for determining appropriate fish consumption advisories and monitoring requirements for mercury concentrations in waters and fish stocks.

E.3.5 Hawthorne Army Depot

E.3.5.1 Affected Environment

E.3.5.1.1 Socioeconomics

Based on the local employment data compiled by the Census Bureau, approximately 90 percent of people employed in the Hawthorne area are assumed to reside in three Nevada counties: Mineral, Lyon, and Churchill (DOC 2009). Therefore, these three counties have been identified as the ROI in this socioeconomics analysis. In 2010, the Hawthorne Army Depot employed approximately 550 to 650 persons.

E.3.5.1.1.1 Regional Economic Characteristics

From 2000 to 2011, the labor force of the ROI increased by approximately 21 percent from 32,259 to 39,096. During this period, the unemployment rate of the ROI increased from 6.2 percent to 15.0 percent. The unemployment rate in the ROI peaked during 2010 at 15.1 percent. By July 2012, the unemployment rate of the ROI was 13.5 percent, which was higher than the unemployment rate for Nevada (12.0 percent) (BLS 2012).

E.3.5.1.1.2 Demographic and Housing Characteristics

In 2010, the estimated population of the three-county ROI was 81,629. From 2000 to 2010, the ROI population grew by 28 percent, which was lower than the growth rate throughout the entire state of Nevada (35.1 percent) (DOC 2001a, 2011a). Young children and pregnant women are considered to be among the most vulnerable populations to mercury poisoning. In 2010, the percentage of the ROI population under the age of 18 was 25 percent; women ages 18 to 39 composed 12 percent (DOC 2011a). There were 36,203 housing units in the ROI in 2010, 61 percent of which were owner-occupied, 27 percent were renter-occupied, and 12 percent were vacant (DOC 2011b, 2011c).

E.3.5.1.2 Environmental Justice

The 16-kilometer (10-mile) radius surrounding the candidate storage location at the Hawthorne Army Depot encompasses part of Mineral County, Nevada. Figure E–9 shows populations residing in Mineral County, as reported in the 2000 and 2010 censuses (DOC 2001b, 2011d). In this figure, lightly shaded bars show populations in 2000, and the darker bars show those in 2010. In the decade between 2000 and 2010, the total population of Mineral County declined by approximately 5.9 percent from 5,071 to 4,772; the minority population decreased by approximately 1 percent from 1,516 to 1501; and the low-income population increased by 17 percent from 761 to 887 (DOC 2001a, 2001b, 2011d, 2011e). Demographic data from the 2010 census show that the total minority population accounted for approximately 31 percent of the total population. The American Indian and Alaska Native populations residing in Mineral County composed approximately 49 percent of the county's total minority population. Persons who declared that they are of Hispanic or Latino origin are included in the "total Hispanic" population, regardless of race. They composed approximately 9.1 percent of the total population and approximately 29 percent of the total minority population residing in Mineral County in 2010 (DOC 2011d).

In 2010, 2,583 people lived within 16 kilometers (10 miles) of the Hawthorne Army Depot. This area included an estimated 23 percent minority and 15 percent low-income population. By comparison, Mineral County included a 31 percent minority and 19 percent low-income population, and Nevada included a 46 percent minority and 12 percent low-income population (DOC 2011d, 2011e). There are four census block groups located within the 16-kilometer radius surrounding the Hawthorne Army Depot, one of which contained both a minority and low-income population. As described in Appendix B, Section B.11.1, of the January 2011 *Mercury Storage EIS* and updated in Appendix B of this draft SEIS, minority and low-income populations or communities are identified by comparing block-group data to the surrounding state- and county-level data to determine if the minority or low-income population percentage is meaningfully greater than that of the general population.

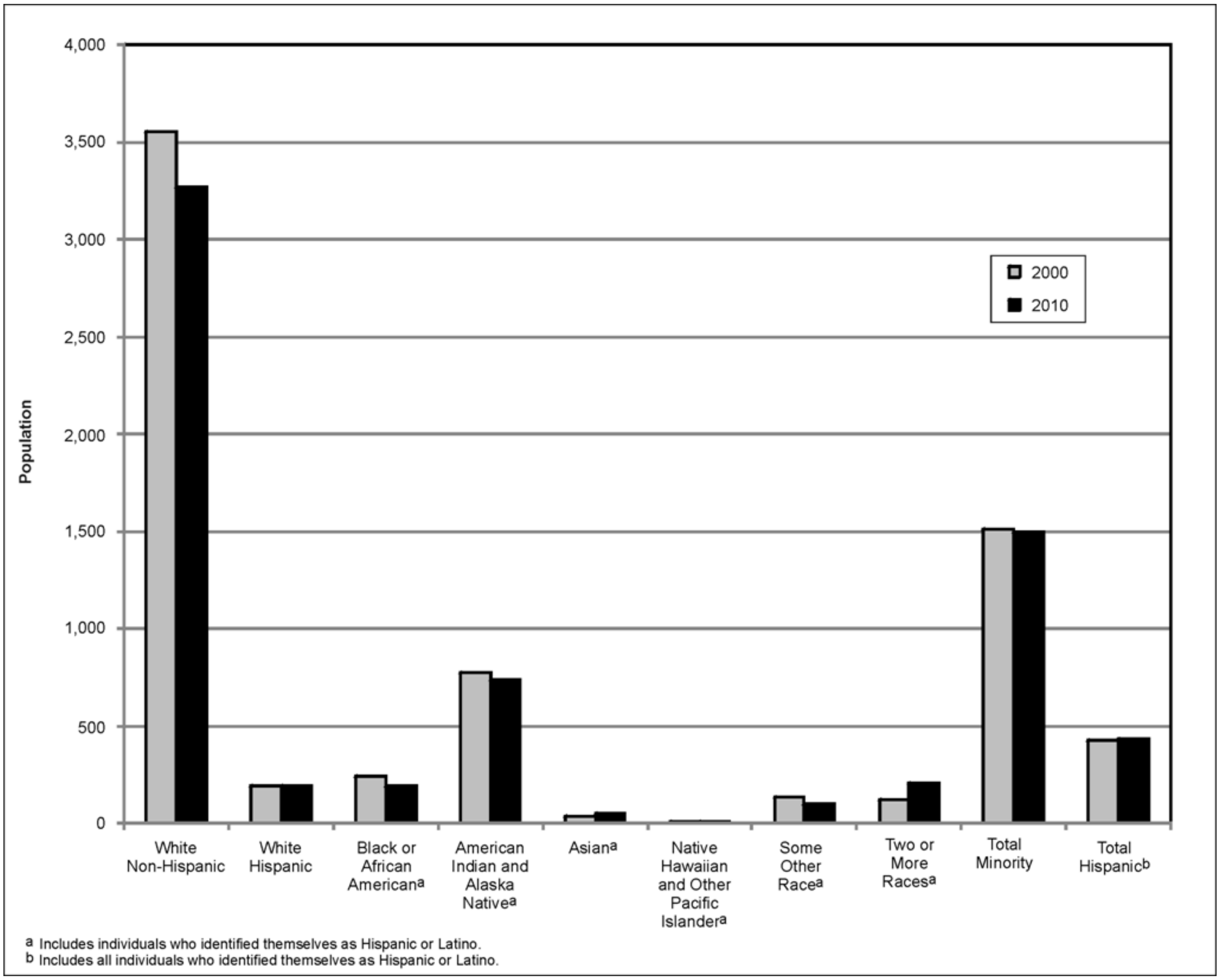

Figure E–9. Populations Residing Within Mineral County, Nevada, Surrounding the Hawthorne Army Depot

In 2010, 169 people lived within approximately 3.2 kilometers (2 miles) of the Hawthorne Army Depot. This area included an estimated 23 percent minority and 20 percent low-income population (DOC 2011d, 2011e). There are two census block groups located within this ROI, one of which contained both a minority and low-income population. Differences in the results of the population analysis within the 3.2-kilometer (2-mile) ROI calculated using data from the 2000 census (i.e., population=0) and the 2010 census (i.e., population=169) are primarily due to changes to the boundaries of block groups associated with the respective data sets and the methodology involved in estimating populations within specific radii. During each decennial census, the boundaries of geographic units at finer spatial resolution (such as census tracts, block groups, and blocks) are typically redrawn to more accurately reflect the dispersion of the population in a given area, which aids local communities in the redistricting process.

Figure E–10 shows the proximity of the identified minority and low-income communities to the Hawthorne Army Depot.

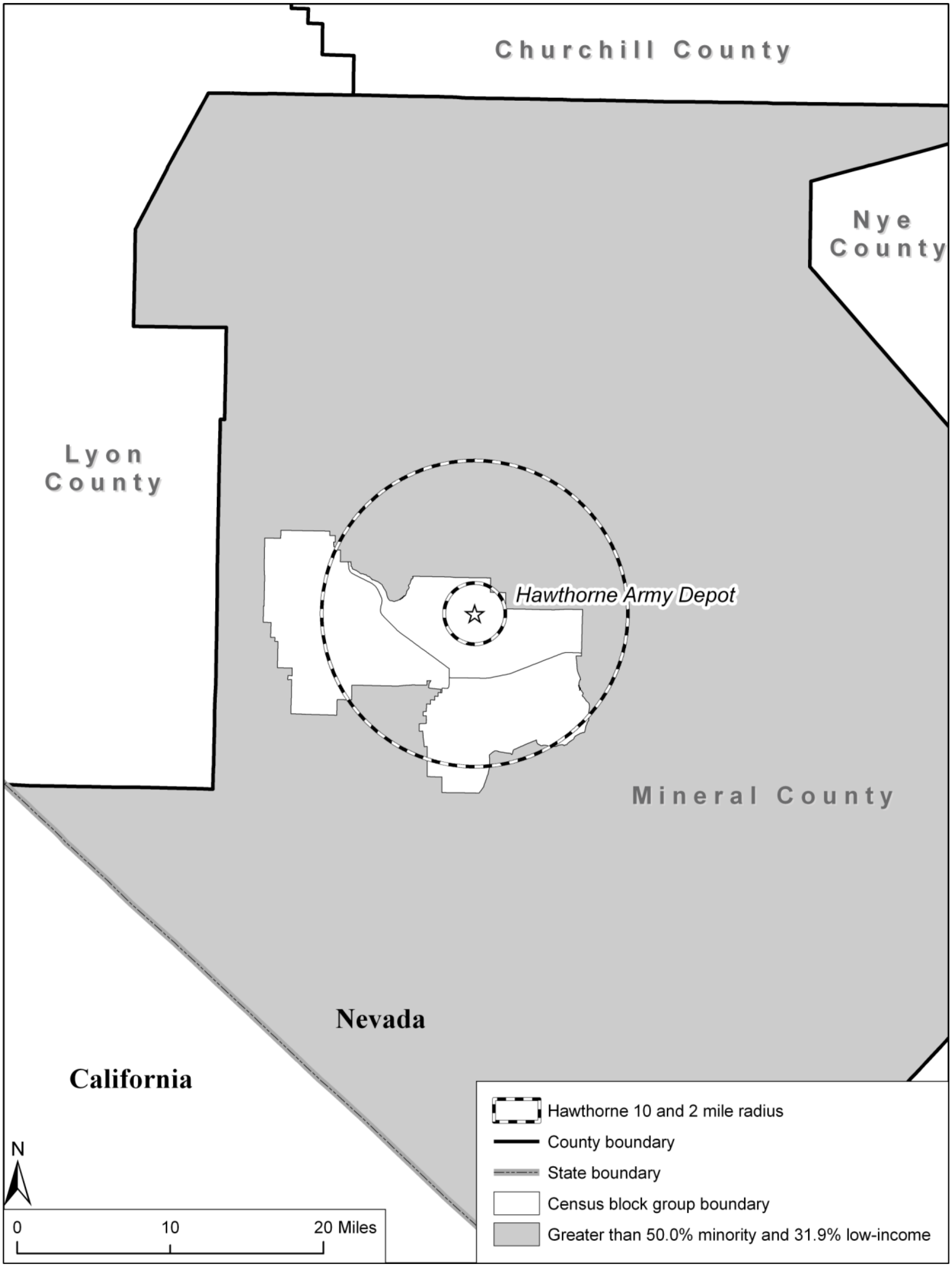

Figure E–10. Block Group Containing Minority and Low-Income Populations Surrounding the Hawthorne Army Depot

Figure E–11 shows the cumulative populations living at a given distance from the Hawthorne Army Depot.

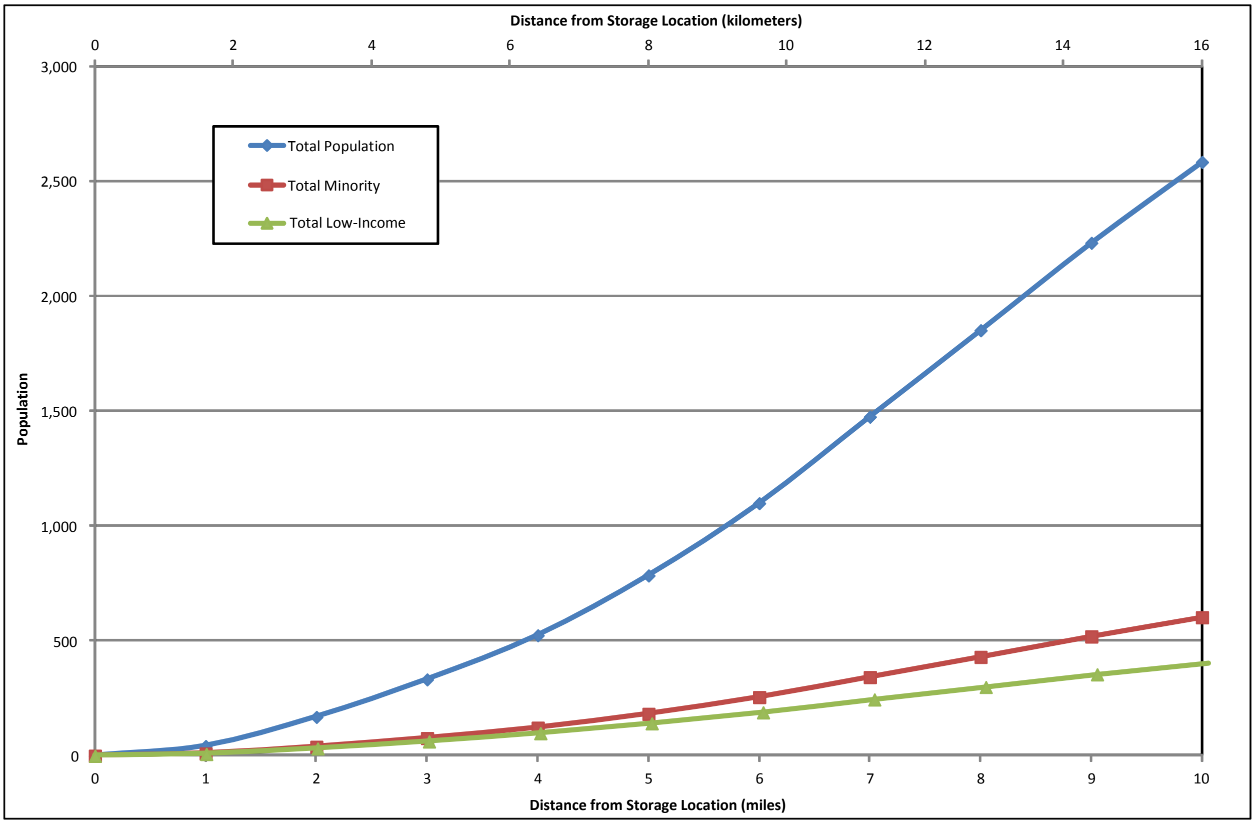

Figure E–11. Populations Residing Within 16 Kilometers (10 Miles) of the Storage Location at the Hawthorne Army Depot

E.3.5.2 Environmental Consequences

Under this alternative, elemental mercury would be stored at the Hawthorne Army Depot. The depot comprises 59,500 hectares (147,000 acres) and is located approximately 16 kilometers (10 miles) from Hawthorne, Nevada. Implementation of this alternative would involve modification of a maximum of 29 existing storage buildings within the depot's Central Magazine Area to accommodate mercury storage, as further described in Chapter 2, Section 2.4.4, of the January 2011 *Mercury Storage EIS*.

E.3.5.2.1 Socioeconomics

Under this alternative, existing storage facilities (igloos) in the Hawthorne Army Depot's Central Magazine Area would be modified for long-term storage of elemental mercury. Employment during renovations is expected to be less than that estimated for constructing a new facility, as described in Chapter 4, Section 4.5.11, of the January 2011 *Mercury Storage EIS*. Appendix C, Table C–1, of this draft SEIS summarizes the necessary modifications to bring the existing storage buildings at the Hawthorne Army Depot up to specifications to support mercury storage. Operation of the existing buildings for mercury storage is estimated to require approximately eight individuals for routine maintenance and support activities during the first 7 years, when higher volumes of shipments are expected, and approximately five to six individuals thereafter, resulting in a possible increase in the depot's workforce of approximately 2 percent and an increase in the ROI workforce of 0.02 percent. Neither modification nor operation of the storage buildings is expected to generate substantial, new direct or indirect employment. Thus, negligible impacts on socioeconomic conditions (i.e., overall employment and population trends) in the ROI would result from implementing this alternative.

Construction-related transportation needed to modify the existing facility, including employee vehicle trips and equipment and materials shipments, is not expected to adversely impact traffic conditions on roads leading to the site. It is likely that significantly fewer than the 45 vehicles a day estimated for construction of a new mercury storage facility would be needed to support facility modification (see Chapter 4, Section 4.5.11, of the January 2011 *Mercury Storage EIS*). Therefore, construction-related transportation is expected to increase the average annual daily traffic count on U.S. Route 95 by no more than 2 percent. Impacts on traffic during construction would be minor.

Transportation impacts during the operations phase would include employee vehicle trips and shipments of mercury to the site for storage. Appendix C, Section C.1, of this draft SEIS provides an estimate of the number of shipments by truck. The additional vehicles due to facility operation are not expected to noticeably increase traffic volumes on roads leading to the site. The greatest impact would be during the first 2 years of operations, when it is estimated that approximately 11 vehicles a day could increase the average annual daily traffic count on U.S. Route 95 by less than 0.5 percent. At the peak of operations, it is estimated that up to 79 shipments would be made in a year. Approximately 96 percent of the additional vehicles would be attributed to employee transportation. Impacts on traffic during operations would be negligible.

E.3.5.2.2 Environmental Justice

One of the block groups within the 16-kilometer (10-mile) radius surrounding the proposed storage site at the Hawthorne Army Depot contains both a minority and low-income population. The same block group has been identified within the 3.2-kilometer (2-mile) radius surrounding the storage site. As discussed in Chapter 3, Section 3.4.1.1, and Chapter 4, Section 4.5.1, of the January 2011 *Mercury Storage EIS*, the surrounding area includes light industrial land use; there would be no offsite impacts on land use as a result of implementing the Hawthorne Army Depot alternative. Impacts on air quality under this alternative would be negligible, as discussed in Chapter 4, Section 4.5.4.2, of the January 2011 *Mercury Storage EIS*. No impacts on ecological resources would occur under this alternative, as discussed in Section 4.5.5 of the January 2011 *Mercury Storage EIS*. Modification of existing storage buildings would not require any additional land to be disturbed and the probability of discovering American Indian archaeological sites would be negligible; thus, there would be negligible impacts on American Indian cultural resources, as discussed in Chapter 3, Section 3.4.6.3, and Chapter 4, Section 4.5.6.3, of the January 2011 *Mercury Storage EIS*. A negligible change in socioeconomic conditions would result under this alternative, as discussed above in Section E.3.5.2.1. As discussed in Section 4.5.9 of the January 2011 *Mercury Storage EIS*, implementing the Hawthorne Army Depot alternative would result in negligible offsite human health risks from mercury emissions during normal operations and facility accidents. As discussed in Section 4.5.9.3 of the January 2011 *Mercury Storage EIS*, transportation accidents are predicted to pose a negligible-to-low human health risk following dry deposition onto the ground or into water bodies. The Hawthorne Army Depot is located in an area proximal to a block group identified as both a minority and low-income community, as described in Section E.3.5.1.2. The analysis of the Hawthorne Army Depot alternative identified the presence of minority and low-income communities adjacent to potential transportation routes. The transportation accident analysis is discussed in Section 4.2.9.3 and Appendix D, Section D.4.5, of the January 2011 *Mercury Storage EIS*.

In addition, under transportation accident scenarios in which a fire occurs, it is possible for nearby downwind surface-water bodies to become contaminated, raising concerns for populations where fish is an important part of the diet. Chapter 4, Section 4.5.9.3.3, of the January 2011 *Mercury Storage EIS* discusses the possibility of accumulation of mercury in fish under such scenarios. Three fish consumption rates were analyzed: the national average consumption rate, the average subsistence fisherman consumption rate, and the 95th percentile subsistence fisherman consumption rate (see Section 4.2.9.1.1 of the January 2011 *Mercury Storage EIS*). Such consumption rates could be representative of a low-income or American Indian subsistence fishing population. Under the Truck Scenarios, the risks to human receptors that consume fish at one of the three rates would be negligible.

Under the Railcar Scenario, the risk to the 95th percentile subsistence fisherman would be negligible to low. American Indian reservations have not been identified within the 16-kilometer (10-mile) ROI surrounding the Hawthorne Army Depot; however, as discussed in Section E.3.5.1.2, there are low-income and minority communities present in the ROI. The Walker River Indian Reservation lies outside the 16-kilometer radius of the proposed storage site; however, transportation of mercury through the reservation is a consideration. Although the risk is negligible to low, if a transportation accident that resulted in fish contamination were to occur, it would be advisable as a mitigation measure to monitor the levels of methylmercury in fish to ensure that subsistence fishermen do not consume amounts of methylmercury that might cause adverse health effects. Subsequent to mandated reporting of any such release by the shipper of the elemental mercury, the appropriate state environmental agency would be responsible for determining appropriate fish consumption advisories and monitoring requirements for mercury concentrations in waters and fish stocks.

E.3.6 Idaho National Laboratory

E.3.6.1 Affected Environment

E.3.6.1.1 Socioeconomics

INL is located in southeastern Idaho, approximately 39 kilometers (24 miles) west of Idaho Falls. Over 90 percent of people employed at INL reside in four counties: Bannock, Bingham, Bonneville, and Jefferson. Therefore, these four counties are identified as the ROI in this socioeconomics analysis. In 2008, INL employed 8,485 persons (Wiser 2008).

E.3.6.1.1.1 Regional Economic Characteristics

From 2000 to 2011, the labor force of the ROI increased by approximately 17 percent from 108,820 to 126,982. During this period, the unemployment rate of the ROI increased from 4.0 percent to 7.4 percent. The unemployment rate in the ROI peaked during 2010 at 7.2 percent. By July 2012, the unemployment rate of the ROI was 6.2 percent, which was lower than the unemployment rate for Idaho (6.9 percent) (BLS 2012).

E.3.6.1.1.2 Demographic and Housing Characteristics

In 2010, the estimated population of the four-county ROI was 258,820. From 2000 to 2010, the ROI population grew by 18 percent, compared with 21 percent growth throughout the state of Idaho (DOC 2001a, 2011a). Young children and pregnant women are considered to be among the most vulnerable populations to mercury poisoning. The percentage of the ROI population under the age of 18 was 31 percent; women ages 18 to 39 composed 15 percent (DOC 2011a). There were 97,785 housing units in the ROI in 2010 (DOC 2011b), 67 percent of which were owner-occupied, 26 percent were renter-occupied, and 7.5 percent were vacant (DOC 2011b, 2011c).

