AR TARGET SHEET

The following document was too large to scan as one unit, therefore it has been broken down into sections.

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SECTION 3 OF 4

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U.S. Department of Energy
Office of Environmental Management

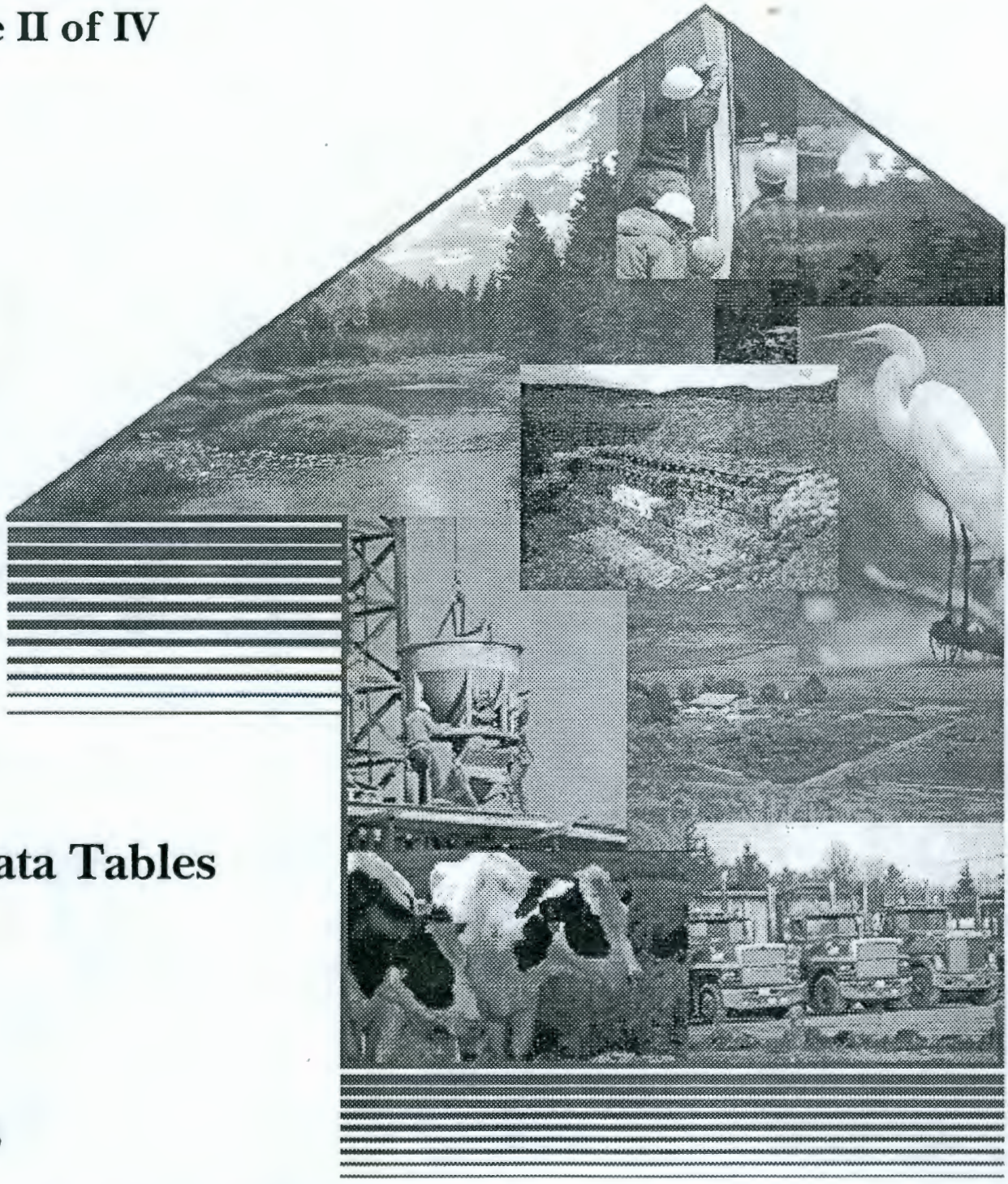
Volume II

Draft Waste Management Programmatic Environmental Impact Statement

For Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste

Volume II of IV

DOE/EIS-0200-D



Site Data Tables

August 1995

DOE/EIS-0200-D

DRAFT
WASTE MANAGEMENT
PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT
for
Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste

Volume II of IV

Site Data Tables

August 1995

U.S. Department of Energy
Office of Environmental Management
1000 Independence Ave.
Washington, DC 20585

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SITE DATA TABLES

1.0 Introduction

Volume II is an integral part of the Office of Environmental Managements (EM's) Waste Management Programmatic Environmental Impact Statement (WM PEIS), which portrays the impacts of EM's waste management activities at each of the 17 major DOE sites evaluated in the WM PEIS.