E.3.6.1.2 Environmental Justice

The 16-kilometer (10-mile) radius surrounding the candidate storage locations at INL encompasses parts of two counties in Idaho: Bingham and Butte. Figure E–12 shows populations residing in the two-county area, as reported in the 2000 and 2010 censuses (DOC 2001a, 2011d). In this figure, lightly shaded bars show populations in 2000, and the darker bars show those in 2010. In the decade between 2000 and 2010, the total population of Bingham and Butte Counties increased by approximately 8.7 percent to 48,498; the minority population increased by approximately 28 percent to 11,609; and the low-income population increased by 22 percent to 6,879 (DOC 2001a, 2001b, 2011d, 2011e). Demographic data from the 2010 census show that the total minority population accounted for approximately 24 percent of the total population. The population self-identified as "some other race" (meaning those who provided write-in entries such as Mexican, Puerto Rican, or Cuban) residing in the two-county area composed approximately 39 percent of the area's total minority population, while those identified as American Indian and Alaska Native composed 26 percent of the total minority population. Persons who declared that they are of Hispanic or Latino origin are included in the "total Hispanic" population, regardless of race. They composed approximately 69 percent of the total minority population residing in Bingham and Butte Counties in 2010 (DOC 2011d).

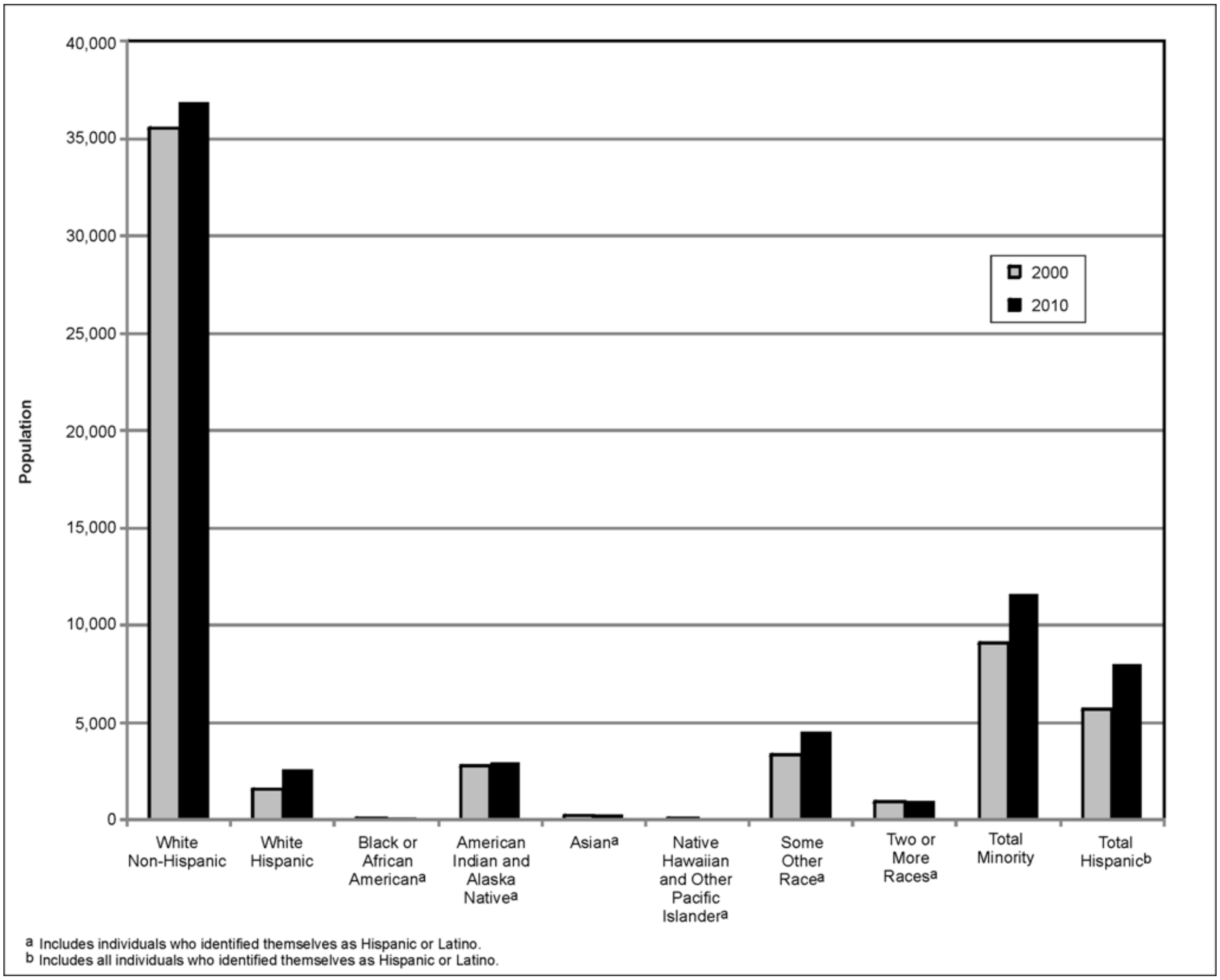

Figure E–12. Populations Residing Within the Two-County Area Surrounding Idaho National Laboratory

Radioactive Waste Management Complex Option

In 2010, 175 people lived within 16 kilometers (10 miles) of the Radioactive Waste Management Complex (RWMC). This area included an estimated 9.8 percent minority and 19 percent low-income population. By comparison, Bingham and Butte Counties included a 24 percent minority and 15 percent low-income population, and Idaho included a 16 percent minority and 14 percent low-income population (DOC 2001a, 2001b, 2011d, 2011e). There are three census block groups located within the 16-kilometer radius surrounding the RWMC, none of which contained a minority or low-income population. As described in Appendix B, Section B.11.1, of the January 2011 *Mercury Storage EIS* and updated in Appendix B of this draft SEIS, minority and low-income populations or communities are identified by comparing block-group data to the surrounding state- and county-level data to determine if the minority or low-income population percentage is meaningfully greater than that of the general population. No one resides within approximately 3.2 kilometers (2 miles) of the RWMC (DOC 2011d).

The Fort Hall Reservation is located approximately 71 kilometers (44 miles) southeast of the RWMC.

Figure E–13 shows the cumulative populations living at a given distance from the RWMC.

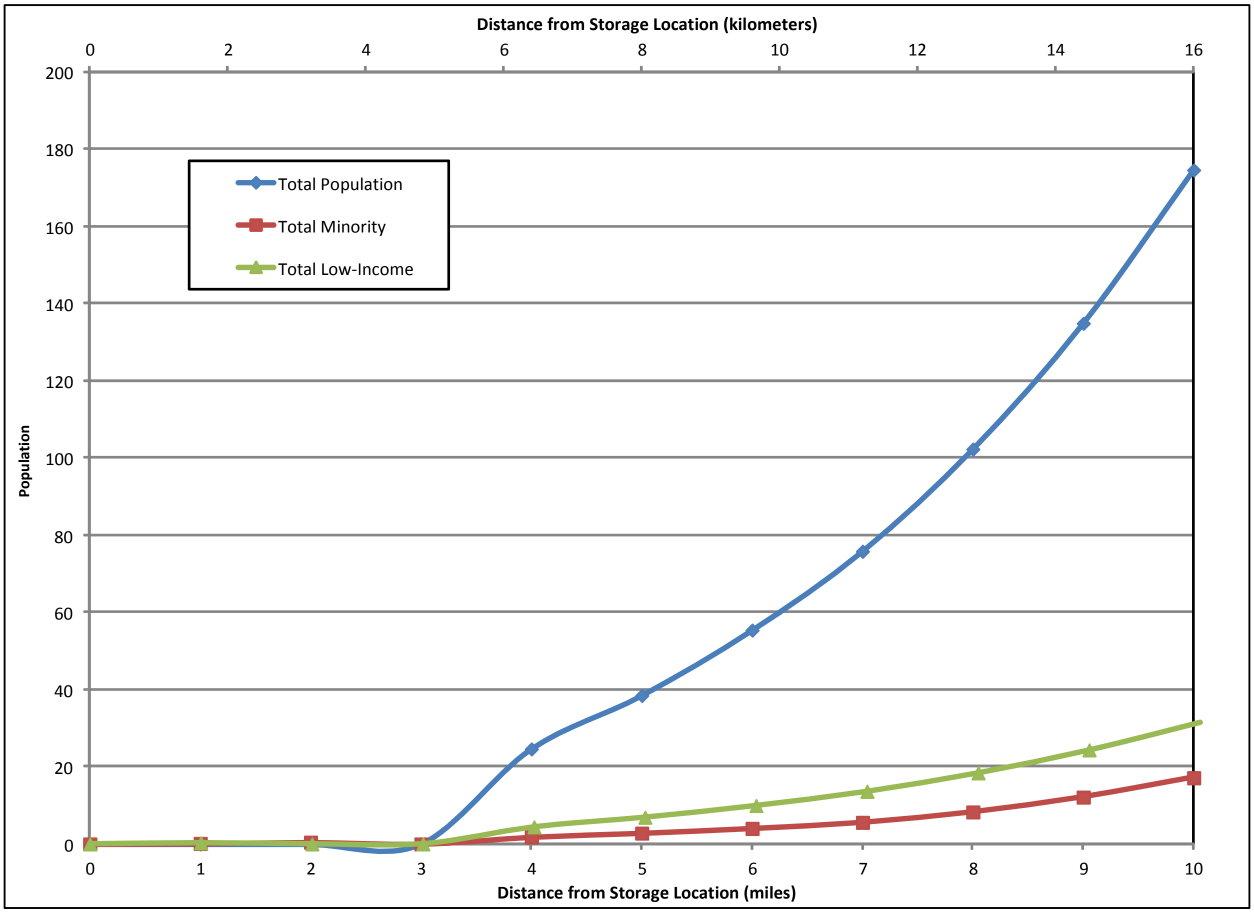

Figure E–13. Populations Residing Within 16 Kilometers (10 Miles) of the Storage Location at the Radioactive Waste Management Complex

Idaho Nuclear Technology and Engineering Center Option

In 2010, 205 people lived within 16 kilometers (10 miles) of the Idaho Nuclear Technology and Engineering Center (INTEC). This area included an estimated 11 percent minority and 15 percent low-income population. By comparison, Bingham and Butte Counties included a 24 percent minority and 15 percent low-income population, and Idaho included a 16 percent minority and 14 percent low-income population (DOC 2001a, 2001b, 2011d, 2011e). There are three census block groups located within the 16-kilometer radius surrounding INTEC, none of which contained a minority or low-income population. No one resides within approximately 3.2 kilometers (2 miles) of INTEC (DOC 2011d).

The Fort Hall Reservation is located approximately 69 kilometers (43 miles) southeast of INTEC.

Figure E–14 shows the cumulative populations living at a given distance from INTEC.

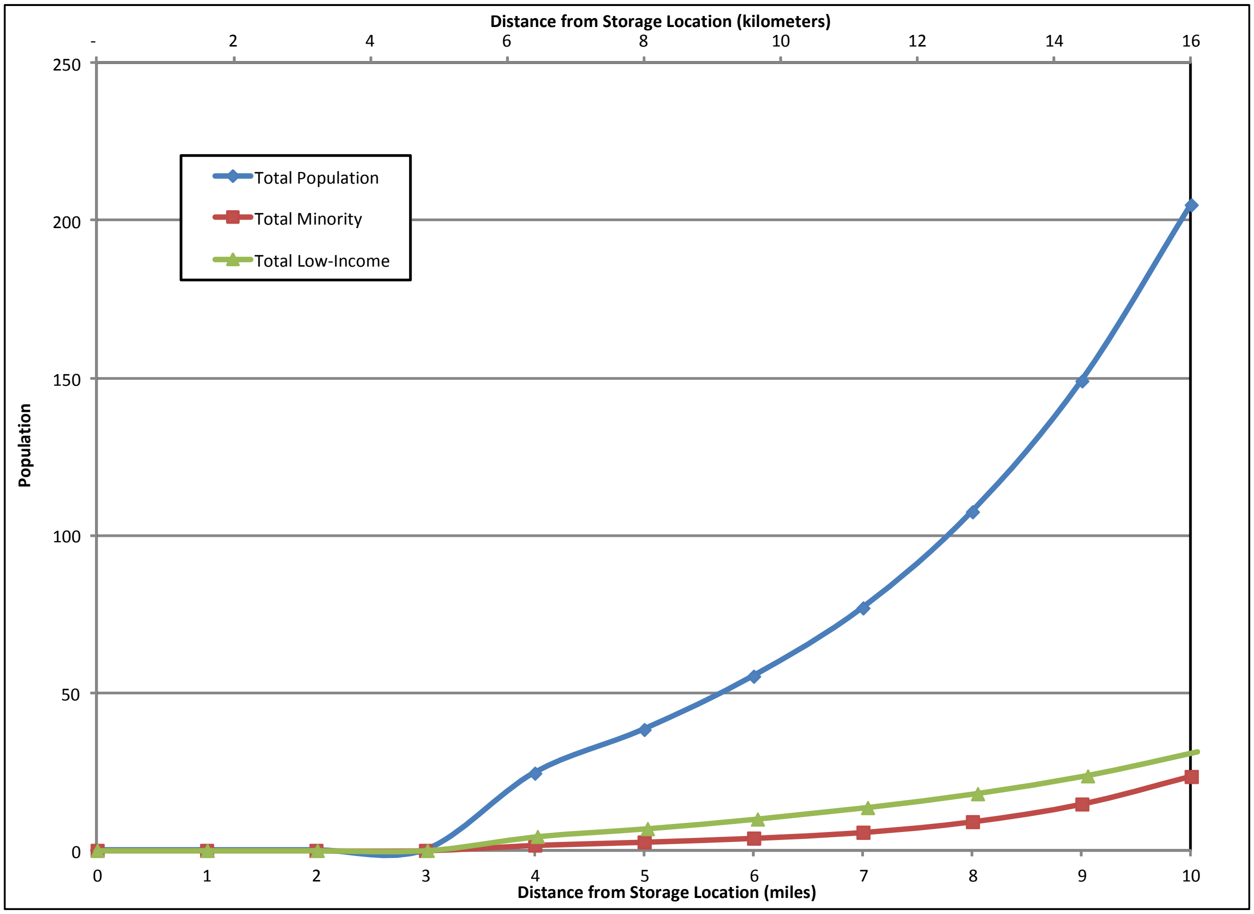

Figure E–14. Populations Residing Within 16 Kilometers (10 Miles) of the Storage Location at the Idaho Nuclear Technology and Engineering Center

E.3.6.2 Environmental Consequences

Under this alternative, elemental mercury would be stored at DOE's INL. INL is a 230,323-hectare (569,135-acre) area located in southeastern Idaho. Two options have been identified at INL: (1) construction of a new mercury storage facility within INTEC, or (2) modification of existing waste storage facilities at the RWMC to accommodate mercury storage. These options are further described in Chapter 2, Section 2.4.5, of the January 2011 *Mercury Storage EIS*. In the following sections, differences in potential impacts between the options are identified, where appropriate.

E.3.6.2.1 Socioeconomics

Idaho Nuclear Technology and Engineering Center Option

Under the INTEC Option at INL, a new facility for long-term storage of elemental mercury would be constructed. Employment during construction is expected to average 18 people for approximately 6 months. Operation of the facility is estimated to require approximately 8 individuals for routine maintenance and support activities during the first 7 years, when higher volumes of shipments are expected, and approximately 5 to 6 individuals thereafter, resulting in a possible increase of the INL workforce of less than 0.1 percent and an increase in the ROI of 0.005 percent. This estimate assumes that new employees would be hired for construction and operations of the new facility rather than drawn from existing onsite personnel. Regardless, neither construction nor operation of a new facility is expected to generate substantial direct or indirect employment. Thus, negligible impacts on socioeconomic conditions (i.e., overall employment and population trends) in the ROI would result from implementing this alternative.

Construction-related transportation, including employee vehicle trips and equipment and materials shipments, is not expected to adversely impact traffic conditions on roads leading to the site. It is assumed that there would be approximately 1.5 employees per vehicle, and every vehicle is counted twice to account for round trips. It is estimated that average construction transportation of 45 vehicles a day could increase the average annual daily traffic count on Idaho State Route 33 by approximately 6 percent. Fifty-three percent of these vehicles would be attributed to employee transportation. Impacts on traffic during construction would be minor.

Transportation impacts during the operations phase would include employee vehicle trips and shipments of mercury to the site for storage. Appendix C, Section C.1, of this draft SEIS provides an estimate of the number of shipments by truck. The additional vehicles due to facility operations are not expected to noticeably increase traffic volumes on roads leading to the site. The greatest impact would be during the first 2 years of operations, when it is estimated that approximately 11 vehicles a day could increase the average annual traffic count on State Route 33 by approximately 2 percent. At the peak of operations, it is estimated that up to 79 shipments would be made in a year. Approximately 96 percent of the additional vehicles would be attributed to employee transportation. Impacts on traffic during operations would be minor.

Radioactive Waste Management Complex Option

Modifications of the existing RWMC storage modules and subsequent operations for storage of elemental mercury under the RWMC Option would result in substantially smaller socioeconomic impacts than those described above for the INTEC Option. The total impact on socioeconomic and traffic conditions in the ROI surrounding INL would be negligible to minor. Appendix C, Table C–1, of the January 2011 *Mercury Storage EIS* summarizes the necessary modifications to the RWMC storage modules to meet the specifications for mercury storage.

E.3.6.2.2 Environmental Justice

Idaho Nuclear Technology and Engineering Center Option

None of the block groups within either the 16-kilometer (10-mile) radius or the 3.2-kilometer (2-mile) radius surrounding INTEC contain a minority or low-income population. Therefore, no disproportionately high and adverse effects on minority or low-income populations are expected.

The Fort Hall Reservation lies well beyond the 16-kilometer (10-mile) radius of the proposed storage site; however, it is possible that mercury shipments originating from points south and east of the site could be transported through the reservation.

Radioactive Waste Management Complex Option

None of the block groups within either the 16-kilometer (10-mile) radius or the 3.2-kilometer (2-mile) radius surrounding the RWMC contain a minority or low-income population. Therefore, no disproportionately high and adverse effects on minority or low-income populations are expected.

The Fort Hall Reservation lies well beyond the 16-kilometer radius of the proposed storage site; however, it is possible that mercury shipments originating from points south and east of the site could be transported through the reservation.

E.3.7 Kansas City Plant

E.3.7.1 Affected Environment

E.3.7.1.1 Socioeconomics

KCP is located in Kansas City, Missouri, approximately 13 kilometers (8 miles) south of the city center. KCP employs approximately 2,400 persons. Approximately 90 percent of the people employed at KCP reside in four counties: Cass, Clay, and Jackson in Missouri and Johnson in Kansas. Therefore, these four counties are identified as the ROI in this socioeconomics analysis (GSA and NNSA 2008:22).

E.3.7.1.1.1 Regional Economic Characteristics

From 2000 to 2011, the labor force of the four-county ROI increased by approximately 6.5 percent from 763,352 to 813,127. During this period, the unemployment rate of the ROI increased from 3.1 percent to 7.9 percent. The unemployment rate in the ROI peaked during 2009 at 8.8 percent and remained at that level through 2010. By July 2012, the unemployment rate of the ROI was 7.3 percent, which was higher than the unemployment rate across the two-state area of Missouri and Kansas (6.8 percent) (BLS 2012).

E.3.7.1.1.2 Demographic and Housing Characteristics

In 2010, the estimated population of the four-county ROI was 1,539,754. From 2000 to 2010, the ROI population grew by 12 percent, compared with 6.7 percent growth throughout the two-state region of Missouri and Kansas (DOC 2001a, 2011a). Young children and pregnant women are considered to be among the most vulnerable populations to mercury poisoning. The percentage of the ROI population under the age of 18 was 26 percent; women ages 18 to 39 composed 15 percent of the population (DOC 2011a). There were 672,624 housing units in the ROI in 2010 (DOC 2011b), 61 percent of which were owner-occupied, 30 percent were renter-occupied, and 9.0 percent were vacant (DOC 2011b, 2011c).

E.3.7.1.2 Environmental Justice

The 16-kilometer (10-mile) radius surrounding the candidate storage location at KCP encompasses parts of four counties: Cass and Jackson in Missouri and Johnson and Wyandotte in Kansas. Figure E–15 shows populations residing in the four-county area, as reported in the 2000 and 2010 censuses (DOC 2001a, 2011d). In this figure, lightly shaded bars show populations in 2000, and the darker bars show those in 2010. In the decade between 2000 and 2010, the total population of Cass, Jackson, Johnson, and Wyandotte Counties increased by approximately 9.6 percent to 1,475,320; the minority population increased by approximately 30 percent to 445,453; and the low-income population increased by 40 percent to 172,177 (DOC 2001a, 2001b, 2011d, 2011e). Demographic data from the 2010 census show that the total minority population accounted for approximately 30 percent of the total population. The Black or African American population residing in the four-county area accounted for approximately 51 percent of the area's total minority population. Persons who declared that they are of Hispanic or Latino origin are included in the "total Hispanic" population, regardless of race. They composed approximately 9.6 percent of the total population and approximately 32 percent of the total minority population residing in Cass, Jackson, Johnson, and Wyandotte Counties in 2010 (DOC 2011d).

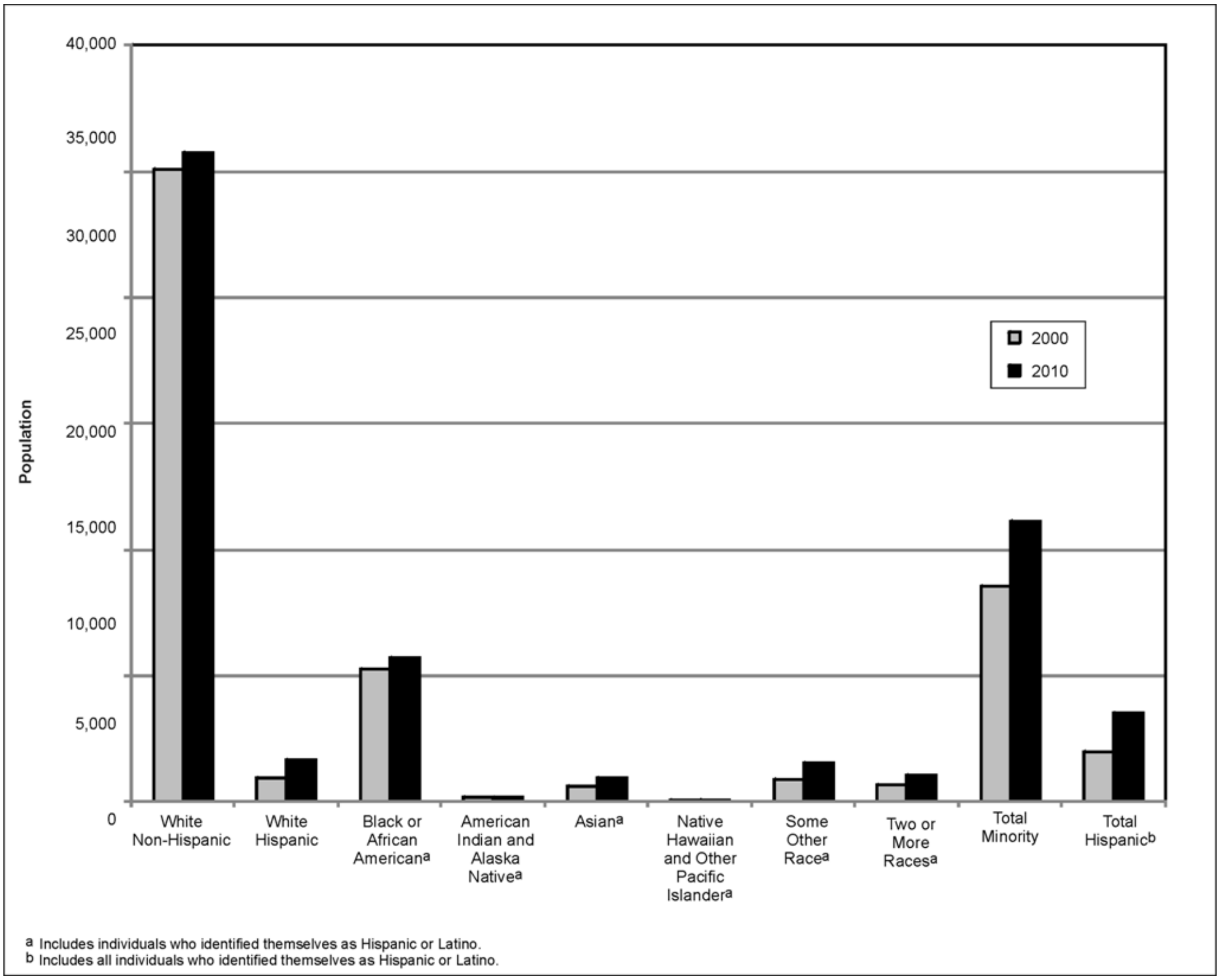

Figure E–15. Populations Residing Within the Four-County Area Surrounding the Kansas City Plant

In 2010, 705,513 people lived within 16 kilometers (10 miles) of KCP. This area included an estimated 36 percent minority and 13 percent low-income population. By comparison, the four-county area included a 30 percent minority and 12 percent low-income population, and the two-state area included a 19 percent minority and 14 percent low-income population (DOC 2011d, 2011e). There are 659 census block groups located within the 16-kilometer radius surrounding KCP; of this total, 157 contained a minority population, 5 contained a low-income population, and 88 contained both a minority and low-income population. A total of 409 block groups did not contain a low-income or minority population. As described in Appendix B, Section B.11.1, of the January 2011 *Mercury Storage EIS* and updated in Appendix B of this draft SEIS, minority and low-income populations or communities are identified by comparing block-group data to the surrounding state- and county-level data to determine if the minority or low-income population percentage is meaningfully greater than that of the general population.

In 2010, 26,192 people lived within approximately 3.2 kilometers (2 miles) of KCP. This area included an estimated 52 percent minority and 20 percent low-income population (DOC 2011d, 2011e). There are 39 census block groups located within this ROI; of this total, 16 contained a minority population, none contained a low-income population, and 6 contained both a minority and low-income population. Seventeen block groups did not contain a minority or low-income population.

Figure E–16 displays the proximity of minority and low-income communities to KCP.

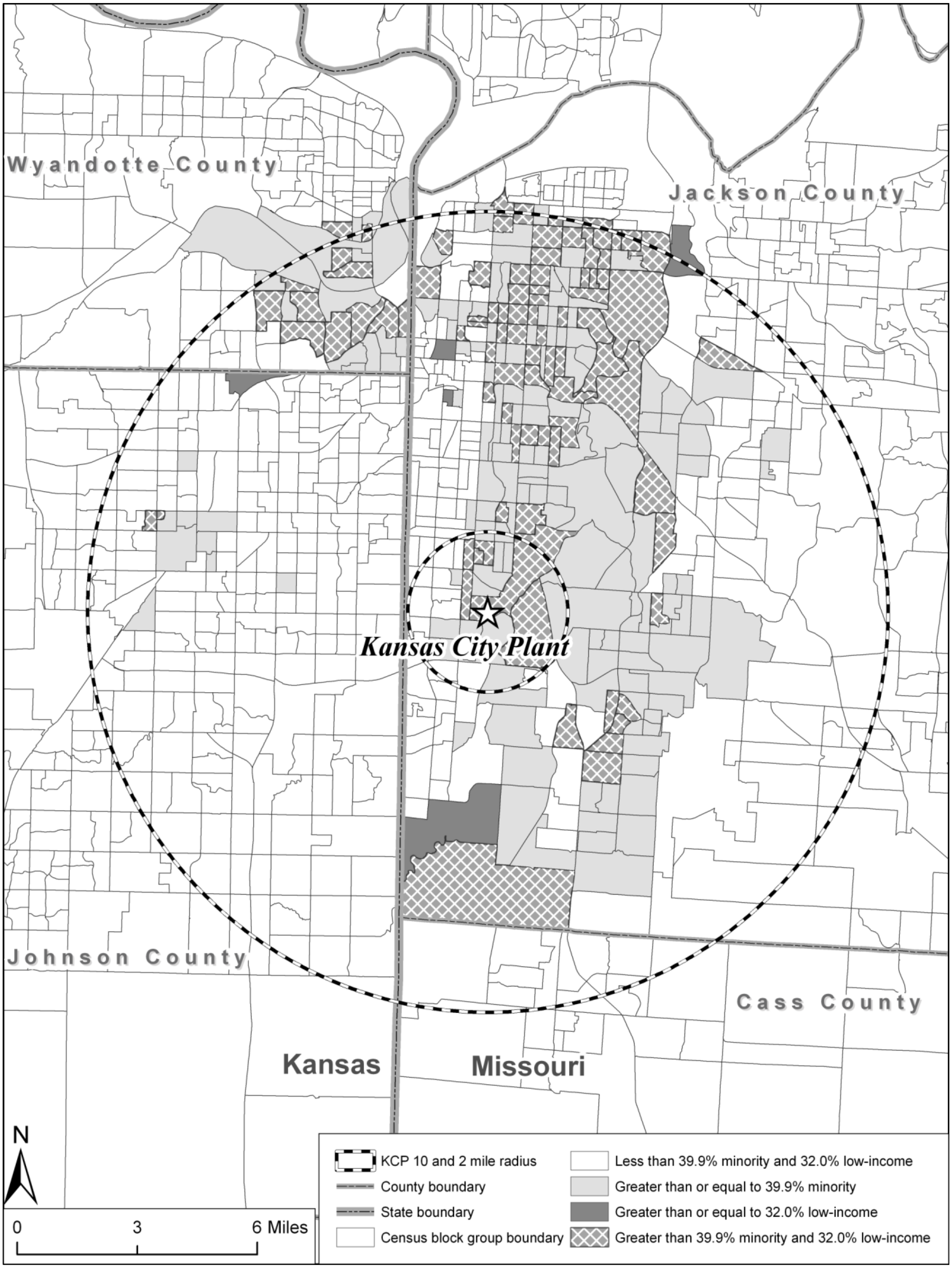

Figure E–16. Block Groups Containing Minority and Low-Income Populations Surrounding the Kansas City Plant

Figure E–17 shows the cumulative populations living at a given distance from the site.

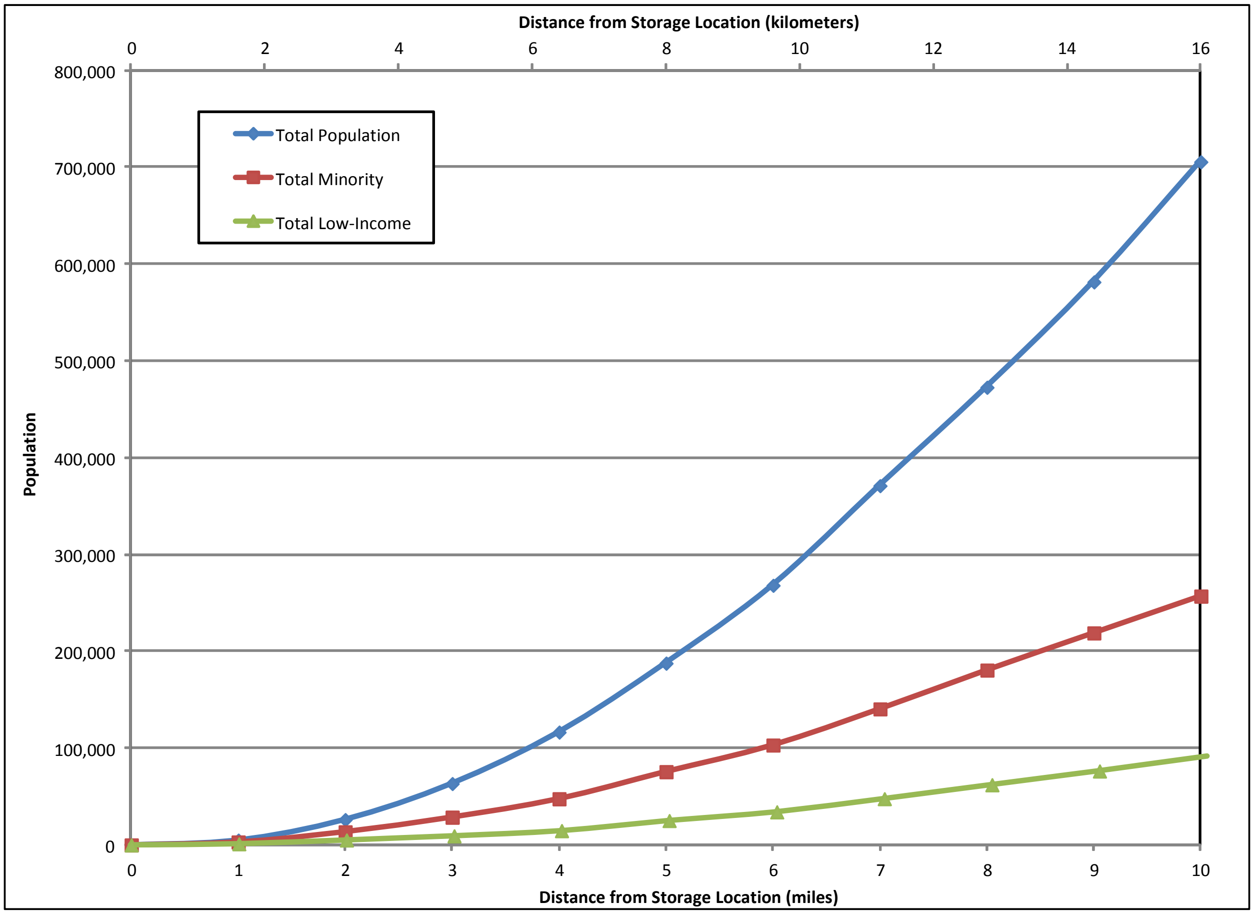

Figure E–17. Populations Residing Within 16 Kilometers (10 Miles) of the Storage Location at the Kansas City Plant

E.3.7.2 Environmental Consequences

Under this alternative, elemental mercury would be stored at DOE's KCP. KCP is part of the 125-hectare (310-acre) Bannister Federal Complex located 13 kilometers (8 miles) south of downtown Kansas City, Missouri. KCP occupies 55 hectares (136 acres) of the complex and is under the custody and control of DOE's National Nuclear Security Administration. Implementation of this alternative would involve modification of an existing building (i.e., Main Manufacturing Building), as further described in Chapter 2, Section 2.4.6, of the January 2011 *Mercury Storage EIS*.

E.3.7.2.1 Socioeconomics

Under this alternative, existing space in KCP would be modified for long-term storage of elemental mercury. Employment during renovations is expected to be less than that estimated for constructing a new facility. Appendix C, Table C–1, of the January 2011 *Mercury Storage EIS* summarizes the necessary modifications to bring the facility up to specifications to support mercury storage. Operation of the facility is estimated to require approximately eight individuals for routine maintenance and support activities during the first 7 years, when higher volumes of shipments are expected, and approximately five to six individuals thereafter. Operation of the facility is not expected to generate substantial direct or indirect employment. The largest estimated increase in employment would only increase the ROI workforce by 0.001 percent. Thus, negligible impacts on socioeconomic conditions (i.e., overall employment and population trends) in the ROI would result from implementing this alternative.

Construction-related transportation needed to modify the existing facility, including employee vehicle trips and equipment and materials shipments, is not expected to adversely impact traffic conditions on roads leading to the site. It is likely that significantly fewer than the 45 vehicles estimated to construct a new mercury storage facility would be needed to support facility modifications. Therefore, construction-related transportation is expected to increase the average annual daily traffic count on Bannister Road by no more than 0.3 percent. Impacts on traffic during construction would be negligible.

Transportation impacts during the operations phase would include employee vehicle trips and shipments of elemental mercury to the site for storage. Appendix C, Section C.1, of this draft SEIS provides an estimate of the number of shipments by truck. The additional vehicles due to facility operations are not expected to noticeably increase traffic volumes on roads leading to the site. The greatest impact would be during the first 2 years of operations, when it is estimated that approximately 11 vehicles a day could increase the average annual daily traffic count on Bannister Road by less than 0.1 percent. At the peak of operations, it is estimated that up to 79 shipments would be made in a year. Approximately 96 percent of the additional vehicles would be attributed to employee transportation. Impacts on traffic during operations would be negligible.

E.3.7.2.2 Environmental Justice

An analysis of populations in census block groups found that, of the 659 block groups within the 16-kilometer (10-mile) radius of KCP, 157 contained only a minority population, 5 contained only a low-income population, and 88 contained both minority and low-income populations. A total of 409 block groups did not contain minority or low-income populations. Of the 39 census block groups within the 3.2-kilometer (2-mile) radius of KCP, 16 contained only a minority population and 6 contained both minority and low-income populations. Seventeen block groups within this ROI did not contain a minority or low-income population.

As discussed in Chapter 3, Section 3.6.1.1, and Chapter 4, Section 4.7.1, of the January 2011 *Mercury Storage EIS*, the surrounding area includes residential, commercial, industrial, and public use lands; there would be no impacts on land use as a result of implementing the KCP alternative. Impacts on air quality under this alternative would be negligible, as discussed in Section 4.7.4.2 of the January 2011 *Mercury Storage EIS*. No impacts on ecological resources would occur under this alternative, as discussed in Section 4.7.5 of the January 2011 *Mercury Storage EIS*. There is a low probability of discovering American Indian archaeological sites in the KCP area; thus, there would be negligible impacts on American Indian cultural resources, as discussed in Sections 3.6.6.3 and 4.7.6.3 of the January 2011 *Mercury Storage EIS*. A negligible change in socioeconomic conditions would result under this alternative, as discussed above in Section E.3.7.2.1.

As discussed in Chapter 4, Section 4.7.9, of the January 2011 *Mercury Storage EIS*, implementing the KCP alternative would result in negligible offsite human health risks from mercury emissions during normal operations and facility accidents. As discussed in Section 4.7.9.3 of the January 2011 *Mercury Storage EIS*, transportation accidents are predicted to pose a negligible-to-low human health risk following dry deposition onto the ground or into water bodies. KCP is located in an area proximal to both minority and low-income communities, as described in Section E.3.7.1.2. The analysis of the KCP alternative identified minority and low-income communities adjacent to potential transportation routes. The transportation accident analysis is discussed in Section 4.2.9.1.5 and Appendix D, Section D.4.5, of the January 2011 *Mercury Storage EIS*.

In addition, under transportation accident scenarios in which a fire occurs, it is possible for nearby downwind surface-water bodies to become contaminated, raising concerns for populations where fish is an important part of the diet. Chapter 4, Section 4.7.9.3.3, of the January 2011 *Mercury Storage EIS* discusses the possibility of accumulation of mercury in fish under such scenarios. Three fish consumption rates were analyzed: the national average consumption rate, the average subsistence fisherman consumption rate, and the 95th percentile subsistence fisherman consumption rate (see Section 4.2.9.1.1 of the January 2011 *Mercury Storage EIS*). Such consumption rates could be representative of a low-income or American Indian subsistence fishing population. Under the Truck Scenarios, the risks to human receptors that consume fish at one of the three rates would be negligible. Under the Railcar Scenario, the risk to the 95th percentile subsistence fisherman would be negligible to low. American Indian reservations have not been identified within the 16-kilometer (10-mile) ROI surrounding KCP; however, as discussed above in Section E.3.7.1.2, there are several low-income and minority communities present within the ROI, including communities immediately adjacent to the Bannister Federal Complex. Although the risk is negligible to low, if a transportation accident that resulted in fish contamination were to occur, it would be advisable as a mitigation measure to monitor the levels of methylmercury in fish to ensure that subsistence fishermen do not consume amounts of methylmercury that might cause adverse health effects. Subsequent to mandated reporting of any such release by the shipper of the elemental mercury, the appropriate state environmental agency would be responsible for determining appropriate fish consumption advisories and monitoring requirements for mercury concentrations in waters and fish stocks.

E.3.8 Savannah River Site

E.3.8.1 Affected Environment

E.3.8.1.1 Socioeconomics

SRS is located approximately 19 kilometers (12 miles) south of Aiken, South Carolina, and 24 kilometers (15 miles) southeast of Augusta, Georgia. Based on local employment data compiled by the Census Bureau, it is assumed that approximately 90 percent of the people employed at SRS reside in four counties: Aiken and Barnwell in South Carolina and Columbia and Richmond in Georgia (DOC 2009). Therefore, these four counties are identified as the ROI in this socioeconomics analysis. As of April 2009, SRS employed approximately 11,000 persons (SRNS 2009).

E.3.8.1.1.1 Regional Economic Characteristics

From 2000 to 2011, the labor force of the four-county ROI increased by 10 percent from 215,077 to 236,490. During this period, the unemployment rate of the ROI increased from 3.8 percent to 9.2 percent. As of July 2012, the unemployment rate of the ROI had increased to 9.8 percent, which was higher than the unemployment rate across the two-state area of South Carolina and Georgia (9.2 percent) (BLS 2012).

E.3.8.1.1.2 Demographic and Housing Characteristics

In 2010, the estimated population of the four-county ROI was 507,322. From 2000 to 2010, the ROI population grew by 11 percent, compared with 17 percent growth throughout the two-state area of Georgia and South Carolina (DOC 2001a, 2011a). Young children and pregnant women are considered to be among the most vulnerable populations to mercury poisoning. The percentage of the ROI population under the age of 18 was 25 percent; women ages 18 to 39 composed 15 percent (DOC 2011a). There were 217,690 housing units in the ROI in 2010 (DOC 2011b), 60 percent of which were owner-occupied, 30 percent were renter-occupied, and 10 percent were vacant (DOC 2011b, 2011c).

E.3.8.1.2 Environmental Justice

The 16-kilometer (10-mile) radius surrounding the candidate storage location at SRS encompasses parts of four counties: Aiken and Barnwell in South Carolina and Burke and Richmond in Georgia. Figure E–18 shows populations residing in the four-county area, as reported in the 2000 and 2010 censuses (DOC 2001a, 2011d). In this figure, lightly shaded bars show populations in 2000, and the darker bars show those in 2010. In the decade between 2000 and 2010, the total population of Aiken, Barnwell, Burke, and Richmond Counties increased by approximately 4.8 percent to 406,585; the minority population increased by approximately 13 percent to 199,224; and the low-income population increased by approximately 19 percent to 80,813 (DOC 2001a, 2001b, 2011d, 2011e). Demographic data from the 2010 census show that the total minority population accounted for approximately 49 percent of the total population. The Black or African American population residing in the four-county area accounted for approximately 85 percent of the total minority population. Persons who declared that they are of Hispanic or Latino origin are included in the "total Hispanic" population, regardless of race. They composed approximately 4.2 percent of the total population and approximately 8.6 percent of the total minority population residing in the four-county region (DOC 2011d).

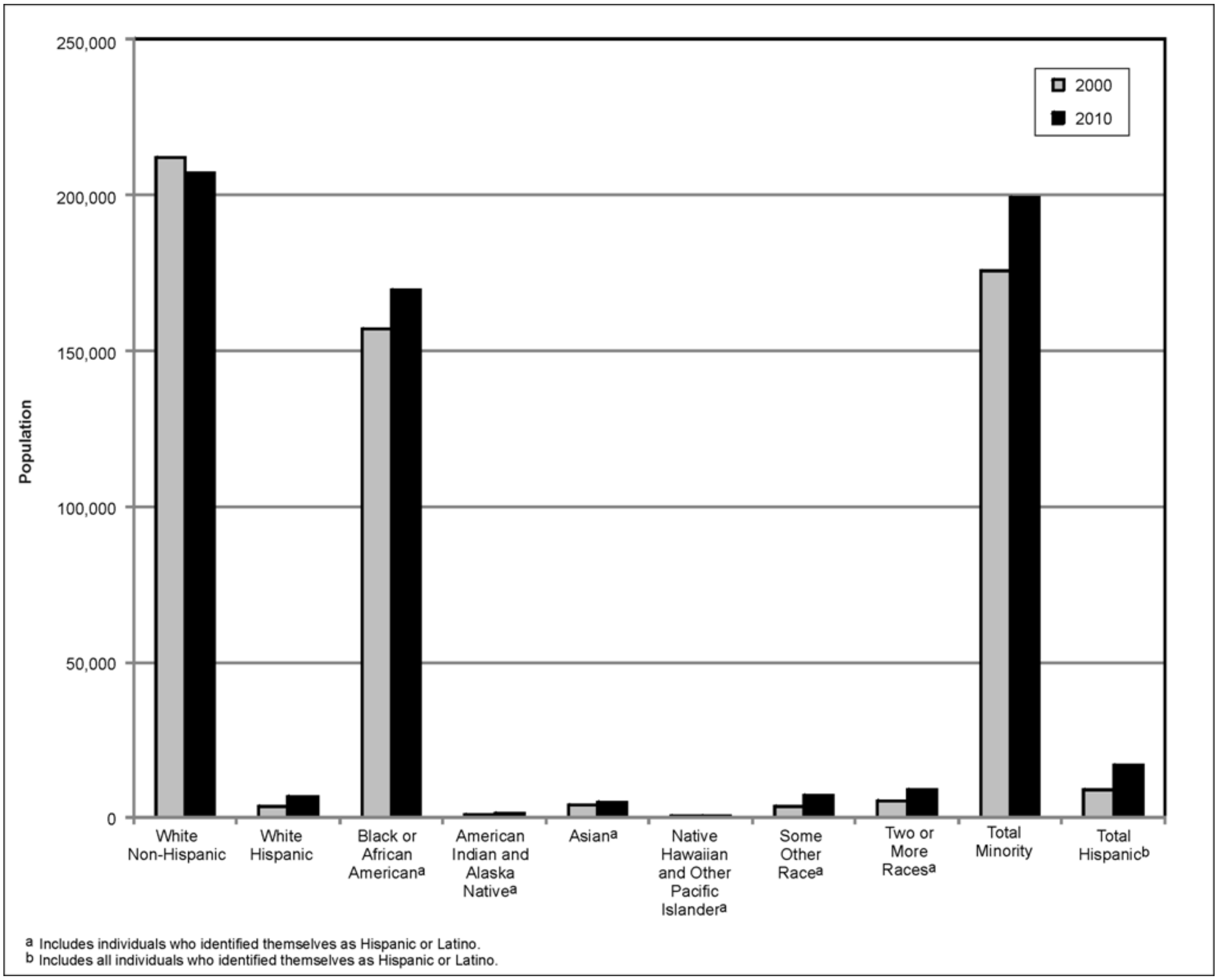

Figure E–18. Populations Residing Within the Four-County Area Surrounding the Savannah River Site

In 2010, 6,691 people lived within 16 kilometers (10 miles) of E Area at SRS (DOC 2011d). This area included an estimated 38 percent minority and 20 percent low-income population. By comparison, the four-county area included a 49 percent minority and 21 percent low-income population, and the two-state region of South Carolina and Georgia included a 41 percent minority and 16 percent low-income population (DOC 2011d, 2011e). There are 15 census block groups located within the 16-kilometer radius surrounding E Area, 4 of which contained a minority population and 1 contained a low-income population. As described in Appendix B, Section B.11.1, of the January 2011 *Mercury Storage EIS* and updated in Appendix B of this draft SEIS, minority and low-income populations or communities are identified by comparing block-group data to the surrounding state- and county-level data to determine if the minority or low-income population percentage is meaningfully greater than that of the general population. No one resides within approximately 3.2 kilometers (2 miles) of E Area.

Figure E–19 shows the proximity of the identified minority communities to E Area.