1.1 Scope

Impacts are displayed for each of the 17 major sites in tabular form as a complement to the impact discussions in waste-type Chapters 6 through 10 (see Table II–1.1). The chapters present background information on each waste type, volume data, existing capacities for managing the wastes, and assumptions used in the waste-type analysis. Readers should refer to these chapters and to Chapter 5, "Impact Analysis Methodologies," for a more thorough discussion of the methodologies, assumptions and definitions associated with these impacts. A synopsis of key definitions and assumptions is also presented at the rear of this introductory section.

Table II.1–1. Waste-Type Chapters

Chapter 6	Impacts of the Management of Low-level Mixed Waste
Chapter 7	Impacts of the Management of Low-level Waste
Chapter 8	Impacts of the Management of Transuranic Waste
Chapter 9	Impacts of the Management of High-level Waste
Chapter 10	Impacts of the Management of Hazardous Waste

Sites were evaluated only when the sites were considered as potential treatment, storage, and/or disposal locations for a given waste type. Not all sites are involved in the alternatives for all waste types. Table II.1–2 presents waste types considered for treatment, storage and/or disposal at the 17 major sites.

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Table II.1–2. Waste Types Considered for Treatment, Storage and/or Disposal at Major DOE Sites

SITES	LLMW	LLW	TRUW	HW	HLW
1. ANL-E	x	x	x		
2. BNL	x				
3. FEMP	x	x			
4. HS	x	x	x	x	x
5. INEL	x	x	x	x	x
6. LANL	x	x	x	x	
7. LLNL	x	x	x		
8. NTS	x	x	x		
9. ORR	x	x	x	x	
10. PGDP	x	x	x		
11. Pantex	x	x			
12. Ports	x	x			
13. RFETS	x	x	x		
14. SNL-NM	x	x	x		
15. SRS	x	x	x	x	x
16. WIPP			x		
17. WVDP	x				x

1. Argonne National Laboratory-East (Illinois)
2. Brookhaven National Laboratory (New York)
3. Fernald Environmental Management Project (Ohio)
4. Hanford Site (Washington)
5. Idaho National Engineering Laboratory (Idaho)
6. Los Alamos National Laboratory (New Mexico)
7. Lawrence Livermore National Laboratory (California)
8. Nevada Test Site (Nevada)
9. Oak Ridge Reservation (Tennessee)
10. Paducah Gaseous Diffusion Plant (Kentucky)
11. Pantex Plant (Texas)
12. Portsmouth Gaseous Diffusion Plant (Ohio)
13. Rocky Flats Plant (Colorado)
14. Sandia National Laboratory-Albuquerque (New Mexico)
15. Savannah River Site (South Carolina)
16. Waste Isolation Pilot Plant (New Mexico)
17. West Valley Demonstration Project (New York)

Fifteen impact categories were analyzed; however, they do not apply to all waste types, as shown in Table II.1-3 below.

Table II-1.3. Impact Categories Associated With the Waste Types

Impact Category	LLMW	LLW	TRUW	HW	HLW
1. Treatment and Disposal (LLMW & LLW), Treatment (TRUW, HW), or Storage (HLW): Estimated Number of Fatalities	x	x	x	x	x
2. Treatment (LLMW, LLW, TRUW, HW) or Storage (HLW): Estimated Number of Cancer Incidences and Genetic Effects	x	x	x	x*	x
3. Disposal: Estimated Number of Cancer Incidences and Genetic Effects	x	x			
4. Treatment and Disposal (LLMW & LLW) or Treatment (TRUW): MEI Probability of Cancer Fatality	x	x	x		
5. Treatment and Disposal (LLMW & LLW) or Treatment (TRUW): MEI Probability of Cancer Incidences and Genetic Effects	x	x	x		
6. Treatment and Disposal (LLMW) or Treatment (TRUW, HW): Noncancer Health Risk from Chemical Exposure	x		x	x	
7. Emissions in tons per year of criteria pollutants	x	x	x	x	x
8. Percent standard/guideline of criteria pollutants	x	x	x	x	x
9. Percent standard/guideline for hazardous air pollutants and toxic air pollutants	x	x	x	x	x
10. Impacts on Water Resources Due to Increased Water Use	x	x	x	x	x
11. Radionuclide Concentration in Ground Water (Percent of Comparison Criteria) for Disposal (Contact and Remote Handled)	x	x			
12. Percent of Drinking Water Standards for Hazardous Constituents in Groundwater from Disposal (Contact and Remote Handled)	x				
13. Socioeconomics Impacts for Treatment and Disposal	x	x	x	x	x
14. Infrastructure Impacts for Treatment and Disposal	x	x	x	x	x
15. Cost	x	x	x	x	x