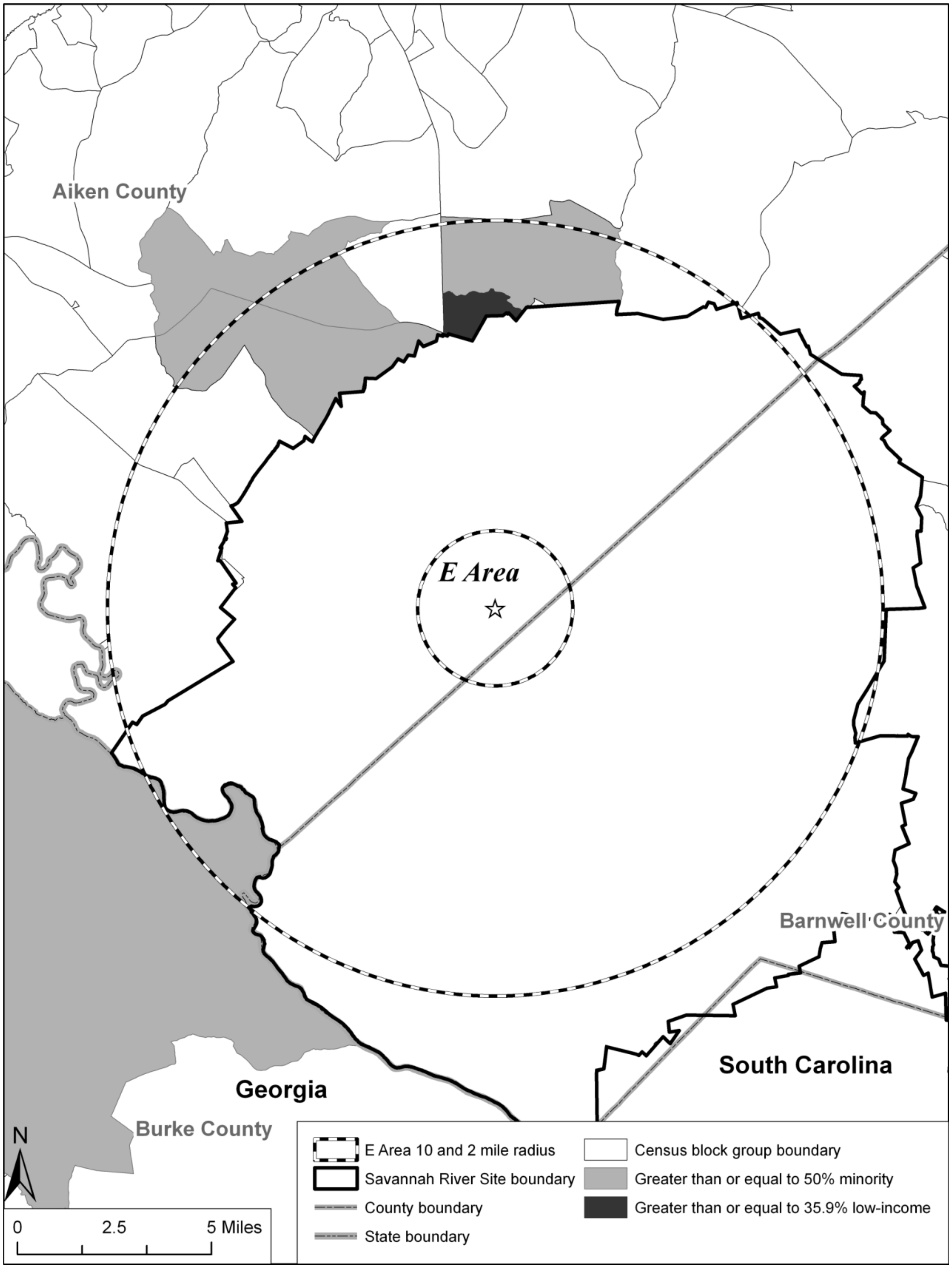

Figure E–19. Block Groups Containing Minority and Low-Income Populations Surrounding the Savannah River Site

Figure E–20 shows the cumulative populations living at a given distance from the site.

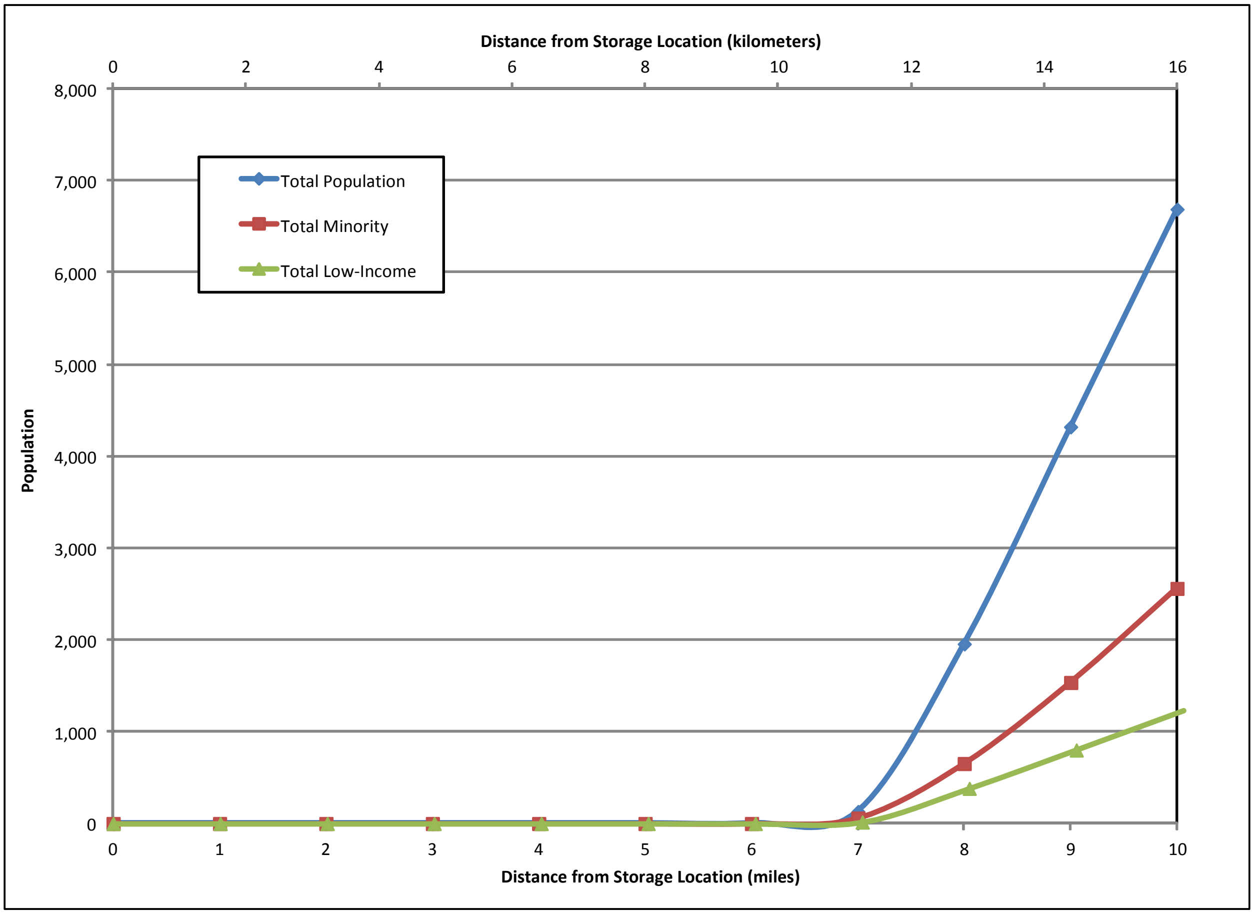

Figure E–20. Populations Residing Within 16 Kilometers (10 Miles) of the Storage Location at the Savannah River Site

E.3.8.2 Environmental Consequences

Under this alternative, a new mercury storage facility would be constructed at DOE's SRS. SRS occupies approximately 80,290 hectares (198,400 acres) and is located approximately 24 kilometers (15 miles) southeast of Augusta, Georgia, and 19 kilometers (12 miles) south of Aiken, South Carolina. Within this site, the new mercury storage facility would be built in E Area, as further described in Chapter 2, Section 2.4.7, of the January 2011 *Mercury Storage EIS*.

E.3.8.2.1 Socioeconomics

Under this alternative, a new facility for long-term storage of elemental mercury would be constructed in the SRS E Area. Employment during construction is expected to average 18 people for approximately 6 months. Operation of the facility is estimated to require approximately 8 individuals for routine maintenance and support activities during the first 7 years, when higher volumes of shipments are expected, and approximately 5 to 6 individuals thereafter, resulting in an increase of the SRS workforce of less than 0.1 percent and an increase in the ROI workforce of 0.003. Neither construction nor operation of a new facility is expected to generate substantial direct or indirect employment. Thus, negligible impacts on socioeconomic conditions (i.e., overall employment and population trends) in the ROI would result from implementing this alternative.

Construction-related transportation, including employee vehicle trips and equipment and materials shipments, is not expected to adversely impact traffic conditions on roads leading to the site. It is assumed that there would be approximately 1.5 employees per vehicle, and every vehicle is counted twice to account for round trips. It is estimated that average construction transportation of 45 vehicles a day could increase the average annual daily traffic counts by less than 1 percent, if utilizing South Carolina Highway 19, to approximately 3 percent, if utilizing Secondary Road 64. It is likely that these additional vehicles would use a combination of routes; thus, the additional traffic would not be concentrated on one particular route. Fifty-three percent of the vehicles would be attributed to employee transportation. Impacts on traffic during construction would be minor.

Transportation impacts during the operations phase would include employee vehicle trips and shipments of elemental mercury to the site for storage. Appendix C, Section C.1, of this draft SEIS provides an estimate of the number of shipments by truck. The additional vehicles due to facility operations are not expected to noticeably increase traffic volumes on roads leading to the site. The greatest impact would be during the first 2 years of operations, when it is estimated that approximately 11 vehicles a day could increase the average annual daily traffic counts by no more than 0.1 percent, if utilizing Highway 19, to as much as approximately 1 percent, if utilizing Secondary Road 62. At the peak of operations, it is estimated that up to 79 shipments would be made in a year. Approximately 96 percent of the additional vehicles would be attributed to employee transportation. Impacts on traffic during operations would be negligible to minor.

E.3.8.2.2 Environmental Justice

An analysis of populations in census block groups found that, of the 15 block groups within the 16-kilometer (10-mile) radius of the SRS E Area, 4 contained a minority population and 1 contained a low-income population. No populations have been identified within the 3.2-kilometer (2-mile) radius surrounding E Area.

As discussed in Chapter 3, Section 3.7.1.1, and Chapter 4, Section 4.8.1, of the January 2011 *Mercury Storage EIS*, the surrounding area includes urban, residential, industrial, agricultural, and recreational land uses; there would be no offsite impacts on land use as a result of implementing the SRS alternative. Impacts on air quality under this alternative would be minor during construction and negligible during operations, as discussed in Section 4.8.4.2 of the January 2011 *Mercury Storage EIS*. Impacts on ecological resources are expected to be minimal under this alternative, as discussed in Section 4.8.5. There is a low probability that resources of interest to American Indian tribes occur in E Area at SRS; thus, there would be no impacts on American Indian cultural resources, as discussed in Sections 3.7.6.3 and 4.8.6.3 of the January 2011 *Mercury Storage EIS*. A negligible change in socioeconomic conditions would result under this alternative, as discussed above in Section E.3.8.2.1.

As discussed in Chapter 4, Section 4.8.9, of the January 2011 *Mercury Storage EIS*, implementing the SRS alternative would result in negligible offsite human health risks from mercury emissions during normal operations and facility accidents. As discussed in Section 4.8.9.3 of the January 2011 *Mercury Storage EIS*, transportation accidents are predicted to pose a negligible-to-low human health risk following dry deposition onto the ground or into water bodies. Three of the four block groups identified that consist of a disproportionately high number of minority individuals and the one block group identified that consists of a disproportionately high number of low-income individuals are located adjacent to one of the entrances into SRS located at South Carolina Highway 19 and adjoining U.S. Route 278. The transportation accident analysis is discussed in Section 4.2.9.1.5 and Appendix D, Section D.4.5, of the January 2011 *Mercury Storage EIS*. No minority or low-income populations have been identified adjacent to the other site entrances. Therefore, if a transportation accident were to occur at or near any of the other site entrances, it would be reasonable to conclude that the consequences to human health of the accident would not be borne by a minority or low-income community.

In addition, under transportation accident scenarios in which a fire occurs, it is possible for nearby downwind surface-water bodies to become contaminated, raising concerns for populations where fish is an important part of the diet. Chapter 4, Section 4.7.9.3.3, of the January 2011 *Mercury Storage EIS* discusses the possibility of accumulation of mercury in fish under such scenarios. Three fish consumption rates were analyzed: the national average consumption rate, the average subsistence fisherman consumption rate, and the 95th percentile subsistence fisherman consumption rate (see Section 4.2.9.1.1 of the January 2011 *Mercury Storage EIS*). Such consumption rates could be representative of a low-income or American Indian subsistence fishing population. Under the Truck Scenarios, the risks to human receptors that consume fish at one of the three rates would be negligible. Under the Railcar Scenario, the risk to the 95th percentile subsistence fisherman would be negligible to low. American Indian reservations have not been identified within the 16-kilometer (10-mile) ROI surrounding SRS; however, as discussed above in Section E.3.8.1.2, there are several low-income or minority communities present within the ROI. Although the risk is negligible to low, if a transportation accident that resulted in fish contamination were to occur, it would be advisable as a mitigation measure to monitor the levels of methylmercury in fish to ensure that subsistence fishermen do not consume amounts of methylmercury that might cause adverse health effects. Subsequent to mandated reporting of any such release by the shipper of the elemental mercury, the appropriate state environmental agency would be responsible for determining appropriate fish consumption advisories and monitoring requirements for mercury concentrations in waters and fish stocks.

E.3.9 Waste Control Specialists, LLC, Site

E.3.9.1 Affected Environment

E.3.9.1.1 Socioeconomics

WCS is located approximately 50 kilometers (31 miles) west of Andrews, Texas, near the Texas–New Mexico state line. As of 2009, WCS employed approximately 150 persons. Approximately 90 percent of the people employed at WCS reside in two counties: Andrews in Texas and Lea in New Mexico (WCS 2009). Therefore, these two counties are identified as the ROI in this socioeconomics analysis.

E.3.9.1.1.1 Regional Economic Characteristics

From 2000 to 2011, the labor force of the two-county ROI increased by approximately 30 percent from 28,277 to 36,788. During this period, the unemployment rate of the ROI experienced minor fluctuations both positive and negative, and by 2011 had returned to the 2000 rate of 5.2 percent. The unemployment rate in the ROI peaked during 2009 at 7.1 percent and remained at that level through 2010. By July 2012, the unemployment rate of the ROI was 4.6 percent, lower than the unemployment rate across the two-state region of Texas and New Mexico (7.0 percent) (BLS 2012).

E.3.9.1.1.2 Demographic and Housing Characteristics

In 2010, the estimated population of the two-county ROI was 79,513. From 2000 to 2010, the ROI population grew by approximately 16 percent, compared with 20 percent growth throughout the two-state region of Texas and New Mexico (DOC 2001a, 2011a). Young children and pregnant women are considered to be among the most vulnerable populations to mercury poisoning. In 2010, the percentage of the ROI population under the age of 18 was 29 percent; women ages 18 to 39 composed 15 percent (DOC 2011a). There were 30,733 housing units in the ROI in 2010, 63 percent of which were owner-occupied, 26 percent were renter-occupied, and 11 percent were vacant (DOC 2011b, 2011c).

E.3.9.1.2 Environmental Justice

The 16-kilometer (10-mile) radius surrounding the candidate storage location at WCS encompasses parts of three counties: Andrews and Gaines in Texas and Lea in New Mexico. Figure E–21 shows populations residing in the three-county area, as reported in the 2000 and 2010 censuses (DOC 2001b, 2011d). In this figure, lightly shaded bars show populations in 2000, and the darker bars show those in 2010. In the decade between 2000 and 2010, the total population of Andrews, Gaines, and Lea Counties decreased by approximately 17 percent to 97,039, while the minority population increased by approximately 40 percent to 51,483, and the low-income population decreased by approximately 3.9 percent to 15,905 (DOC 2001a, 2001b, 2011d, 2011e). Demographic data from the 2010 census show that the total minority population accounts for approximately 53 percent of the total population. The White Hispanic population accounts for approximately 57 percent of the total minority population, while those people self-identified as "some other race" (meaning those who provided write-in entries such as Mexican, Puerto Rican, or Cuban) residing in the three-county area accounted for approximately 29 percent of the total minority population. Persons who declared that they are of Hispanic or Latino origin are included in the "total Hispanic" population, regardless of race. They composed approximately 48 percent of the total population and approximately 91 percent of the total minority population residing in Andrews, Gaines, and Lea Counties in 2010 (DOC 2011d).

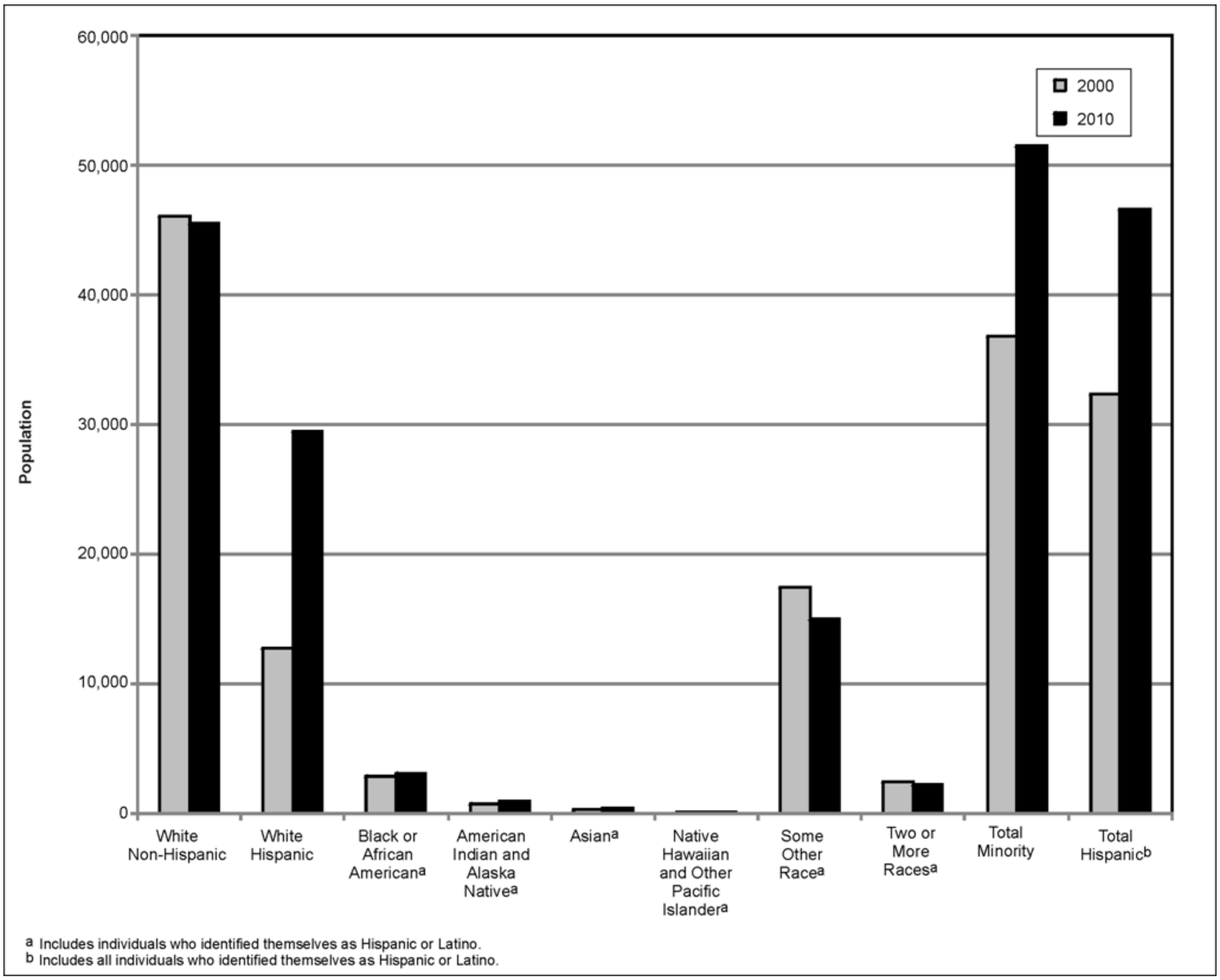

Figure E–21. Populations Residing Within the Three-County Area Surrounding the Waste Control Specialists Site

In 2010, 3,322 people lived within 16 kilometers (10 miles) of WCS. This area included an estimated 47 percent minority and 12 percent low-income population. By comparison, the three-county area included a 53 percent minority and 18 percent low-income population and the two-state region of Texas and New Mexico included a 55 percent minority and 17 percent low-income population (DOC 2011d, 2011e). There are eight census block groups located within the 16-kilometer radius surrounding WCS, two of which contained a minority population; none contained a low-income population. As described in Appendix B, Section B.11.1, of the January 2011 *Mercury Storage EIS* and updated in Appendix B of this draft SEIS, minority and low-income populations or communities are identified by comparing block-group data to the surrounding state- and county-level data to determine if the minority or low-income population percentage is meaningfully greater than that of the general population.

Approximately 27 people lived within approximately 3.2 kilometers (2 miles) of WCS in 2010. This area included an estimated 35 percent minority and 7.8 percent low-income population (DOC 2011d, 2011e). There are two census block groups located within this ROI; of this total, none contained a minority or low-income population.

Figure E–22 shows the proximity of the identified minority communities to WCS.

Figure E–23 shows the cumulative populations living at a given distance from WCS.

E.3.9.2 Environmental Consequences

Under this alternative, elemental mercury would be stored at WCS. Waste Control Specialists, LLC, owns and operates the 541-hectare (1,338-acre) site for the treatment, storage, and landfill disposal of various hazardous and radioactive wastes. The site is located approximately 50 kilometers (31 miles) west of Andrews, Texas, and 13 kilometers (8 miles) east of Eunice, New Mexico. Implementation of this alternative would involve interim use of the Container Storage Building located in the existing facility complex at the site until a new facility could be constructed. The new mercury storage facility would be similar to that proposed at the other candidate sites and would be constructed at one of two identified locations (i.e., a north and a south site relative to the developed WCS facilities area) on WCS, as further described in Chapter 2, Section 2.4.8, of the January 2011 *Mercury Storage EIS*. Consideration was given to the two locations at WCS where a new facility could be sited; no significant differences in potential impacts were identified.

E.3.9.2.1 Socioeconomics

Under this alternative, a new facility for long-term storage of elemental mercury would be constructed at WCS. Employment during construction is expected to average 18 people for approximately 6 months. Operation of the facility is estimated to require approximately 8 individuals for routine maintenance and support activities during the first 7 years, when higher volumes of shipments are expected, and approximately 5 to 6 individuals thereafter, resulting in an increase of the existing WCS workforce of approximately 3 to 5 percent and an increase in the ROI workforce of approximately 0.02 percent. Neither construction nor operation of a new facility is expected to generate substantial direct or indirect employment. Thus, negligible impacts on socioeconomic conditions (i.e., overall employment and population trends) in the ROI would result from implementing this alternative.

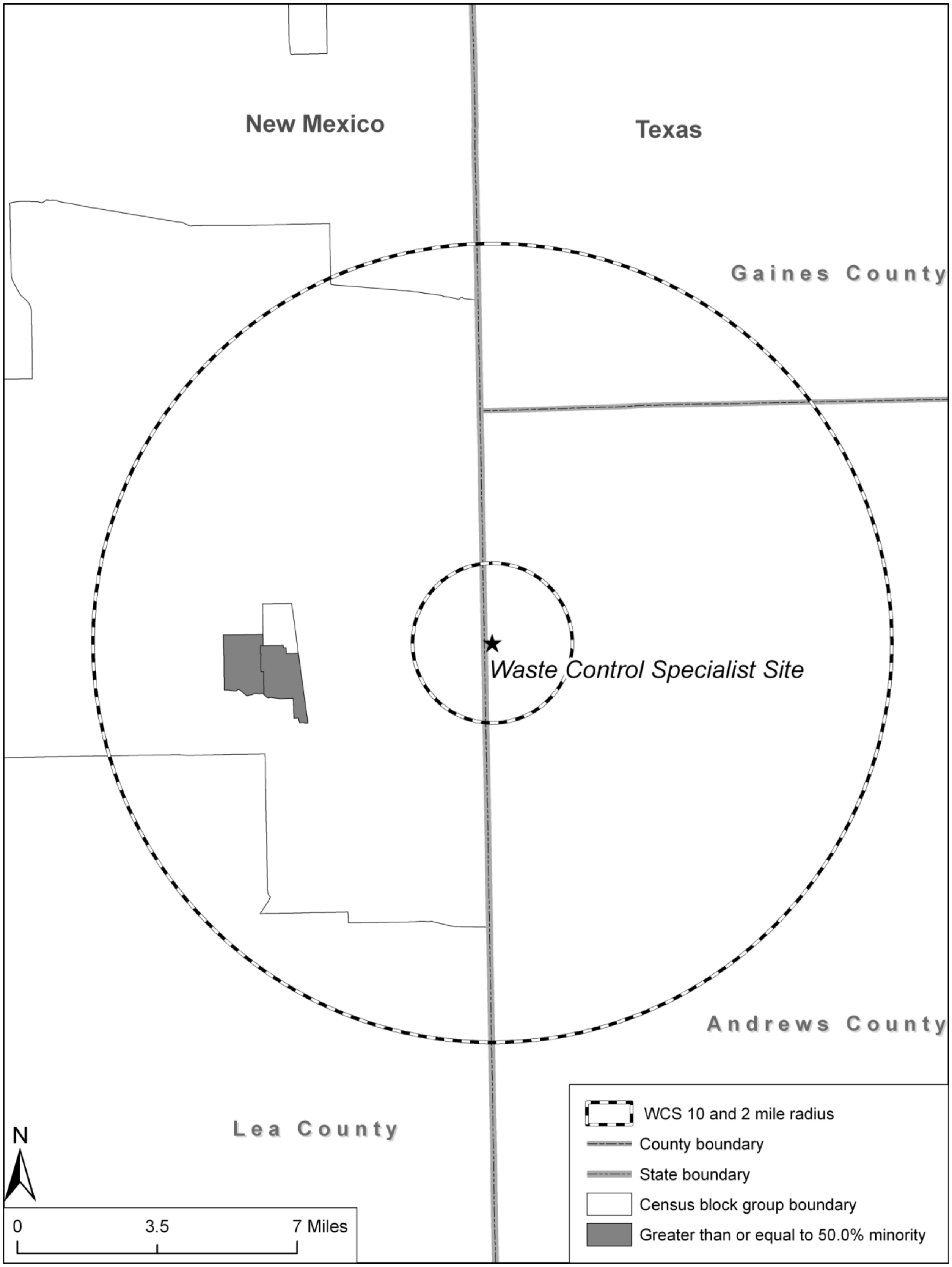

Figure E–22. Block Groups Containing Minority and Low-Income Populations Surrounding the Waste Control Specialists Site

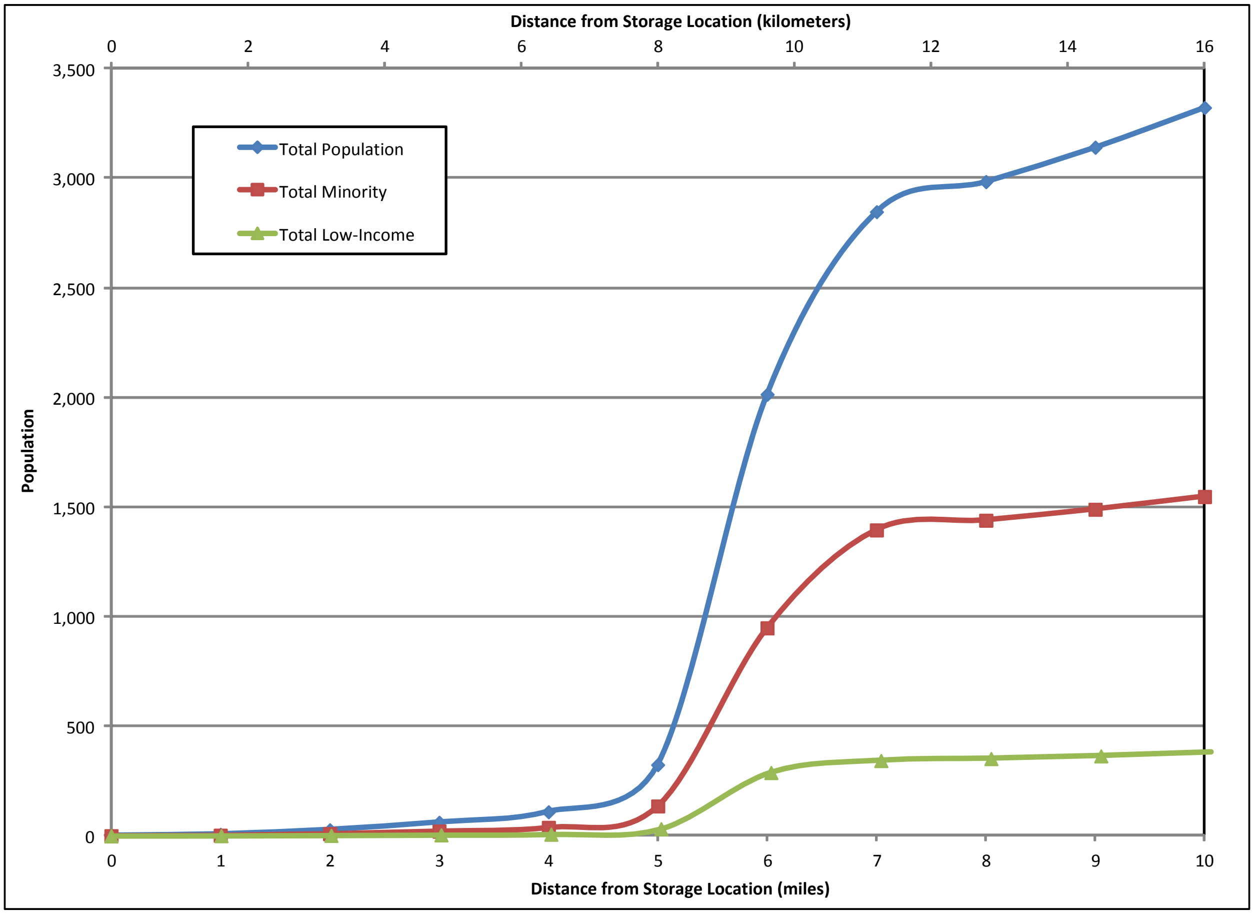

Figure E–23. Populations Residing Within 16 Kilometers (10 Miles) of the Storage Location at the Waste Control Specialists Site

Construction-related transportation, including employee vehicle trips and equipment and materials shipments, is not expected to adversely impact traffic conditions on roads leading to the site. It is assumed that there would be approximately 1.5 employees per vehicle, and every vehicle is counted twice to account for round trips. It is estimated that average construction transportation of 45 vehicles a day could increase the average annual daily traffic count on State Highway 176 by less than 2 percent; 53 percent of these vehicles would be attributed to employee transportation. Impacts on traffic during construction would be minor.

Transportation impacts during the operations phase would include employee vehicle trips and shipments of elemental mercury to the site for storage. Appendix C, Section C.1, of this draft SEIS provides an estimate of the number of shipments by truck. The additional vehicles due to facility operations are not expected to noticeably increase traffic volumes on roads leading to the site. The greatest impact would be during the first 2 years of operations, when it is estimated that approximately 11 vehicles a day could increase the average annual daily traffic count on State Highway 176 by less than 0.5 percent. At the peak of operations, it is estimated that up to 79 shipments would be made in a year. Approximately 96 percent of the additional vehicles would be attributed to employee transportation. Impacts on traffic during operations would be negligible.

E.3.9.2.2 Environmental Justice

An analysis of populations in census block groups found that, of the eight block groups within the 16-kilometer (10-mile) radius of WCS, two contained a minority population and none contained a low-income population. There are only two block groups within the 3.2-kilometer (2-mile) ROI, none of which contained a minority or low-income population.

As discussed in Chapter 3, Section 3.8.1.1, and Chapter 4, Section 4.9.1, of the January 2011 *Mercury Storage EIS*, land use in the surrounding area includes industrial activity and ranching, and there would be no offsite impacts on land use as a result of implementing the WCS alternative. Impacts on air quality under this alternative would be minor during construction and negligible during operations, as discussed in Section 4.9.4.2 of the January 2011 *Mercury Storage EIS*. Impacts on ecological resources are expected to be minimal under this alternative, as discussed in Section 4.9.5 of the January 2011 *Mercury Storage EIS*. There have been no American Indian resources identified on WCS; thus, there would be no impacts on American Indian cultural resources, as noted in Sections 3.8.6.2 and 4.9.6.3 of the January 2011 *Mercury Storage EIS*. A negligible change in socioeconomic conditions would result under this alternative, as discussed above in Section E.3.9.2.1.

As discussed in Chapter 4, Section 4.9.9, of the January 2011 *Mercury Storage EIS*, implementing the WCS alternative would result in negligible offsite human health risks from mercury emissions during normal operations and facility accidents. As discussed in Section 4.9.9.3 of the January 2011 *Mercury Storage EIS*, transportation accidents are predicted to pose a negligible-to-low human health risk following dry deposition onto the ground or into water bodies. The two block groups identified that consist of a disproportionately high number of minority individuals are located approximately 10 kilometers (6 miles) to the west in the city of Eunice near potential transportation routes. Potential truck transportation routes include Texas State Highway 176 from points east, New Mexico State Highway 176 from points west, and New Mexico State Road 18 from points north.

In addition, under transportation accident scenarios in which a fire occurs, it is possible for nearby downwind surface-water bodies to become contaminated, raising concerns for populations where fish is an important part of the diet. Chapter 4, Section 4.7.9.3.3, of the January 2011 *Mercury Storage EIS* discusses the possibility of accumulation of mercury in fish under such scenarios. Three fish consumption rates were analyzed: the national average consumption rate, the average subsistence fisherman consumption rate, and the 95th percentile subsistence fisherman consumption rate (see Section 4.2.9.1.1 of the January 2011 *Mercury Storage EIS*). Such consumption rates could be representative of a low-income or American Indian subsistence fishing population. Under the Truck Scenarios, the risks to human receptors that consume fish at one of the three rates would be negligible. Under the Railcar Scenario, the risk to the 95th percentile subsistence fisherman would be negligible to low. American Indian reservations have not been identified within the 16-kilometer (10-mile) ROI surrounding WCS; however, as discussed above in Section E.3.9.1.2, there are minority communities present within the ROI. Although the risk is negligible to low, if a transportation accident that resulted in fish contamination were to occur, it would be advisable as a mitigation measure to monitor the levels of methylmercury in fish to ensure that subsistence fishermen do not consume amounts of methylmercury that might cause adverse health effects. Subsequent to mandated reporting of any such release by the shipper of the elemental mercury, the appropriate state environmental agency would be responsible for determining appropriate fish consumption advisories and monitoring requirements for mercury concentrations in waters and fish stocks.

E.4 ENVIRONMENTAL DOCUMENTATION REVIEW

This draft SEIS is being published approximately 2 years after the publication of the January 2011 *Mercury Storage EIS*. As such, there was a possibility that some environmental data upon which the impact analyses rely for the seven candidate sites analyzed in the January 2011 *Mercury Storage EIS* may have changed significantly, potentially affecting the analyses or comparison of alternatives. Previously in this appendix, updates to occupational and public health and safety, socioeconomics, and environmental justice were discussed. Most of the candidate sites publish annual site environment reports, periodic monitoring reports, or other environmental data. Environmental documentation that has become available since publication of the January 2011 *Mercury Storage EIS* has been reviewed, and no other changes to the affected environment or analyses as presented in the January 2011 *Mercury Storage EIS* were found to be necessary. The documents reviewed for each candidate site are listed below.

Grand Junction Disposal Site:

- *Data Validation Package – August 2012 Groundwater Sampling at the Grand Junction, Colorado, Disposal Site*, October 2012 (DOE 2012b).
- *2011 Uranium Mill Tailings Radiation Control Act Title I Annual Report*, January 2012 (DOE 2012c).

200-West Area at the Hanford Site:

- *Final Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington*, November 2012 (DOE 2012d).
- *Hanford Site Environmental Report for Calendar Year 2009*, September 2010 (Poston, Duncan, and Dirkes 2010).

Central Magazine Area at Hawthorne Army Depot:

- *Hawthorne Army Depot Webpage – The Nevada Division of Environmental Protection*, http://ndep.nv.gov/hwad/haap02.htm, accessed in January 2013 (NDEP 2013).

Idaho National Laboratory's Idaho Nuclear Technology and Engineering Center or the Radioactive Waste Management Complex:

- *Idaho National Laboratory Site Environmental Report, Calendar Year 2010*, September 2011 (DOE 2011a).

Bannister Federal Complex's Kansas City Plant:

- *2010 Kansas City Plant Annual Injury and Illness Surveillance Report*, 2011 (DOE 2011b).

E Area at the Savannah River Site:

- *Draft Surplus Plutonium Disposition Supplemental Environmental Impact Statement*, July 2012 (NNSA 2012).
- *Savannah River Site Environmental Report for 2011*, 2012 (SRNS 2012).

Waste Control Specialists, LLC Site:

- *Waste Control Specialists, LLC, Homepage*, http://www.wcstexas.com/, accessed in January 2013 (WCS 2013).

Y–12 National Security Complex:

- *Oak Ridge Reservation Annual Site Environmental Report for 2011*, September 2012 (ORNL 2012).
- *Final Site-Wide Environmental Impact Statement for the Y–12 National Security Complex*, February 2011 (NNSA 2011).

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APPENDIX F
COMMON AND SCIENTIFIC NAMES OF PLANT AND ANIMAL SPECIES

APPENDIX F
COMMON AND SCIENTIFIC NAMES OF PLANT AND ANIMAL SPECIES

The scientific names of plant and animal species associated with the Waste Isolation Pilot Plant Vicinity reference locations as cited in Chapter 3 and throughout this *Draft Long-Term Management and Storage of Elemental Mercury Supplemental Environmental Impact Statement* are listed in Table F–1. Plant, bird, and mammal species are grouped by common name and listed in alphabetical order. The scientific names of plant and animal species associated with the other candidate sites previously analyzed, as cited in the January 2011 *Long-Term Management and Storage of Elemental Mercury Environmental Impact Statement (Mercury Storage EIS)*, are provided in Appendix E of the January 2011 *Mercury Storage EIS* and have not been reproduced here.

Table F–1. List of Common and Scientific Names of Plant and Animal Species

Common Name	Scientific Name
Plants	
Dune yucca	*Yucca campestris*
Glass Mountain coral-root	*Hexalectris nitida*
Guadalupe jewelflower	*Streptanthus sparsiflorus*
Gypsum wild-buckwheat	*Eriogonum gypsophilum*
Hershey's cliff daisy	*Chaetopappa hersheyi*
Kuenzler hedgehog cactus	*Echinocereus fendleri* var. *kuenzleri*
Lee's pincushion cactus	*Escobaria sneedii* var. *leei*
Mesquite	*Prosopis glandulosa*
Russian thistle	*Salsola kali*
Sand sagebrush	*Artemisia filifolia*
Shinnery oak	*Quercus havardii*
Smallhead snakeweed	*Gutierrezia microcephala*
Sneed pincushion cactus	*Coryphantha sneedii* var. *sneedii*
Wright's water-willow	*Justicia wrightii*
Birds	
American peregrine falcon	*Falco peregrinus anatum*
Arctic peregrine falcon	*Falco peregrinus tundrius*
Baird's sparrow	*Ammodramus bairdi*
Black-throated sparrow	*Amphispiza bilineata*
Least tern (interior population)	*Sterna antillarum athalassos*
Lesser prairie-chicken	*Tympanuchus pallidicinctus*
Loggerhead shrike	*Lanius ludovicianus*
Pyrrhuloxia	*Cardinalis sinuatus*
Southwestern willow flycatcher	*Empidonax trallii extimus*
Sprague's pipit	*Anthus spragueii*

Table F–1. List of Common and Scientific Names of Plant and Animal Species *(continued)*

Common Name	Scientific Name
Mammals	
Black-footed ferret	*Mustela nigripes*
Coyote	*Canis latrans*
Mule deer	*Odocoileus hemionus*
Pronghorn	*Antilocapra americana*

APPENDIX G
COOPERATING AGENCY AGREEMENTS

APPENDIX G
COOPERATING AGENCY AGREEMENTS

This appendix provides copies of invitation letters, responses, and final agreements between the U.S. Department of Energy and cooperating agencies associated with this *Draft Long-Term Management and Storage of Elemental Mercury Supplemental Environmental Impact Statement*. Invitation letters, responses, and final cooperating agency agreements associated with the January 2011 *Long-Term Management and Storage of Elemental Mercury Environmental Impact Statement (Mercury Storage EIS)* are provided in Appendix F of the January 2011 *Mercury Storage EIS* and have not been reproduced here.

G.1 CORRESPONDENCE WITH THE U.S. DEPARTMENT OF THE INTERIOR

G.1.1 U.S. Department of Energy's Correspondence to the U.S. Department of the Interior

Department of Energy
Washington, DC 20585

SEP 19 2012

Mr. James K. Stovall
Field Manager
U.S. Department of the Interior
Bureau of Land Management
Carlsbad Field Office
620 E. Greene Street
Carlsbad, NM 88221

Dear Mr. Stovall:

This letter is to invite the Bureau of Land Management (BLM) to participate as a cooperating agency in the Department of Energy's (DOE's) preparation of a supplemental environmental impact statement (SEIS), pursuant to the National Environmental Policy Act (NEPA), on alternatives for long-term management and storage of elemental mercury. Section 5 of the Mercury Export Ban Act of 2008 (the Act), Pub. L. 110-414, 122 Stat. 4341, sets forth requirements for DOE to establish and manage a facility for the purpose of long-term management and storage of elemental mercury generated within the United States. DOE prepared the final EIS (FEIS) for the Long-Term Management and Storage of Elemental Mercury (DOE/EIS-0423) in January 2011. Since its publication, DOE has reconsidered the range of reasonable alternatives evaluated, and now proposes to analyze additional alternatives in an SEIS. This SEIS will evaluate two additional locations for a long-term mercury storage facility, one within the boundary of the Waste Isolation Pilot Plant (WIPP) in New Mexico, and a second in the vicinity of WIPP.

DOE published a Notice of Intent (NOI) on June 5, 2012 in the Federal Register (77 FR 33204). BLM's participation as a cooperating agency is requested; we would appreciate your response to this invitation as soon as practicable. If you or your staff has any questions or issues concerning the SEIS and/or FEIS, please contact David Levenstein of DOE's Office of Environmental Management at 301-903-6500 or david.levenstein@em.doe.gov. Mr. Levenstein is the DOE NEPA Document Manager for the SEIS. If you have any questions about DOE's NEPA process, please contact me at 202-586-4600.

Sincerely,

Carol Borgstrom

Carol M. Borgstrom
Director
Office of NEPA Policy and Compliance

Printed with soy ink on recycled paper

cc: David Levenstein, EM-11

G.1.2 Response from the U.S. Department of the Interior

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Pecos District
Carlsbad Field Office
620 E. Greene
Carlsbad, New Mexico 88220-6292
www.blm.gov/nm

In Reply Refer To:
1610 (P020)ol

Ms. Carol M. Borgstrom
Director of NEPA Policy and Compliance
U.S. Department of Energy
Washington Office

Dear Ms. Borgstrom:

This letter is in reference to your letter dated September 19, 2012, inviting our office to become a Cooperating Agency in the preparation of the supplemental environmental impact statement for the Long-Term Management and Storage of Elemental Mercury (DOE/EIS-0423). Our office accepts the invitation and looks forward to working with you through this process.

Please inform us as to the agreement that will follow to ratify the Cooperating Agency relationship. If you have any questions, please contact Owen Lofton of my staff at 575-234-5923 or email olofton@blm.gov.

Sincerely,

for Jim Stovall
Field Manager
Carlsbad Field Office

Cc: David Levenstein, EM-11

G.2 CORRESPONDENCE WITH THE U.S. ENVIRONMENTAL PROTECTION AGENCY

G.2.1 U.S. Department of Energy's Correspondence to the U.S. Environmental Protection Agency

Department of Energy
Washington, DC 20585

SEP 19 2012

Ms. Susan Bromm
Director, Office of Federal Activities
U.S. Environmental Protection Agency
Mail Code 2251-A
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Dear Ms. Bromm:

This letter is to invite the U.S. Environmental Protection Agency (EPA) to participate as a cooperating agency in the Department of Energy's (DOE's) preparation of a supplemental environmental impact statement (SEIS), pursuant to the National Environmental Policy Act (NEPA), on alternatives for long-term management and storage of elemental mercury. Section 5 of the Mercury Export Ban Act of 2008 (the Act), Pub. L. 110-414, 122 Stat. 4341, sets forth requirements for DOE to establish and manage a facility for the purpose of long-term management and storage of elemental mercury generated within the United States. DOE prepared the final EIS (FEIS) for the Long-Term Management and Storage of Elemental Mercury (DOE/EIS-0423) in January 2011, and appreciates EPA's past participation as a cooperating agency (May 18, 2009 letter from Susan Bromm to Carol Borgstrom) on that FEIS. Since its publication, DOE has reconsidered the range of reasonable alternatives evaluated, and now proposes to analyze additional alternatives in an SEIS. This SEIS will evaluate two additional locations for a long-term mercury storage facility, one within the boundary of the Waste Isolation Pilot Plant (WIPP) in New Mexico, and a second in the vicinity of WIPP.

DOE published a Notice of Intent (NOI) on June 5, 2012 in the Federal Register (77 FR 33204). EPA's continued participation as a cooperating agency on the SEIS is requested; we would appreciate your response to this invitation as soon as practicable. If you or your staff has any questions or issues concerning the SEIS and/or FEIS, please contact David Levenstein of DOE's Office of Environmental Management at 301-903-6500 or david.levenstein@em.doe.gov. Mr. Levenstein is the DOE NEPA Document Manager for the SEIS. If you have any questions about DOE's NEPA process, please contact me at 202-586-4600.

Sincerely,

Carol Borgstrom

Carol M. Borgstrom
Director
Office of NEPA Policy and Compliance

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cc: David Levenstein, EM-11

G.2.2 Response from the U.S. Environmental Protection Agency

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

NOV 1 2012

OFFICE OF
ENFORCEMENT AND
COMPLIANCE ASSURANCE

Ms. Carol M. Borgstrom
Director, Office of NEPA Policy and Compliance
GC–20
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585–0103

Dear ~~Ms. Borgstrom~~ Carol:

Thank you for your September 19, 2012 letter inviting the U.S. Environmental Protection Agency (EPA) to participate as a cooperating agency in the Department of Energy's preparation of a Supplemental Environmental Impact Statement (SEIS) on additional alternatives for long-term management and storage of mercury. EPA accepts this invitation, and as a cooperating agency, we look forward to providing early review and comment on select technical studies and reports concerning procedures and standards for storage, as well as preliminary drafts of the SEIS. We will also participate in cooperating agency conference calls.

The extent to which EPA can assist with these efforts will be dependent upon the availability of Agency resources and the timeliness of information sharing.

If you have any questions concerning this matter, please contact me or my staff point of contact, Marthea Rountree, at (202) 564-7141.