* Cancer incidences only.

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1.2 General Description of Table Formats

Sections 2 through 18 present the impacts of managing radioactive and hazardous wastes at each of the 17 major sites. Typical sections are subdivided by waste type, then by impact category. Impacts are presented in the form of tables for applicable impact categories and sites. Each of these tables provides a comparative analysis: displaying the magnitude of a given impact for each of the alternatives analyzed by this PEIS. [These alternatives are described in detail in Chapter 3 as well as in the specific waste-type chapters (see Table II.1-1).]

Impact tables are often further subdivided to present impacts associated with the treatment of waste versus those associated with the disposal of waste. A glossary is provided in Volume I for acronyms and selected terms appearing under these two major headings in the tables. Also in Volume I, Chapter 5 provides a detailed explanation of each of the 14 impact categories.

The site tables that present information for LLMW and LLW include two columns, one labeled with a T for Treatment and the other labeled with a D for Disposal. The information in these two columns represents, for the alternative concerned, the number of sites that are treating LLMW or LLW, and the number of sites disposing LLMW or LLW.

The site tables that present information for TRUW include three columns, one labeled CH Treat, the next labeled RH Treat, and the third labeled Treat STD (standard). The information in these three columns represents, for the alternative concerned, the number of sites treating contact-handled TRUW, the number of sites treating remote-handled TRUW, and the treatment standard that the sites are using (i.e., to meet current waste acceptance criteria at WIPP, or to reduce the potential for gas generation after disposal, or to meet land disposal restrictions under the Resource Conservation and Recovery Act).

The site tables that present information for HLW include a column that is labeled with an $ for Storage. The information in this column represents, for the alternative concerned, the number of sites storing HLW.

The site tables that present information for HW include a column that is labeled with a T for Treatment. The information in this column represents, for the alternative concerned, the number of sites treating HW.

1.3 Description of Health Risk Data Tables

Background

Health risk impacts can result from exposure to radiation and chemicals and from physical trauma associated with constructing and operating treatment, storage and/or disposal facilities or transporting waste. Health effects resulting from radiation exposure, whether from sources external or internal to the body, can affect either the exposed individual (known as "somatic" effects, such as cancer) or descendants of the exposed individual (known as "genetic" effects). Chapter 5 of Volume I provides additional information about the methodologies and assumptions used in the health risk analysis.

The WM PEIS evaluated potential health risks to a number of receptor populations and individuals including:

- the offsite population - those individuals living within an 80 km (50-mile) radius of the site, as well as along transportation routes;
- noninvolved workers population - the workers on DOE sites who are not involved directly in waste management activities;
- waste management workers population (or "waste management workers") - onsite employees working in an installation's waste management facilities, including workers involved in the waste management process, construction workers who build the waste management facilities, and those operating the trucks and trains that transport the waste;
- maximally exposed individuals (MEIs) for the offsite population - hypothetical individual in the offsite population who would receive the highest total lifetime multimedia dose;
- MEI for the noninvolved worker population - hypothetical individual in the noninvolved worker population who would receive the highest total lifetime multimedia dose;
- Farm family most exposed lifetime MEI - hypothetical individual in the most exposed lifetime of the farm family who would receive the highest dose from disposal of LLW and LLMW;
- a hypothetical intruder - an individual who would experience potential future risks from disposal of LLW and LLMW upon the loss of institutional control; and (the hypotnetical intruder risk not reported in Volume II Site Data Tables)
- A waste management worker - an individual who would experience potential noncancer effects, as estimated using the Exposure Index, following exposure to LLMW, TRUW, and HW.