Sincerely,

Susan

Susan E. Bromm
Director
Office of Federal Activities

Internet Address (URL) • http://www.epa.gov
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G.3 CORRESPONDENCE WITH THE NEW MEXICO ENVIRONMENT DEPARTMENT

G.3.1 U.S. Department of Energy's Correspondence to the New Mexico Environment Department

Department of Energy
Washington, DC 20585

SEP 19 2012

Mr. David Martin
Secretary
New Mexico Environment Department
1190 St. Francis Drive
Room N4050
Santa Fe, NM 87502

Dear Mr. Martin:

This letter is to invite the New Mexico Environment Department to participate as a cooperating agency in the Department of Energy's (DOE's) preparation of a supplemental environmental impact statement (SEIS), pursuant to the National Environmental Policy Act (NEPA), on alternatives for long-term management and storage of elemental mercury. Section 5 of the Mercury Export Ban Act of 2008 (the Act), Pub. L. 110-414, 122 Stat. 4341, sets forth requirements for DOE to establish and manage a facility for the purpose of long-term management and storage of elemental mercury generated within the United States. DOE prepared the final EIS (FEIS) for the Long-Term Management and Storage of Elemental Mercury (DOE/EIS-0423) in January 2011. Since its publication, DOE has reconsidered the range of reasonable alternatives evaluated, and now proposes to analyze additional alternatives in an SEIS. This SEIS will evaluate two additional locations for a long-term mercury storage facility, one within the boundary of the Waste Isolation Pilot Plant (WIPP) in New Mexico, and a second in the vicinity of WIPP.

DOE published a Notice of Intent (NOI) to prepare the SEIS on June 5, 2012 in the Federal Register (77 FR 33204). The New Mexico Environment Department's participation as a cooperating agency is requested; we would appreciate your response to this invitation as soon as practicable. If you or your staff has any questions or issues concerning the SEIS and/or FEIS, please contact David Levenstein of DOE's Office of Environmental Management at 301-903-6500 or david.levenstein@em.doe.gov. Mr. Levenstein is the DOE NEPA Document Manager for the SEIS. If you have any questions about DOE's NEPA process, please contact me at 202-586-4600.

Sincerely,

Carol Borgstrom

Carol M. Borgstrom
Director
Office of NEPA Policy and Compliance

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cc: David Levenstein, EM-11

APPENDIX H
CONTRACTOR NATIONAL ENVIRONMENTAL POLICY ACT DISCLOSURE STATEMENT

NATIONAL ENVIRONMENTAL POLICY ACT DISCLOSURE STATEMENT FOR PREPARATION OF THE *LONG-TERM MANAGEMENT AND STORAGE OF ELEMENTAL MERCURY SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT*

The Council of Environmental Quality (CEQ) Regulations at Title 40 of the *Code of Federal Regulations* (CFR) Section 1506.5(c), which have been adopted by the U.S. Department of Energy (10 CFR 1021), require contractors and subcontractors who will prepare an environmental impact statement to execute a disclosure specifying that they have no financial or other interest in the outcome of the project.

“Financial or other interest in the outcome of the project” is defined as any direct financial benefits such as a promise of future construction or design work in the project, as well as indirect financial benefits the contractor is aware of.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows, to the best of their actual knowledge as the date set forth below:

(a) X Offeror and any proposed subcontractors have no financial or other interest in the outcome of the project.

(b)__ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract, or agree to the attached plan to mitigate, neutralize or avoid any such conflict of interest.

Financial or Other Interests
1.
2.
3.

Certified by:

____
Signature

Gil Olivas
Name

AVP, Operations Contracts Manager
Title

Science Applications International Corporation
Company

10 December 2012
Date

APPENDIX I
RESPONSES TO CONSULTATION REQUESTS

APPENDIX I
RESPONSES TO CONSULTATION REQUESTS

This appendix provides copies of consultation requests and agency responses associated with this *Draft Long-Term Management and Storage of Elemental Mercury Supplemental Environmental Impact Statement*. Consultation requests and agency responses associated with the January 2011 *Long-Term Management and Storage of Elemental Mercury Environmental Impact Statement (Mercury Storage EIS)* are provided in Appendix H of the January 2011 *Mercury Storage EIS* and have not been reproduced here.

I.1 CORRESPONDENCE WITH THE NEW MEXICO ECOLOGICAL SERVICES OFFICE

I.1.1 U.S. Department of Energy's Correspondence to the New Mexico Ecological Services Office

Department of Energy
Washington, DC 20585

AUG 2 4 2012

Mr. Wally Murphy, Field Supervisor
U.S. Fish and Wildlife Service
New Mexico Ecological Services Office
2105 Osuna NE
Albuquerque, New Mexico 87113

Dear Mr. Murphy:

The purpose of this letter is to notify you that the Department of Energy (DOE) is preparing a Supplement to the Environmental Impact Statement (EIS) for the Long-Term Management and Storage of Elemental Mercury (see enclosed Notice of Intent). Pursuant to the Mercury Export Ban Act of 2008 (P.L. 110-414), DOE has been directed to designate a facility or facilities for the long-term management and storage of elemental mercury generated within the United States. DOE is analyzing the storage of up to 10,000 metric tons (11,000 tons) of elemental mercury in a facility or facilities constructed and operated in accordance with the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act. To evaluate the range of reasonable alternatives for siting, constructing, and operating a facility or facilities to meet its obligations under the Act, DOE prepared the Mercury Storage EIS in accordance with the National Environmental Policy Act and its implementing regulations (40 CFR Parts 1500-1508 and 10 CFR Part 1021) and issued the Mercury Storage Final EIS in January 2011. The Mercury Storage EIS evaluated seven candidate locations for the elemental mercury storage facility, as well as the No Action Alternative. Since publication of the Final Mercury Storage EIS, DOE has reconsidered the range of reasonable alternatives evaluated in that EIS. Accordingly, DOE now proposes to evaluate two additional locations for a long-term mercury storage facility, both near the Waste Isolation Pilot Plant (WIPP), which DOE operates for disposal of defense transuranic waste.

This Supplement to the *Mercury Storage EIS* will analyze the potential environmental, human health, and socioeconomic impacts of elemental mercury storage at two locations near WIPP. One of the additional locations to be evaluated is in Section 20, Township 22 South, Range 31 East within the land subject to the WIPP Land Withdrawal Act (Act) (P.L. No. 102-579) as amended, across the WIPP access road from the WIPP facility. The second is in the vicinity of WIPP, but outside of the lands withdrawn by the Act, in Section 10, Township 22 South, Range 31 East, approximately 3 miles north of the WIPP facility (see enclosed map). Mercury storage at either location would require the construction of a new facility occupying approximately 3.1 hectares (7.7 acres).

In support of the preparation of this Supplement to the Mercury Storage EIS, DOE is requesting information on listed or sensitive species and critical habitat, if present, that may be affected by the proposed project.

Please send the requested information to:

Mr. David Levenstein
EIS Document Manager
U.S. Department of Energy
P.O. Box 2612
Germantown, Maryland 20874
(301) 903-6500

Sincerely,

David Levenstein
EIS Document Manager

Enclosures: 1. *Notice of Intent to Prepare a Supplemental Environmental Impact Statement for the Long-Term Management and Storage of Elemental Mercury* (77 FR 33204).

2. Map indicating potential mercury storage locations.

33204 Federal Register / Vol. 77, No. 108 / Tuesday, June 5, 2012 / Notices

20202. Email: *equitycommission@ed.gov*. Telephone: (202) 453–6567.

John DiPaolo,

Chief of Staff, Assistant Secretary for Civil Rights, Office for Civil Rights.

[FR Doc. 2012–13499 Filed 6–4–12; 8:45 am]

BILLING CODE 4000–01–P

DEPARTMENT OF ENERGY

Notice of Intent To Prepare a Supplemental Environmental Impact Statement for the Long-Term Management and Storage of Elemental Mercury

AGENCY: Department of Energy.

ACTION: Notice of intent.

SUMMARY: As required by the Mercury Export Ban Act of 2008 (the Act), the Department of Energy (DOE) plans to identify a facility or facilities for the long-term management and storage of elemental mercury generated in the United States. To this end, DOE intends to prepare a supplement to the January 2011 *Environmental Impact Statement for the Long-Term Management and Storage of Elemental Mercury* to analyze additional alternatives, in accordance with the National Environmental Policy Act (NEPA). This supplemental EIS (SEIS) will evaluate alternatives for a facility at and in the vicinity of the Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico.

DATES: DOE invites public comment on the scope of this SEIS until July 5, 2012. The first scoping meeting will be held on June 26, 2012, from 5:30 p.m.–8 p.m., at the Skeen-Whitlock Building auditorium at the U.S. DOE, Carlsbad Field Office, 4021 National Parks Highway, Carlsbad, New Mexico 88220. An open house will be held on the same day at the same location from 4:30 p.m.–5:30 p.m. A second scoping meeting will be held on June 28, 2012, from 6 p.m.–8:30 p.m. at the Crowne Plaza Albuquerque, 1901 University Blvd. NE., Albuquerque, New Mexico 87102. An open house will be held on the same day at the same location from 4:30 p.m.–6 p.m.

ADDRESSES: Written comments on the scope of the SEIS should be sent to: Mr. David Levenstein, Document Manager, Office of Environmental Compliance (EM–11), U.S. Department of Energy, Post Office Box 2612, Germantown, Maryland 20874; to the Mercury Storage EIS Web site at *http://mercurystorageeis.com/*; or via email to *David.Levenstein@em.doe.gov*.

This Notice will be available on the Internet at *http://www.energy.gov/NEPA/* and on the project Web site at *http://mercurystorageeis.com/*.

FOR FURTHER INFORMATION CONTACT: To request further information about the SEIS or the Mercury Storage EIS, or to be placed on the SEIS distribution list, use any of the methods (mail, Web site, or email) listed under **ADDRESSES** above. In requesting a copy of the Draft SEIS, please specify a request for a paper copy of the Summary only; a paper copy of the full SEIS; the full SEIS on a computer CD; or any combination thereof.

For general information concerning DOE's NEPA process, please contact: Ms. Carol M. Borgstrom, Director, Office of NEPA Policy and Compliance (GC–54), U.S. Department of Energy, 1000 Independence Avenue SW., Washington, DC 20585, either by telephone at (202) 586–4600, by fax at (202) 586–7031, or leave a message at 1–800–472–2756.

SUPPLEMENTARY INFORMATION:

Background

The Mercury Export Ban Act of 2008 (Pub. L. 110–414) amends the Toxic Substances Control Act (TSCA) (15 U.S.C. 2605(f)) to prohibit the sale, distribution, or transfer by Federal agencies to any other Federal agency, any state or local government agency, or any private individual or entity, of any elemental mercury under the control or jurisdiction of a Federal agency (with certain limited exceptions). It also amends TSCA (15 U.S.C. 2611(c)) to prohibit the export of elemental mercury from the U.S. effective January 1, 2013 (subject to certain essential use exemptions). Section 5 of the Act, *Long-Term Storage*, directs DOE to designate a facility or facilities for the long-term management and storage of elemental mercury generated within the U.S. Pursuant to this law, this facility is required to be operational and ready to accept custody of any elemental mercury generated within the U.S. by January 1, 2013. The Act also requires DOE to assess fees based upon the *pro rata* costs of long-term management and storage of elemental mercury delivered to the facility or facilities.

The sources of elemental mercury in the U.S. include mercury used in the chlorine and caustic soda manufacturing process (i.e., chlor-alkali industry), reclaimed from recycling and waste recovery activities, and generated as a byproduct of the gold mining process. In addition, DOE's National Nuclear Security Administration stores approximately 1,200 metric tons of elemental mercury at the Oak Ridge Reservation in Tennessee.

To evaluate the range of reasonable alternatives for siting, constructing and operating a facility or facilities to meet its obligations under the Act, DOE prepared the Mercury Storage EIS (DOE/EIS–0423) in accordance with NEPA and its implementing regulations (40 CFR parts 1500–1508 and 10 CFR part 1021) and issued the Mercury Storage Final EIS in January 2011 (76 FR 5156). DOE estimated that up to approximately 10,000 metric tons of elemental mercury would need to be managed and stored at the DOE facility during the 40-year period of analysis. These estimates do not include approximately 4,400 metric tons of elemental mercury that the Department of Defense (DOD) stores at its facility in Hawthorne, Nevada.

Purpose and Need for Action

As indicated in the Mercury Storage EIS, DOE needs to designate a facility for the long-term management and storage of elemental mercury generated within the U.S., as required by the Act.

Proposed Action

As also indicated in the Mercury Storage EIS, DOE proposes to construct one or more new facilities and/or select one or more existing facilities (including modification as needed) for the long-term management and storage of elemental mercury in accordance with the Act. Facilities to be constructed as well as existing or modified facilities must comply with applicable requirements of section 5(d) of the Act, *Management Standards for a Facility*, including the requirements of the Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act (42 U.S.C. 6901 *et seq.*), and other permitting requirements.

Proposed Alternatives

The Mercury Storage EIS evaluated seven candidate locations for the elemental mercury storage facility, as well as the No Action Alternative. Those candidate locations are: DOE Grand Junction Disposal site near Grand Junction, Colorado; DOE Hanford site near Richland, Washington; Hawthorne Army Depot near Hawthorne, Nevada; DOE Idaho National Laboratory near Idaho Falls, Idaho; DOE Kansas City Plant in Kansas City, Missouri; DOE Savannah River Site near Aiken, South Carolina; and Waste Control Specialists, LLC, site near Andrews, Texas.

Since publication of the Final Mercury Storage EIS, DOE has reconsidered the range of reasonable alternatives evaluated in that EIS. Accordingly, DOE now proposes to evaluate two additional locations for a long-term mercury storage facility, both

Federal Register / Vol. 77, No. 108 / Tuesday, June 5, 2012 / Notices **33205**

near the Waste Isolation Pilot Plant (WIPP), which DOE operates for disposal of defense transuranic waste. One of the additional locations to be evaluated is in Section 20, Township 22 South, Range 31 East within the land subject to the WIPP Land Withdrawal Act (Pub. L. 102–579) as amended (Act), across the WIPP access road from the WIPP facility. The second is in the vicinity of WIPP, but outside of the lands withdrawn by the Act, in Section 10, Township 22 South, Range 31 East, approximately 3½ miles north of the WIPP facility. Through development of the SEIS, DOE will evaluate the cumulative impacts of constructing and operating a facility for long-term management and storage of elemental mercury with the ongoing and planned operations of WIPP for disposal of defense transuranic waste, as well as the potential disposal of greater-than-Class C waste (*Draft Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-level Radioactive Waste and GTCC-Like Waste* (GTCC EIS, DOE/EIS–0375, February 2011). The locations to be evaluated in the SEIS would be suitable for an above-ground storage facility.

Identification of Environmental Issues

DOE proposes to analyze the potential environmental impacts of the two additional alternatives for management and storage of elemental mercury as they apply to the following:

- Land use and visual resources.
- Geology, soils, and geologic hazards, including seismicity.
- Water resources (surface water and groundwater).
- Meteorology, air quality and noise.
- Ecological resources (terrestrial resources, wetlands and aquatic resources, and species that are Federal- or state-listed as threatened, endangered, or of special concern).
- Cultural and paleontological resources such as prehistoric, historic, or Native American sites.
- Site infrastructure.
- Waste management.
- Occupational and public health and safety, including from construction, operations, facility accidents, transportation, and intentional destructive acts.
- Ecological risk.
- Socioeconomic impacts on potentially affected communities.
- Environmental Justice (i.e., whether long-term mercury management and storage activities have a disproportionately high and adverse effect on minority and low-income populations).
- Facility closure.
- Cumulative impacts, including global commons cumulative impacts, i.e., ozone depletion and climate change.
- Potential mitigation measures.
- Unavoidable adverse environmental impacts.
- Irreversible and irretrievable commitments of resources.
- Relationship between short-term uses of the environment and maintenance and enhancement of long-term productivity.

Public Participation in the SEIS Process

NEPA implementing regulations require an early and open process for determining the scope of an EIS (or SEIS) and for identifying the significant issues related to the proposed action. To ensure that the full range of issues related to the proposed action are addressed, DOE invites Federal agencies, state, local, and tribal governments, and the general public to comment on the scope of the SEIS, including identification of reasonable alternatives and specific issues to be addressed. DOE will hold a public scoping meeting in Carlsbad, New Mexico, on June 26, 2012, and in Albuquerque, New Mexico, on June 28, 2012, as previously described (see DATES).

Issued in Washington, DC, on May 24, 2012.

Mark A. Gilbertson,

Deputy Assistant Secretary for Site Restoration.

[FR Doc. 2012–13614 Filed 6–4–12; 8:45 am]

BILLING CODE 6450–01–P

DEPARTMENT OF ENERGY

Federal Energy Regulatory Commission

Combined Notice of Filings

May 30, 2012.

Take notice that the Commission has received the following Natural Gas Pipeline Rate and Refund Report filings:

Filings Instituting Proceedings

Docket Numbers: RP12–754–000.
Applicants: Arkansas Electric Cooperative Corp., Hot Spring Power Company, LLC.
Description: Petition for Waiver of Gas Regulations of Arkansas Electric Cooperative Corporation and Hot Spring Power Company, LLC in RP12–754.
Filed Date: 5/25/12.
Accession Number: 20120525–5153.
Comments Due: 5 p.m. ET 6/6/12.

Docket Numbers: RP12–755–000.
Applicants: MarkWest Pioneer, LLC.
Description: MarkWest Pioneer—Quarterly FRP Filing to be effective 7/1/2012.
Filed Date: 5/29/12.
Accession Number: 20120529–5201.
Comments Due: 5 p.m. ET 6/11/12.

Any person desiring to intervene or protest in any of the above proceedings must file in accordance with Rules 211 and 214 of the Commission's Regulations (18 CFR 385.211 and 385.214) on or before 5:00 p.m. Eastern time on the specified comment date. Protests may be considered, but intervention is necessary to become a party to the proceeding.

Filings in Existing Proceedings

Docket Numbers: CP10–16–001.
Applicants: Cadeville Gas Storage LLC.
Description: Abbreviated amendment of Cadeville Gas Storage LLC under CP10–16.
Filed Date: 5/15/12.
Accession Number: 20120515–5240.
Comments Due: 5 p.m. ET 6/4/12.

Any person desiring to protest in any the above proceedings must file in accordance with Rule 211 of the Commission's Regulations (18 CFR 385.211) on or before 5:00 p.m. Eastern time on the specified comment date.

The filings are accessible in the Commission's eLibrary system by clicking on the links or querying the docket number.

eFiling is encouraged. More detailed information relating to filing requirements, interventions, protests, and service can be found at: *http://www.ferc.gov/docs-filing/efiling/filing-req.pdf.* For other information, call (866) 208–3676 (toll free). For TTY, call (202) 502–8659.

Nathaniel J. Davis, Sr.,

Deputy Secretary.

[FR Doc. 2012–13552 Filed 6–4–12; 8:45 am]

BILLING CODE 6717–01–P

DEPARTMENT OF ENERGY

Federal Energy Regulatory Commission

Combined Notice of Filings

Take notice that the Commission has received the following Natural Gas Pipeline Rate and Refund Report filings:

Filings Instituting Proceedings

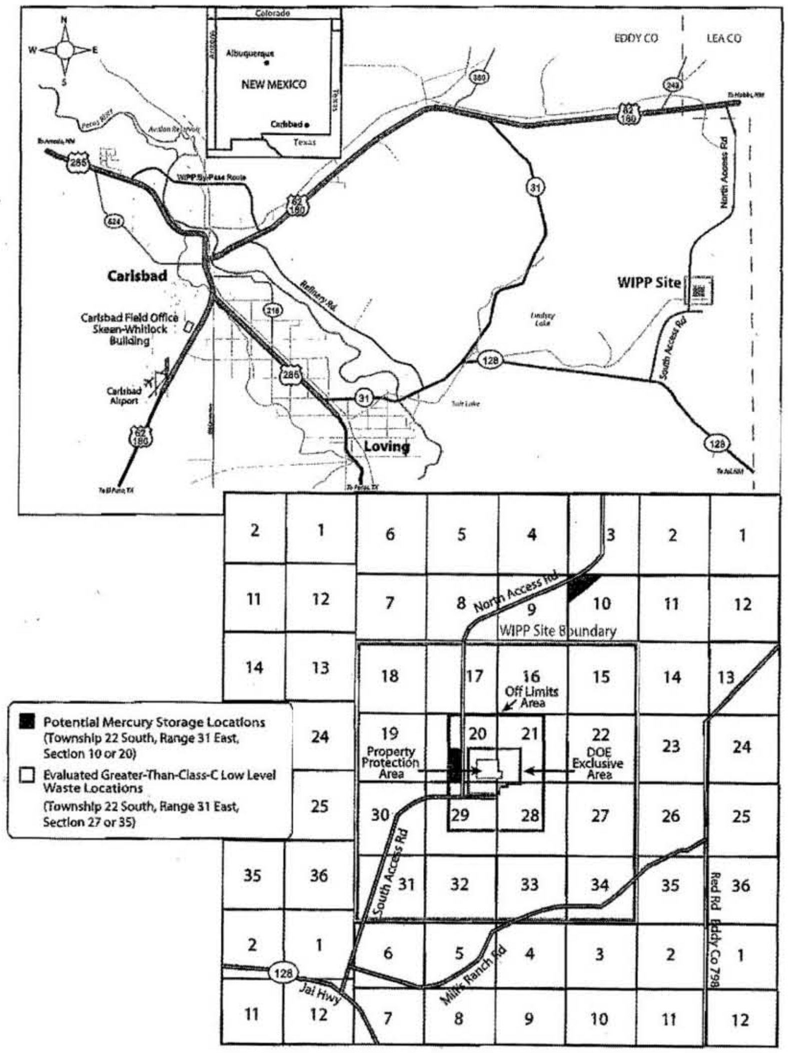
Docket Numbers: RP12–748–000.
Applicants: Algonquin Gas Transmission, LLC.
Description: AGT Negotiated Rate—Taunton 66667 to be effective 6/1/2012.
Filed Date: 5/24/12.

Long-Term Management and Storage of Elemental Mercury Supplemental Environmental Impact Statement (Mercury Storage SEIS)

DOE's goal is to provide safe, secure, long-term mercury storage.

Additional Candidate Mercury Storage Sites to be Analyzed in a Supplemental EIS

Since publication of the *Final Mercury Storage EIS* in January 2011, the U.S. Department of Energy (DOE) has reconsidered the range of reasonable alternatives evaluated in that EIS. Accordingly, DOE now proposes to evaluate two additional locations for a long-term mercury storage facility, both near the Waste Isolation Pilot Plant (WIPP), which is located approximately 26 miles southeast of Carlsbad, New Mexico.



To Submit Comments or Request More Information

Mr. David Levenstein
EIS Document Manager
U.S. Department of Energy
Office of Environmental Compliance
EM-11
P.O. Box 2612
Germantown, MD 20874-2612
http://www.mercurystorageeis.com

Department of Energy
Washington, DC 20585

JAN 15 2013

Mr. Wally Murphy, Field Supervisor
U.S. Fish and Wildlife Service
New Mexico Ecological Services Office
2105 Osuna NE
Albuquerque, New Mexico 87113

Dear Mr. Murphy:

The purpose of this letter is to amend the U.S. Department of Energy's (DOE's) previous notification to you on August 24, 2012, regarding the Supplement to the Environmental Impact Statement for the Long-Term Management and Storage of Elemental Mercury. In August, DOE informed you of its intent to develop the supplemental environmental impact statement (SEIS) to evaluate two locations in the vicinity of the Waste Isolation Pilot Plant (WIPP): Sections 10 and 20, Township 22 South, Range 31 East. DOE received a response on January 10, 2013.

However, as a result of comments received during the SEIS scoping process, DOE has decided to evaluate a third location, also in the vicinity of WIPP. The additional location is in Section 35, within the same township and range as Sections 10 and 20 and outside of the lands withdrawn by the WIPP Land Withdrawal Act (P.L. No. 102-579), as amended. Section 35 is approximately 3.5 miles southeast of the WIPP facility (see enclosed map). Construction and operation of a long-term mercury storage facility would be the same as described in the August 24th correspondence, occupying approximately 3.1 hectares (7.7 acres).

In support of the preparation of the Supplement to the Mercury Storage EIS, DOE is requesting a review to determine if there is any additional information regarding listed or sensitive species and critical habitat specific to Section 35 that should be considered in our analyses or if the response received on January 10th would apply equally to Section 35 as it does for Sections 10 and 20.

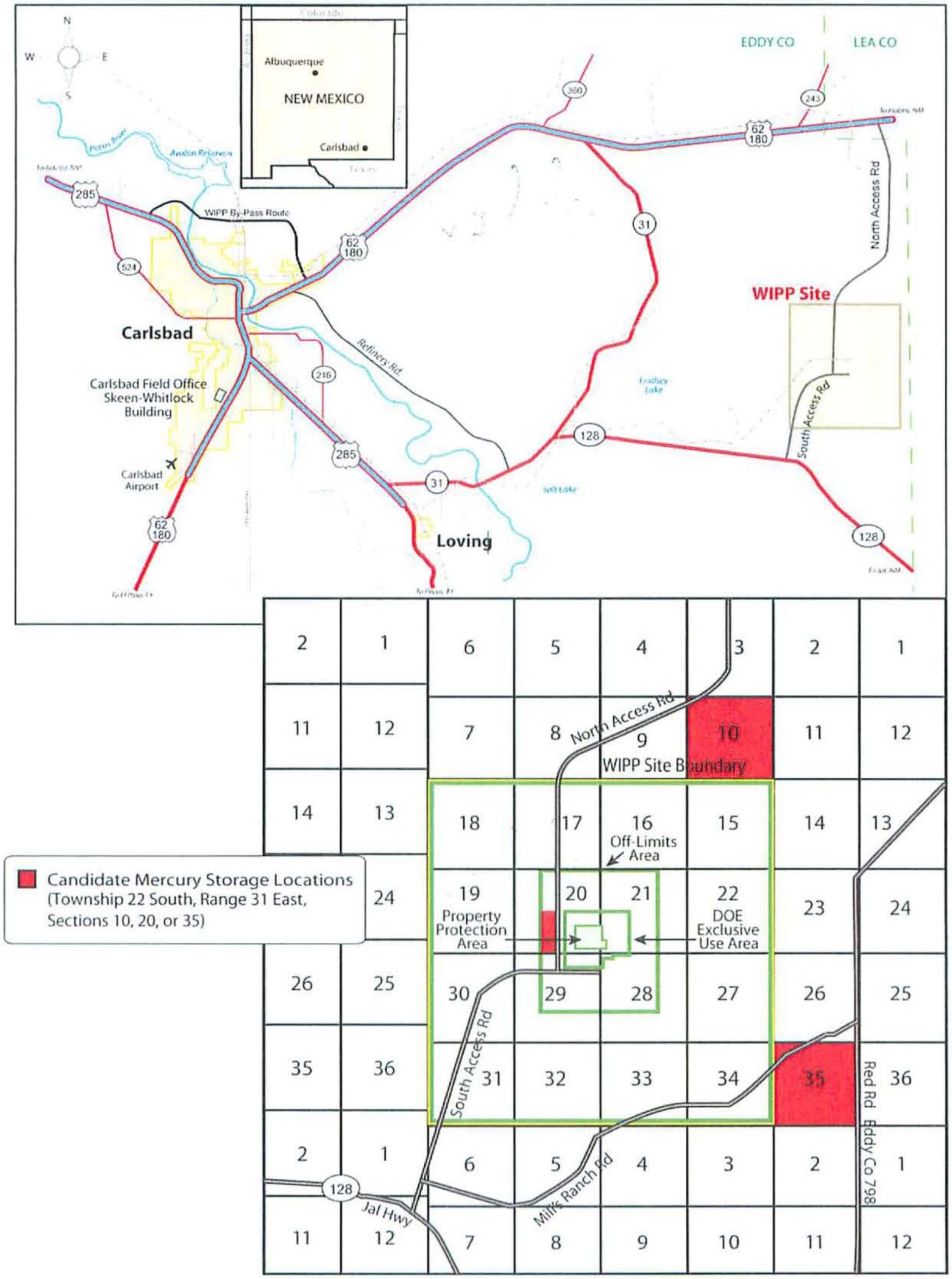
Please send the requested information to:

Mr. David Levenstein
EIS Document Manager
U.S. Department of Energy
P.O. Box 2612
Germantown, Maryland 20874
(301) 903-6500

Sincerely,

David Levenstein
EIS Document Manager

Enclosures: 1. Map indicating potential mercury storage locations.



Candidate Locations Evaluated in the
Long-Term Management and Storage of Elemental Mercury
Supplemental Environmental Impact Statement

I.1.2 Response from the New Mexico Ecological Services Office

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New Mexico Ecological Services Field Office
2105 Osuna NE
Albuquerque, New Mexico 87113
Phone: (505) 346-2525 Fax: (505) 346-2542

Thank you for your recent request for information on threatened or endangered species or important wildlife habitats that may occur in your project area. The New Mexico Ecological Services Field Office has posted lists of the endangered, threatened, proposed, candidate and species of concern occurring in all New Mexico Counties on the Internet. Please refer to the following web page for species information in the county where your project occurs: http://www.fws.gov/southwest/es/NewMexico/SBC_intro.cfm. If you do not have access to the Internet or have difficulty obtaining a list, please contact our office and we will mail or fax you a list as soon as possible.

After opening the web page, find New Mexico Listed and Sensitive Species Lists on the main page and click on the county of interest. Your project area may not necessarily include all or any of these species. This information should assist you in determining which species may or may not occur within your project area.

Under the Endangered Species Act of 1973, as amended (Act), it is the responsibility of the Federal action agency or its designated representative to determine if a proposed action "may affect" endangered, threatened, or proposed species, or designated critical habitat, and if so, to consult with us further. Similarly, it is their responsibility to determine if a proposed action has no effect to endangered, threatened, or proposed species, or designated critical habitat. On December 16, 2008, we published a final rule concerning clarifications to section 7 consultations under the Act (73 FR 76272). One of the clarifications is that section 7 consultation is not required in those instances when the direct and indirect effects of an action pose no effect to listed species or critical habitat. As a result, we do not provide concurrence with project proponent's "no effect" determinations.

If your action area has suitable habitat for any of these species, we recommend that species-specific surveys be conducted during the flowering season for plants and at the appropriate time for wildlife to evaluate any possible project-related impacts. Please keep in mind that the scope of federally listed species compliance also includes any interrelated or interdependent project activities (e.g., equipment staging areas, offsite borrow material areas, or utility relocations) and any indirect or cumulative effects.

Candidates and species of concern have no legal protection under the Act and are included on the web site for planning purposes only. We monitor the status of these species. If significant declines are detected, these species could potentially be listed as endangered or threatened. Therefore, actions that may contribute to their decline should be avoided. We recommend that candidates and species of concern be included in your surveys.

Also on the web site, we have included additional wildlife-related information that should be considered if your project is a specific type. These include communication towers, power line safety for raptors, road and highway improvements and/or construction, spring developments and livestock watering facilities, wastewater facilities, and trenching operations.

Under Executive Orders 11988 and 11990, Federal agencies are required to minimize the destruction, loss, or degradation of wetlands and floodplains, and preserve and enhance their natural and beneficial values. We recommend you contact the U.S. Army Corps of Engineers for permitting requirements under section 404 of the Clean Water Act if your proposed action could impact floodplains or wetlands. These habitats should be conserved through avoidance, or mitigated to ensure no net loss of wetlands function and value.

The Migratory Bird Treaty Act (MBTA) prohibits the taking of migratory birds, nests, and eggs, except as permitted by the U.S. Fish and Wildlife Service. To minimize the likelihood of adverse impacts to all birds protected under the MBTA, we recommend construction activities occur outside the general migratory bird nesting season of March through August, or that areas proposed for construction during the nesting season be surveyed, and when occupied, avoided until nesting is complete.

We suggest you contact the New Mexico Department of Game and Fish, and the New Mexico Energy, Minerals, and Natural Resources Department, Forestry Division for information regarding fish, wildlife, and plants of State concern.

Thank you for your concern for endangered and threatened species and New Mexico's wildlife habitats. We appreciate your efforts to identify and avoid impacts to listed and sensitive species in your project area.

Sincerely,

Wally Murphy
Field Supervisor

OVER

Department of Energy
Washington, DC 20585

RECEIVED
AUG 30 2012
USFWS-NMESFO

AUG 24 2012

Mr. Wally Murphy, Field Supervisor
U.S. Fish and Wildlife Service
New Mexico Ecological Services Office
2105 Osuna NE
Albuquerque, New Mexico 87113

Dear Mr. Murphy:

The purpose of this letter is to notify you that the Department of Energy (DOE) is preparing a Supplement to the Environmental Impact Statement (EIS) for the Long-Term Management and Storage of Elemental Mercury (see enclosed Notice of Intent). Pursuant to the Mercury Export Ban Act of 2008 (P.L. 110-414), DOE has been directed to designate a facility or facilities for the long-term management and storage of elemental mercury generated within the United States. DOE is analyzing the storage of up to 10,000 metric tons (11,000 tons) of elemental mercury in a facility or facilities constructed and operated in accordance with the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act. To evaluate the range of reasonable alternatives for siting, constructing, and operating a facility or facilities to meet its obligations under the Act, DOE prepared the Mercury Storage EIS in accordance with the National Environmental Policy Act and its implementing regulations (40 CFR Parts 1500-1508 and 10 CFR Part 1021) and issued the Mercury Storage Final EIS in January 2011. The Mercury Storage EIS evaluated seven candidate locations for the elemental mercury storage facility, as well as the No Action Alternative. Since publication of the Final Mercury Storage EIS, DOE has reconsidered the range of reasonable alternatives evaluated in that EIS. Accordingly, DOE now proposes to evaluate two additional locations for a long-term mercury storage facility, both near the Waste Isolation Pilot Plant (WIPP), which DOE operates for disposal of defense transuranic waste.

This Supplement to the *Mercury Storage EIS* will analyze the potential environmental, human health, and socioeconomic impacts of elemental mercury storage at two locations near WIPP. One of the additional locations to be evaluated is in Section 20, Township 22 South, Range 31 East within the land subject to the WIPP Land Withdrawal Act (Act) (P.L. No. 102-579) as amended, across the WIPP access road from the WIPP facility. The second is in the vicinity of WIPP, but outside of the lands withdrawn by the Act, in Section 10, Township 22 South, Range 31 East, approximately 3 miles north of the WIPP facility (see enclosed map). Mercury storage at either location would require the construction of a new facility occupying approximately 3.1 hectares (7.7 acres).

2

In support of the preparation of this Supplement to the Mercury Storage EIS, DOE is requesting information on listed or sensitive species and critical habitat, if present, that may be affected by the proposed project.

Please send the requested information to:

Mr. David Levenstein
EIS Document Manager
U.S. Department of Energy
P.O. Box 2612
Germantown, Maryland 20874
(301) 903-6500

Please send a species list letter to this address. and return to me.

Sincerely, George

David Levenstein
EIS Document Manager

Enclosures: 1. *Notice of Intent to Prepare a Supplemental Environmental Impact Statement for the Long-Term Management and Storage of Elemental Mercury* (77 FR 33204).

2. Map indicating potential mercury storage locations.

I.2 CORRESPONDENCE WITH THE NEW MEXICO DEPARTMENT OF GAME AND FISH

I.2.1 U.S. Department of Energy's Correspondence to the New Mexico Department of Game and Fish

Department of Energy
Washington, DC 20585

AUG 2 4 2012

Mr. Matthew Wunder, Division Chief
Conservation Services
New Mexico Department of Game and Fish
P.O. Box 25112
Santa Fe, New Mexico 87504

Dear Mr. Wunder:

The purpose of this letter is to notify you that the Department of Energy (DOE) is preparing a Supplement to the Environmental Impact Statement (EIS) for the Long-Term Management and Storage of Elemental Mercury (see enclosed Notice of Intent). Pursuant to the Mercury Export Ban Act of 2008 (P.L. 110-414), DOE has been directed to designate a facility or facilities for the long-term management and storage of elemental mercury generated within the United States. DOE is analyzing the storage of up to 10,000 metric tons (11,000 tons) of elemental mercury in a facility or facilities constructed and operated in accordance with the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act. To evaluate the range of reasonable alternatives for siting, constructing, and operating a facility or facilities to meet its obligations under the Act, DOE prepared the Mercury Storage EIS in accordance with the National Environmental Policy Act and its implementing regulations (40 CFR Parts 1500-1508 and 10 CFR Part 1021) and issued the Mercury Storage Final EIS in January 2011. The Mercury Storage EIS evaluated seven candidate locations for the elemental mercury storage facility, as well as the No Action Alternative. Since publication of the Final Mercury Storage EIS, DOE has reconsidered the range of reasonable alternatives evaluated in that EIS. Accordingly, DOE now proposes to evaluate two additional locations for a long-term mercury storage facility, both near the Waste Isolation Pilot Plant (WIPP), which DOE operates for disposal of defense transuranic waste.

This Supplement to the *Mercury Storage EIS* will analyze the potential environmental, human health, and socioeconomic impacts of elemental mercury storage at two locations near WIPP. One of the additional locations to be evaluated is in Section 20, Township 22 South, Range 31 East within the land subject to the WIPP Land Withdrawal Act (Act) (P.L. No. 102-579) as amended, across the WIPP access road from the WIPP facility. The second is in the vicinity of WIPP, but outside of the lands withdrawn by the Act, in Section 10, Township 22 South, Range 31 East, approximately 3 miles north of the WIPP facility (see enclosed map). Mercury storage at either location would require the construction of a new facility occupying approximately 3.1 hectares (7.7 acres).

Printed with soy ink on recycled paper

In support of the preparation of this Supplement to the Mercury Storage EIS, DOE is requesting information on state-listed or sensitive species, if present, that may be affected by the proposed project.

Please send the requested information to:

Mr. David Levenstein
EIS Document Manager
U.S. Department of Energy
P.O. Box 2612
Germantown, Maryland 20874
(301) 903-6500

Sincerely,

David Levenstein
EIS Document Manager

Enclosures: 1. *Notice of Intent to Prepare a Supplemental Environmental Impact Statement for the Long-Term Management and Storage of Elemental Mercury* (77 FR 33204).

2. Map indicating potential mercury storage locations.

Department of Energy
Washington, DC 20585

JAN 15 2013

Mr. Matthew Wunder, Division Chief
Conservation Services
New Mexico Department of Game and Fish
P.O. Box 25112
Santa Fe, New Mexico 87504

Dear Mr. Wunder:

The purpose of this letter is to amend the U.S. Department of Energy's (DOE's) previous notification to you on August 24, 2012, regarding the Supplement to the Environmental Impact Statement for the Long-Term Management and Storage of Elemental Mercury. In August, DOE informed you of its intent to develop the supplemental environmental impact statement (SEIS) to evaluate two locations in the vicinity of the Waste Isolation Pilot Plant (WIPP): Sections 10 and 20, Township 22 South, Range 31 East.

However, as a result of comments received during the SEIS scoping process, DOE has decided to evaluate a third location, also in the vicinity of WIPP. The additional location is in Section 35, within the same township and range as Sections 10 and 20 and outside of the lands withdrawn by the WIPP Land Withdrawal Act (P.L. No. 102-579), as amended. Section 35 is approximately 3.5 miles southeast of the WIPP facility (see enclosed map). Construction and operation of a long-term mercury storage facility would be the same as described in the August 24th correspondence, occupying approximately 3.1 hectares (7.7 acres).

In support of the preparation of the Supplement to the Mercury Storage EIS, DOE is requesting that any information provided by your department regarding state-listed or sensitive species and critical habitat, if any, that may be affected by the proposed project also include Section 35, as well as Sections 10 and 20 previously mentioned in the August 24th correspondence.

Please send the requested information to:

Mr. David Levenstein
EIS Document Manager
U.S. Department of Energy
P.O. Box 2612
Germantown, Maryland 20874
(301) 903-6500

Sincerely,

David Levenstein
EIS Document Manager

Enclosures: 1. Map indicating potential mercury storage locations.

I.2.2 Response from the New Mexico Department of Game and Fish

GOVERNOR
Susana Martinez

DIRECTOR AND SECRETARY
TO THE COMMISSION
James S. Lane, Jr.

Daniel E. Brooks, Deputy Director

STATE OF NEW MEXICO
DEPARTMENT OF GAME & FISH

One Wildlife Way
Santa Fe, NM 87507
Post Office Box 25112
Santa Fe, NM 87504
Phone: (505) 476-8008
Fax: (505) 476-8124

Visit our website at www.wildlife.state.nm.us
For information call: (888) 248-6866
To order free publications call: (800) 862-9310

July 3, 2012

David Levenstein, Document Manager
Office of Environmental Compliance (EM-11)
US Department of Energy
P.O. Box 2612
Germantown, MD 20874

Long-Term Management and Storage of Elemental Mercury Supplemental Environmental Impact Statement Scoping; NMGF Project No.15156

Dear Mr. Levenstein:

In response to the Federal Register Notice of Intent dated 8 June 2012, the New Mexico Department of Game and Fish (Department) has reviewed information pertaining to the above referenced project. The Mercury Export Ban Act of 2008 requires the Department of Energy (DOE) to designate a facility for the long-term management and storage of elemental mercury generated within the U.S. DOE estimates a future need to manage and store up to 10,000 metric tons of elemental mercury during the 40-year period of analysis. The project will comprise an aboveground storage and containment building with ancillary delivery facilities. An EIS issued in 2011 evaluated seven candidate locations in the states of Colorado, Washington, Nevada, Idaho, Missouri, South Carolina and Texas. This Supplemental EIS will evaluate two additional alternatives located at and in the vicinity of the Waste Isolation Pilot Plant, Eddy County, New Mexico. They are located in Sections 10 and 20, Township 22S, Range 31E. Our comments pertain only to the locations in New Mexico. No site inspection was conducted by Department staff in connection with this consultation request.

For your information we have enclosed a list of sensitive, threatened and endangered species occurring in Eddy County. For more information on listed and other species of concern, contact the following sources:

1. BISON-M Species Accounts, Searches, and County lists: bison-m.org
2. Habitat Handbook Project Guidelines: wildlife.state.nm.us/conservation/habitat_handbook/index.htm
3. For custom, site-specific database searches on plants and wildlife. Go to Data then to Free On-Line Data and follow the directions go to: nmnhp.unm.edu
4. New Mexico State Forestry Division (505-827-5830) or nmrareplants.unm.edu/index.html for state-listed plants
5. For the most current listing of federally listed species always check the U.S. Fish and Wildlife Service at (505-346-2525) or fws.gov/ifw2es/NewMexico/index.cfm.

Long-Term Management and Storage of Elemental Mercury | Page 2 – 2 | July 3, 2012

The entire project area is within historic Lesser Prairie Chicken (LPC) habitat. The proposed project location may intersect current occupied habitat in Section 10. The Southern Great Plains Critical Habitat Assessment Tool classifies LPC habitat in the project area as "significant." The Department recommends avoiding impacts to suitable LPC habitat. For more information, please contact Grant Beauprez, Department LPC biologist at 575-478-2460 or grant.beauprez@state.nm.us.

The project area likely includes suitable habitat for Burrowing Owls. Please follow the survey and mitigation procedures recommended in the Department Habitat Handbook Burrowing Owl guideline, available at wildlife.state.nm.us/conservation/habitat_handbook/index.htm. Ephemerally wet, low lying portions of the project area may support leopard frogs and other amphibians. The Department recommends avoiding construction in or disturbance of hydrologic balance affecting ephemeral wet areas. No probable playa lakes are mapped by the Playa Lakes Joint Venture in the proposed project area.

Thank you for the opportunity to comment on this Supplemental EIS. We look forward to the opportunity to review a Draft EIS for this project. If there are any questions, please contact Rachel Jankowitz, Mining Habitat Specialist at 505-476-8159 or rjankowitz@state.nm.us.

Sincerely,

Matt Wunder, Ph.D.
Chief, Conservation Services Division

MW/rj

Encl: 1

xc: USFWS NMES Field Office
Leon Redman, SE Area Operations Chief, NMDGF
George Farmer, SE Area Habitat Specialist, NMDGF
Grant Beauprez, Lesser Prairie Chicken Biologist, NMDGF

NEW MEXICO WILDLIFE OF CONCERN
EDDY COUNTY

For complete up-dated information on federal-listed species, including plants, see the US Fish & Wildlife Service NM Ecological Services Field Office website at http://www.fws.gov/southwest/es/NewMexico/SBC.cfm. For information on state-listed plants, contact the NM Energy, Minerals and Natural Resources Department, Division of Forestry, or go to http://nmrareplants.unm.edu/. If your project is on Bureau of Land Management, contact the local BLM Field Office for information on species of particular concern. If your project is on a National Forest, contact the Forest Supervisor's office for species information. E = Endangered; T = Threatened; s = sensitive; SOC = Species of Concern; C = Candidate; Exp = Experimental non-essential population; P = Proposed

Common Name	Scientific Name	NMGF	US FWS	critical habitat
Mexican Tetra	Astyanax mexicanus	T		
Rio Grande Chub	Gila pandora	s		
Rio Grande Shiner	Notropis jemezanus	s	SOC	
Pecos Bluntnose Shiner	Notropis simus pecosensis	E	T	Y
Blue Sucker	Cycleptus elongatus	E	SOC	
Gray Redhorse	Moxostoma congestum	T	SOC	
Headwater Catfish	Ictalurus lupus	s	SOC	
Pecos Pupfish	Cyprinodon pecosensis	T	SOC	
Pecos Gambusia	Gambusia nobilis	E	E	
Greenthroat Darter	Etheostoma lepidum	T	SOC	
Bigscale Logperch	Percina macrolepida (Native pop.)	T		
Western River Cooter	Pseudemys gorzugi	T		
Sand Dune Lizard	Sceloporus arenicolus	E	P	
Gray-banded Kingsnake	Lampropeltis alterna	E		
Blotched Water Snake	Nerodia erythrogaster transversa	E		
Arid Land Ribbon Snake	Thamnophis proximus diabolicus	T		
Mottled Rock Rattlesnake	Crotalus lepidus lepidus	T		
Brown Pelican	Pelecanus occidentalis	E		
Neotropic Cormorant	Phalacrocorax brasilianus	T		
Bald Eagle	Haliaeetus leucocephalus	T		
Northern Goshawk	Accipiter gentilis	s	SOC	
Common Black-Hawk	Buteogallus anthracinus	T	SOC	
Aplomado Falcon	Falco femoralis	E	Exp	
Peregrine Falcon	Falco peregrinus	T	SOC	
Lesser Prairie-Chicken	Tympanuchus pallidicinctus	s	C	
Piping Plover	Charadrius melodus circumcinctus	T	T	
Mountain Plover	Charadrius montanus	s	SOC	
Least Tern	Sterna antillarum	E	E	
Black Tern	Chlidonias niger surinamensis		SOC	
Common Ground-Dove	Columbina passerina	E		
Yellow-billed Cuckoo	Coccyzus americanus	s	SOC	
Mexican Spotted Owl	Strix occidentalis lucida	s	T	Y
Burrowing Owl	Athene cunicularia		SOC	
Broad-billed Hummingbird	Cynanthus latirostris	T		
Lucifer Hummingbird	Calothorax lucifer	T		
Northern Beardless-Tyrannulet	Camptostoma imberbe	E		
Southwestern Willow Flycatcher	Empidonax traillii extimus	E	E	Y
Thick-billed Kingbird	Tyrannus crassirostris	E		

NEW MEXICO WILDLIFE OF CONCERN
EDDY COUNTY

For complete up-dated information on federal-listed species, including plants, see the US Fish & Wildlife Service NM Ecological Services Field Office website at http://www.fws.gov/southwest/es/NewMexico/SBC.cfm. For information on state-listed plants, contact the NM Energy, Minerals and Natural Resources Department, Division of Forestry, or go to http://nmrareplants.unm.edu/. If your project is on Bureau of Land Management, contact the local BLM Field Office for information on species of particular concern. If your project is on a National Forest, contact the Forest Supervisor's office for species information. E = Endangered; T = Threatened; s = sensitive; SOC = Species of Concern; C = Candidate; Exp = Experimental non-essential population; P = Proposed

Common Name	Scientific Name	NMGF	US FWS	critical habitat
Loggerhead Shrike	Lanius ludovicianus	s		
Bell's Vireo	Vireo bellii	T	SOC	
Gray Vireo	Vireo vicinior	T		
Baird's Sparrow	Ammodramus bairdii	T	SOC	
Sprague's Pipit	Anthus spragueii		C	
Varied Bunting	Passerina versicolor	T		
Western Small-footed Myotis Bat	Myotis ciliolabrum melanorhinus	s		
Yuma Myotis Bat	Myotis yumanensis yumanensis	s		
Cave Myotis Bat	Myotis velifer	s		
Long-legged Myotis Bat	Myotis volans interior	s		
Fringed Myotis Bat	Myotis thysanodes thysanodes	s		
Eastern Red Bat	Lasiurus borealis	s		
Pale Townsend's Big-eared Bat	Corynorhinus townsendii pallescens	s	SOC	
Big Free-tailed Bat	Nyctinomops macrotis	s		
Black-tailed Prairie Dog	Cynomys ludovicianus ludovicianus	s	SOC	
Guadalupe Pocket Gopher	Thomomys bottae guadalupensis	s	SOC	
Nelson's Pocket Mouse	Chaetodipus nelsoni canescens	s		
Pecos River Muskrat	Ondatra zibethicus ripensis	s	SOC	
Swift Fox	Vulpes velox velox	s	SOC	
Ringtail	Bassariscus astutus	s		
Western Spotted Skunk	Spilogale gracilis	s		
Common Hog-nosed Skunk	Conepatus leuconotus	s		
Texas Hornshell	Popenaias popeii	E	C	
Pecos Springsnail	Pyrgulopsis pecosensis	T	SOC	
Ovate Vertigo Snail	Vertigo ovata	T	SOC	
Desert Viceroy Butterfly	Limenitis archippus obsoleta		SOC	

GOVERNOR
Susana Martinez

DIRECTOR AND SECRETARY
TO THE COMMISSION
James S. Lane, Jr.