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Population impacts focus on the *total number* of people in each receptor population who would experience adverse health impacts if a particular alternative is implemented. Individual impacts focus on the *probability* that the individual would experience an adverse health impact. Because the focus is on an individual, the risk is presented as a probability (e.g., one-in-one million) of that individual experiencing an adverse health impact, rather than the total number of impacts for a particular population.

The types of potential health impacts evaluated include:

- fatalities from physical hazards;
- latent cancer fatalities from radiation exposure;

- cancer incidences from radiation or chemical exposure;
- genetic effects from radiation exposure; and
- noncancer effects from chemical exposure (e.g., headaches, nasal irritation, liver or kidney toxicity, neurotoxicity, immunotoxicity, and reproductive and developmental toxicity).

The WM PEIS did not estimate the incidence of nonfatal cancers resulting from exposure to direct radiation or radionuclides. However, the number of nonfatal cancers can be derived from the total cancer incidence values by subtracting the estimated number of fatal cancer cases. Note that both the total cancer incidence and the nonfatal cancer incidence values are overestimated by a factor of about two because the estimates contain a relatively large component of skin cancers. The International Commission on Radiological Protection (ICRP) dose conversion factor (see "Interpreting the Health Risk Tables") used in the WM PEIS to estimate total cancer incidence includes incidences of skin cancer. However, the internal exposure pathways evaluated in the WM PEIS (i.e., inhalation or ingestion of radionuclides) are not likely to induce large numbers of skin cancer cases.

Data in the risk tables are presented in scientific notation; see Table II.1–4 for an explanation of this format.

Table II.1–4. Scientific Notation and "E" Notation

Scientific notation is used in the WM PEIS to express numbers that are so large or so small that they can be difficult to read or write. Scientific notation is based on the use of positive and negative powers (or exponents) of 10. A number written in scientific notation is expressed as the product of a number between 1 and 10 times a positive or negative power of 10. Some positive and negative powers of 10 include:

Positive Powers of 10	*Negative Powers of 10*
$10^1 = 10 \times 1 = 10$	$10^{-1} = 1/10 = 0.1$
$10^2 = 10 \times 10 = 100$	$10^{-2} = 1/100 = 0.01$
and so on, therefore,	*and so on, therefore,*
$10^6 = 1{,}000{,}000$ *(or 1 million)*	$10^{-6} = 0.000001$ *(or 1 in 1 million)*

A power of 10 is also commonly expressed as "E," where "E" means "x 10." For example, 3×10^5 can also be written as 3E5, and 3×10^{-5} is equivalent to 3E-5. Therefore, 3E5=300,000 and 3E-5=0.00003.

The health risk data in this volume use "E" notation with negative exponents. An important value for relative comparison of health risk probability estimates is the number "1 in 1 million." This value appears in the data tables as "1E-6." It can also be expressed as 1×10^{-6}, and is equivalent to 0.000001, or 1/1,000,000.

Tables II.1–5 and II.1–6 provide indices for a the health risk information contained in the Volume II Site Data Tables. Interpreting the results of the health risk analyses involves consideration of both uncertainties and appropriate standards. See Chapter 5 of Volume I for a further discussion of these issues.

The Volume II Site Data Tables are organized by waste type. Table II.1–5 indicates the health risk endpoint/population receptor combinations that were evaluated for each waste type. Table II.1–6 represents similar information for individual receptors.

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Table II.1-5. Crosswalk of Health Risk Information for Reporter Populations Contained in Volume II Site Data Tables

Receptors	Health Risk Endpoints				
	Number of Radiation Cancer Fatalities	Number of Physical Trauma Fatalities	Number of Radiation Cancer Incidences	Number of Chemical Cancer Incidences	Number of Radiation Genetic Effects
Offsite Population	LLMW, LLW, TRUW	NA	LLMW, LLW, TRUW	LLMW, TRUW, HW	LLMW, LLW, TRUW
Noninvolved Workers	LLMW, LLW, TRUW	NA	LLMW, LLW, TRUW	LLMW, TRUW, HW	LLMW, LLW, TRUW
WM Workers	LLMW, LLW, TRUW, HLW	LLMW, LLW, TRUW, HLW, HW	LLMW, LLW, TRUW, HLW	LLMW, TRUW, HW	LLMW, LLW, TRUW, HLW

NA = Not applicable.