Daniel E. Brooks, Deputy Director

STATE OF NEW MEXICO
DEPARTMENT OF GAME & FISH

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For information call: (888) 248-6866
To order free publications call: (800) 862-9310

February 5, 2013

David Levenstein, Document Manager
Office of Environmental Compliance (EM-11)
US Dept. of Energy
P.O. Box 2612
Germantown MD 20874

Long-Term Management and Storage of Elemental Mercury Supplemental Environmental Impact Statement Scoping; NMDGF Project No.15434

Dear Mr. Levenstein:

In response to your letter dated January 15, 2013, the New Mexico Department of Game and Fish (Department) has reviewed information pertaining to the above referenced project. The Mercury Export Ban Act of 2008 requires the Department of Energy (DOE) to designate a facility for the long-term management and storage of elemental mercury generated within the US. The DOE estimates there will be a need to manage and store up to 10,000 metric tons of elemental mercury during the 40-year period of analysis. The project will comprise an aboveground storage/containment building with ancillary delivery facilities. An EIS issued in 2011 evaluated seven candidate locations in the states of Colorado, Washington, Nevada, Idaho, Missouri, South Carolina and Texas. We previously responded to your request for information regarding two additional alternatives located at and in the vicinity of the Waste Isolation Pilot Plant (WIPP), Eddy County, New Mexico (NMDGF Project No. 15156, dated July 2, 2012). A third alternative in the same vicinity is currently under evaluation. It is located in Section 35, Township 22S, Range 31E, approximately 3.5 miles east of the WIPP. No site inspection was conducted by Department staff in connection with this consultation request.

For your information, we have enclosed a list of sensitive, threatened and endangered species that occur in Eddy County. Included below are sources of additional information:

1. For Biota Information System of New Mexico (BISON-M) species accounts, searches, and county lists go to bison-m.org.
2. For the Department's Habitat Handbook Project guidelines go to wildlife.state.nm.us/conservation/habitat_handbook/index.htm.
3. For custom, site-specific database searches on plants and wildlife go to nhnm.unm.edu, then go to Data, Free On-Line Data, and follow the directions.
4. For state-listed plants contact the New Mexico State Forestry Division at (505) 476-3334) or nmrareplants.unm.edu/index.html.

David Levenstein Page -2- February 5, 2012

5. For the most current listing of federally listed species **always** check the U.S. Fish and Wildlife Service at (505) 346-2525 or fws.gov/southwest/es/NewMexico/SBC.cfm.

Section 35 intersects current occupied habitat for Lesser Prairie-Chicken (LPC). The Southern Great Plains Critical Habitat Assessment Tool classifies LPC habitat in this Section as "common." The Department recommends avoiding conversion of suitable LPC habitat. For more information, please contact Grant Beauprez, Department LPC biologist at 575-478-2460 or grant.beauprez@state.nm.us.

The project area likely includes suitable habitat for Burrowing Owls. Please follow the survey and mitigation procedures recommended in the Department Habitat Handbook Burrowing Owl guideline, available at wildlife.state.nm.us/conservation/habitat_handbook/index.htm. Ephemerally wet, low lying portions of the project area may support leopard frogs and other amphibians. The Department recommends avoiding construction in ephemeral wet areas or disturbance of the hydrologic balance affecting them. No playa lakes were mapped by the Playa Lakes Joint Venture in the proposed project area. The project area is a year-round concentration zone for Harris Hawk. The selected area should be surveyed for raptor nests prior to construction, and human activity, including noise, should be avoided within ¼ mile of an active nest. There may also be important habitat for pronghorn antelope along the eastern edge of the section.

Thank you for the opportunity to comment on this Supplemental EIS. We look forward to the opportunity to review a Draft EIS for this project. If there are any questions, please contact Rachel Jankowitz, Mining Habitat Specialist at 505-476-8159 or rjankowitz@state.nm.us.

Sincerely,

Matthew Wunder, Chief
Conservation Services Division

cc: USFWS NMES Field Office
George Farmer, SE Regional Habitat Biologist, NMDGF
Grant Beauprez, Lesser Prairie-Chicken Biologist, NMDGF

I.3 CORRESPONDENCE WITH THE NEW MEXICO ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

I.3.1 U.S. Department of Energy's Correspondence to the New Mexico Energy, Minerals and Natural Resources Department

Department of Energy
Washington, DC 20585

AUG 24 2012

Mr. Tony Delfin, State Forester
Forestry Division
New Mexico Energy, Minerals and Natural Resources Department
1220 South Saint Francis Drive
Santa Fe, New Mexico 87505

Dear Mr. Delfin:

The purpose of this letter is to notify you that the Department of Energy (DOE) is preparing a Supplement to the Environmental Impact Statement (EIS) for the Long-Term Management and Storage of Elemental Mercury (see enclosed Notice of Intent). Pursuant to the Mercury Export Ban Act of 2008 (P.L. 110-414), DOE has been directed to designate a facility or facilities for the long-term management and storage of elemental mercury generated within the United States. DOE is analyzing the storage of up to 10,000 metric tons (11,000 tons) of elemental mercury in a facility or facilities constructed and operated in accordance with the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act. To evaluate the range of reasonable alternatives for siting, constructing, and operating a facility or facilities to meet its obligations under the Act, DOE prepared the Mercury Storage EIS in accordance with the National Environmental Policy Act and its implementing regulations (40 CFR Parts 1500-1508 and 10 CFR Part 1021) and issued the Mercury Storage Final EIS in January 2011. The Mercury Storage EIS evaluated seven candidate locations for the elemental mercury storage facility, as well as the No Action Alternative. Since publication of the Final Mercury Storage EIS, DOE has reconsidered the range of reasonable alternatives evaluated in that EIS. Accordingly, DOE now proposes to evaluate two additional locations for a long-term mercury storage facility, both near the Waste Isolation Pilot Plant (WIPP), which DOE operates for disposal of defense transuranic waste.

This Supplement to the *Mercury Storage EIS* will analyze the potential environmental, human health, and socioeconomic impacts of elemental mercury storage at two locations near WIPP. One of the additional locations to be evaluated is in Section 20, Township 22 South, Range 31 East within the land subject to the WIPP Land Withdrawal Act (Act) (P.L. No. 102-579) as amended, across the WIPP access road from the WIPP facility. The second is in the vicinity of WIPP, but outside of the lands withdrawn by the Act, in Section 10, Township 22 South, Range 31 East, approximately 3 miles north of the WIPP facility (see enclosed map). Mercury storage at either location would require the construction of a new facility occupying approximately 3.1 hectares (7.7 acres).

Printed with soy ink on recycled paper

In support of the preparation of this Supplement to the Mercury Storage EIS, DOE is requesting information on state-listed or sensitive species, if present, that may be affected by the proposed project.

Please send the requested information to:

Mr. David Levenstein
EIS Document Manager
U.S. Department of Energy
P.O. Box 2612
Germantown, Maryland 20874
(301) 903-6500

Sincerely,

David Levenstein
EIS Document Manager

Enclosures: 1. *Notice of Intent to Prepare a Supplemental Environmental Impact Statement for the Long-Term Management and Storage of Elemental Mercury* (77 FR 33204).

2. Map indicating potential mercury storage locations.

Department of Energy
Washington, DC 20585

JAN 15 2013

Mr. Tony Delfin, State Forester
Forestry Division
New Mexico Energy, Minerals and Natural Resources Department
1220 South Saint Francis Drive
Santa Fe, New Mexico 87505

Dear Mr. Delfin:

The purpose of this letter is to amend the U.S. Department of Energy's (DOE's) previous notification to you on August 24, 2012, regarding the Supplement to the Environmental Impact Statement for the Long-Term Management and Storage of Elemental Mercury. In August, DOE informed you of its intent to develop the supplemental environmental impact statement (SEIS) to evaluate two locations in the vicinity of the Waste Isolation Pilot Plant (WIPP): Sections 10 and 20, Township 22 South, Range 31 East. DOE received your response dated September 17, 2012.

However, as a result of comments received during the SEIS scoping process, DOE has decided to evaluate a third location, also in the vicinity of WIPP. The additional location is in Section 35, within the same township and range as Sections 10 and 20 and outside of the lands withdrawn by the WIPP Land Withdrawal Act (P.L. No. 102-579), as amended. Section 35 is approximately 3.5 miles southeast of the WIPP facility (see enclosed map). Construction and operation of a long-term mercury storage facility would be the same as described in the August 24th correspondence, occupying approximately 3.1 hectares (7.7 acres).

In support of the preparation of the Supplement to the Mercury Storage EIS, DOE is requesting a review to determine if there is any additional information regarding state-listed or sensitive species specific to Section 35 that should be considered in our analyses or if the response dated September 17, 2012, would apply equally to Section 35 as it does for Sections 10 and 20.

Please send the requested information to:

Mr. David Levenstein
EIS Document Manager
U.S. Department of Energy
P.O. Box 2612
Germantown, Maryland 20874
(301) 903-6500

Sincerely,

David Levenstein
EIS Document Manager

Enclosures: 1. Map indicating potential mercury storage locations.

I.3.2 Response from the New Mexico Energy, Minerals and Natural Resources Department

State of New Mexico
Energy, Minerals and Natural Resources Department

Susana Martinez
Governor

John H. Bemis
Cabinet Secretary

Brett F. Woods, Ph.D.
Deputy Cabinet Secretary

Tony Delfin, Division Director
State Forestry Division

September 17, 2012

Mr. David Levenstein
EIS Document Manager
U.S. Department of Energy
Germantown, Maryland 20874

RE: Supplemental Environmental Impact Statement for the Long-Term Storage of Elemental Mercury (77 FR 33204).

Dear Mr. Levenstein:

Thank for inquiring about a list of potential NM state-listed endangered plants that could potentially be impacted by the proposed project near Carlsbad in Eddy County, NM. The presence of potential habitat should be evaluated for the following plant species:

Amsonia tharpii (Tharp's bluestar)
Cirsium wrightii (Wright's marsh thistle)
Coryphanta scheeri var. scheeri (Scheer's pincushion cactus)
Echinocereus fendleri var. kuenzleri (Kuenzler's hedgehog cactus)
Eriogonum gypsophilum (Gypsum wild buckwheat)
Escobaria sneedii var. leei (Lee's pincushion cactus)

Additional information on these state-listed plants and other sensitive plants in Eddy County, NM, can be found at: http://nmrareplants.unm.edu/index.html
If suitable habitat is found, clearance surveys should be conducted at the appropriate time of year, optimizing chances to detect potential plants within the project area. If plants are found within the project area minimization or avoidance measures will need to be developed to minimize impacts to the species.
Please let me know if I can be of further help.

Sincerely,

Daniela Roth, Botany Coordinator
505-476-3347

1220 South St. Francis Drive • Santa Fe, New Mexico 87505
Phone (505) 476-3325 • Fax (505) 476-3330 • www.emnrd.state.nm.us/fd

State of New Mexico
Energy, Minerals and Natural Resources Department

Susana Martinez
Governor

John H. Bemis
Cabinet Secretary

Brett F. Woods, Ph.D.
Deputy Cabinet Secretary

Tony Delfin, Division Director
State Forestry Division

NEW MEXICO STATE FORESTRY

Mr. David Levenstein
EIS Document Manager
U.S. Department of Energy
Germantown, Maryland 20874

January 24, 2013

RE: Additional site location for the Long-Term Management and Storage of Elemental Mercury

Dear Mr. Levenstein:

Thank for inquiring about NM state-listed endangered plants that could potentially be impacted by the proposed mercury storage project near Carlsbad in Eddy County, NM. As stated in my letter from September 17, 2012, the presence of potential habitat should be evaluated for the following plant species:

Amsonia tharpii (Tharp's bluestar)
Cirsium wrightii (Wright's marsh thistle)
Coryphanta scheeri var. scheeri (Scheer's pincushion cactus)
Echinocereus fendleri var. kuenzleri (Kuenzler's hedgehog cactus)
Eriogonum gypsophilum (Gypsum wild buckwheat)
Escobaria sneedii var. leei (Lee's pincushion cactus)

No additional plants need to be considered for the third location, in Section 35, within the same township and range as the previously addressed locations.

Additional information on these state-listed plants and other sensitive plants in Eddy County, NM, can be found at: http://nmrareplants.unm.edu/index.html
If suitable habitat is found, clearance surveys should be conducted at the appropriate time of year, optimizing chances to detect potential plants within the project area. If plants are found within the project area minimization or avoidance measures will need to be developed to minimize impacts to the species.

Please let me know if I can be of further help.

Sincerely,

Daniela Roth

Daniela Roth, Botany Coordinator
505-476-3347

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I.4 CORRESPONDENCE WITH THE NEW MEXICO HISTORIC PRESERVATION DIVISION

I.4.1 U.S. Department of Energy's Correspondence to the New Mexico Historic Preservation Division

Department of Energy
Washington, DC 20585

AUG 2 4 2012

Ms. Jan Biella
State Historic Preservation Officer
New Mexico Historic Preservation Division
Bataan Memorial Building
407 Galisteo Street, Suite 236
Santa Fe, New Mexico 87501

Dear Ms. Biella:

The purpose of this letter is to notify you that the Department of Energy (DOE) is preparing a Supplement to the Environmental Impact Statement (EIS) for the Long-Term Management and Storage of Elemental Mercury (see enclosed Notice of Intent). Pursuant to the Mercury Export Ban Act of 2008 (P.L. 110-414), DOE has been directed to designate a facility or facilities for the long-term management and storage of elemental mercury generated within the United States. DOE is analyzing the storage of up to 10,000 metric tons (11,000 tons) of elemental mercury in a facility or facilities constructed and operated in accordance with the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act. To evaluate the range of reasonable alternatives for siting, constructing, and operating a facility or facilities to meet its obligations under the Act, DOE prepared the Mercury Storage EIS in accordance with the National Environmental Policy Act (NEPA) and its implementing regulations (40 CFR Parts 1500-1508 and 10 CFR Part 1021) and issued the Mercury Storage Final EIS in January 2011. The Mercury Storage EIS evaluated seven candidate locations for the elemental mercury storage facility, as well as the No Action Alternative. Since publication of the Final Mercury Storage EIS, DOE has reconsidered the range of reasonable alternatives evaluated in that EIS. Accordingly, DOE now proposes to evaluate two additional locations for a long-term mercury storage facility, both near the Waste Isolation Pilot Plant (WIPP), which DOE operates for disposal of defense transuranic waste.

This Supplement to the *Mercury Storage EIS* will analyze the potential environmental, human health, and socioeconomic impacts of elemental mercury storage at two locations near WIPP. One of the additional locations to be evaluated is in Section 20, Township 22 South, Range 31 East within the land subject to the WIPP Land Withdrawal Act (Act) (P.L. No. 102-579) as amended, across the WIPP access road from the WIPP facility. The second is in the vicinity of WIPP, but outside of the lands withdrawn by the Act, in Section 10, Township 22 South, Range 31 East, approximately 3 miles north of the WIPP facility (see enclosed map).

In preparing this Supplement to the *Mercury Storage EIS*, DOE has gathered and analyzed information regarding cultural resources at these locations near WIPP.

This consultation is in accordance with NEPA and Section 106 of the National Historic Preservation Act. Preconstruction surveys and construction monitoring for previously unknown resources would be conducted if either of these locations is chosen for construction of the facility.

In support of the preparation of this Supplement to the *Mercury Storage EIS*, DOE is soliciting any specific concerns you may have regarding cultural resources that may be affected by the proposed project. We would appreciate a reply to this letter within 30 days of receipt.

If you have any questions or concerns, please contact me at:

Mr. David Levenstein
EIS Document Manager
U.S. Department of Energy
P.O. Box 2612
Germantown, Maryland 20874
(301) 903-6500.

Sincerely,

David Levenstein
EIS Document Manager

Enclosures: 1. *Notice of Intent to Prepare a Supplemental Environmental Impact Statement for the Long-Term Management and Storage of Elemental Mercury* (77 FR 33204).

2. Map indicating potential mercury storage locations.

Department of Energy
Washington, DC 20585

JAN 15 2013

Ms. Jan Biella
State Historic Preservation Officer
New Mexico Historic Preservation Division
Bataan Memorial Building
407 Galisteo Street, Suite 236
Santa Fe, NM 87501

Dear Ms. Biella:

The purpose of this letter is to amend the U.S. Department of Energy's (DOE's) previous notification to you on August 24, 2012, regarding the Supplement to the Environmental Impact Statement for the Long-Term Management and Storage of Elemental Mercury. In August, DOE informed you of its intent to develop the supplemental environmental impact statement (SEIS) to evaluate two locations in the vicinity of the Waste Isolation Pilot Plant (WIPP): Sections 10 and 20, Township 22 South, Range 31 East. DOE received your response dated August 31, 2012.

However, as a result of comments received during the SEIS scoping process, DOE has decided to evaluate a third location, also in the vicinity of WIPP. The additional location is in Section 35, within the same township and range as Sections 10 and 20 and outside of the lands withdrawn by the WIPP Land Withdrawal Act (P.L. No. 102-579), as amended. Section 35 is approximately 3.5 miles southeast of the WIPP facility (see enclosed map). Construction and operation of a long-term mercury storage facility would be the same as described in the August 24th correspondence, occupying approximately 3.1 hectares (7.7 acres).

In support of the preparation of the Supplement to the Mercury Storage EIS, DOE is requesting a review to determine if there is any additional information regarding cultural resources specific to Section 35 that should be considered in our analyses or if the response dated August 31, 2012, would apply equally to Section 35 as it does for Sections 10 and 20.

Please send the requested information to:

Mr. David Levenstein
EIS Document Manager
U.S. Department of Energy
P.O. Box 2612
Germantown, Maryland 20874
(301) 903-6500

Sincerely,

David Levenstein
EIS Document Manager

Enclosures: 1. Map indicating potential mercury storage locations.

I.4.2 Response from the New Mexico Historic Preservation Division

STATE OF NEW MEXICO

DEPARTMENT OF CULTURAL AFFAIRS

HISTORIC PRESERVATION DIVISION

Susana Martinez
Governor

BATAAN MEMORIAL BUILDING
407 GALISTEO STREET, SUITE 236
SANTA FE, NEW MEXICO 87501
PHONE (505) 827-6320 FAX (505) 827-6338

August 31, 2012

Mr. David Levenstein
EIS Document Manager
U.S. Department of Energy
P.O. Box 2612
Germantown, Maryland 20874

Subject: Supplement to the Mercury Storage EIS

Dear Mr. Levenstein:

Thank you for your notification that the Department of Energy (DOE) is preparing a Supplement to the Environmental Impact Statement (EIS) for Long-Term Management and Storage of Elemental Mercury. We understand the supplement will analyze elemental mercury storage at two locations near WIPP. One of the locations to be evaluated is in Section 20, Township 22 South, Range 31 East. This location is within lands withdrawn by the WIPP Land Withdrawal Act (Act). The second location is also in the vicinity of WIPP but outside of the lands withdrawn by the ACT. This second location is in Section 10, Township 22 South, Range 31 East.

We agree with preconstruction surveys of the proposed project and construction monitoring (when appropriate) if one of these two locations were to be selected. Assuming there would be underground mining, we would also point out the need for cultural resource surveys of off-site waste disposal areas and associated access roads. We thank you for the opportunity to comment. We look forward to further project related correspondence.

Sincerely,

Norman B. Nelson
Archaeologist
Planning and Review
Historic Preservation Division
N.M. Office of Cultural Affairs
(505) 476-0255

STATE OF NEW MEXICO
DEPARTMENT OF CULTURAL AFFAIRS
HISTORIC PRESERVATION DIVISION

Susana Martinez
Governor

BATAAN MEMORIAL BUILDING
407 GALISTEO STREET, SUITE 236
SANTA FE, NEW MEXICO 87501
PHONE (505) 827-6320 FAX (505) 827-6338

January 23, 2013

Mr. David Levenstein
EIS Document Manager
U.S. Department of Energy
P.O. Box 2612
Germantown, Maryland 20874

Subject: Supplement to the Mercury Storage EIS adding Section 35

Dear Mr. Levenstein:

Thank you for your notification that the Department of Energy (DOE) is preparing a Supplement to the Environmental Impact Statement (EIS) for Long-Term Management and Storage of Elemental Mercury. We understand the supplement will analyze elemental mercury storage at three locations near WIPP. One of the locations to be evaluated is in Section 20, Township 22 South, Range 31 East. This location is within lands withdrawn by the WIPP Land Withdrawal Act (Act). The second location is also in the vicinity of WIPP but outside of the lands withdrawn by the ACT. This second location is in Section 10, Township 22 South, Range 31 East. In addition a third location, Section 35 has been added since the August 31, 2012 reply from our office (your letter dated August 24, 2012).

We agree with preconstruction archaeological surveys of the proposed project area(s) and construction monitoring (when appropriate) if one of these three locations were to be selected. Assuming there would be underground mining, we would also point out the need for cultural resource surveys of off-site waste disposal areas and for associated access roads. We thank you for the opportunity to comment. We look forward to further project related correspondence.

Sincerely,

Norman B. Nelson

Norman B. Nelson
Archaeologist
Planning and Review
Historic Preservation Division
N.M. Office of Cultural Affairs
(505) 476-0255