Table II.1-6. Crosswalk of Health Risk Information for Reporter Individuals Contained in Volume II Site Data Tables

Receptors*	Health Risk Endpoints				
	Radiation Cancer Fatality Probability	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Noncancer Effects (Hazard Index/ Exposure Index)
Offsite MEI	LLMW, LLW, TRUW	LLMW, LLW, TRUW	LLMW, TRUW, HW	LLMW, LLW, TRUW	LLMW, TRUW, HW
Noninvolved Worker MEI	LLMW, LLW, TRUW	LLMW, LLW, TRUW	LLMW, TRUW, HW	LLMW, LLW, TRUW	LLMW, TRUW, HW
WM Worker	NA	NA	NA	NA	LLMW, TRUW, HW
Hypothetical Farm Family MEI (most exposed lifetime)	LLMW, LLW	LLMW, LLW	LLMW	LLMW, LLW	LLMW

*Volume II risk tables do not contain results for the Hypothetical Intruder. See Appendix D for results for this receptor (LLMW and LLW only).

NA = Not applicable.

Table II.1-7 provides a summary of the exposure pathways evaluated for treatment, storage and disposal activities.

Table II.1-7. Exposure Pathways for Treatment, Storage, Transportation, and Disposal Activities

Waste Processing Phase	Pathway	Potentially Exposed Populations and Individuals
Treatment • Routine emissions	Atmospheric • Inhalation • Ingestion of crops and animals Direct Radiation	• Public within 50-mile radius • Onsite employees, evenly distributed within site borders (atmospheric only) • Onsite MEI (atmospheric only) • Offsite MEI (atmospheric only) • Waste management worker (inhalation and direct radiation only)
Storage • Routine emissions	Atmospheric • Inhalation • Ingestion of crops and animals Direct Radiation	• Public within 50-mile radius • Onsite employees, evenly distributed within site borders (atmospheric only) • Onsite MEI (atmospheric only) • Offsite MEI (atmospheric only) • Waste management worker (inhalation and direct radiation only)
Disposal • Routine emissions	Atmospheric • Inhalation Groundwater • Ingestion of drinking water • Irrigation of crops • Watering of livestock • Bathing Direct Radiation	• Waste management worker (atmospheric and direct radiation during disposal operations only) • Hypothetical farm family (ingestion of groundwater and food) • Hypothetical intruder (ingestion of crops and soil, inhalation of soil particulates, direct radiation)

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Interpreting the Health Risk Tables

This section provides some examples of the types of health risk tables found in this volume and describes how the data should be interpreted using the following series of tables for management of LLMW. Table II.1-8 presents information on the estimated number of fatalities resulting from treatment and disposal of LLMW for several receptor groups (i.e., Waste Management Workers, Offsite Population, Noninvolved Workers). Since each of these receptor groups contains multiple individuals, the estimated health risks are presented as the number of potential adverse health effects in each population. For example, under the "Treatment" heading, "Waste Management Workers" are the first receptor group listed. Under the "Waste Management Worker" heading, the column entitled "Radiation Exposure" contains the estimated number of latent cancer fatalities resulting from radiation exposure of waste management workers.

Table II-1.8 LLMW - Treatment and Disposal: Esitmated Number of Fatlities

LLMW Alternatives	Number of Sites		Treatment				Disposal	
			WM Worker		Offsite Population	Noninvolved Workers	WM Worker	
	T	D	Radiation Exposure	Physical Hazards	Radiation Exposure	Radiation Exposure	Radiation Exposure	Physical Hazards
No Action	3	-	4.4E-02	9.1E-02	2.6E-02	1.2E-04	- -	- -
Decentralized	37	16	1.9E-02	2.1E-01	1.3E-03	6.1E-06	1.24E-02	3.91E-02
Regionalized-1	11	12	1.0E-02	4.7E-02	6.0E-06	2.8E-08	- -	- -
Regionalized-2	7	6	1.0E-02	4.7E-02	6.0E-06	2.8E-08	- -	- -
Regionalized-3	7	1	1.0E-02	4.7E-02	6.0E-06	2.8E-08	- -	- -
Regionalized-4	4	6	1.0E-02	4.7E-02	6.0E-06	2.8E-08	- -	- -
Centralized	1	1	1.0E-02	4.7E-02	6.0E-06	2.8E-08	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this Alternative.

Waste management workers are assumed to be exposed to direct radiation during the 10-year operational lifetime of the treatment facility. However, radiation-induced latent cancer fatalities are estimated over the entire 70-year lifetime of the workers since a fatal cancer could occur throughout the lifetime of exposed workers. The numbers in this column are all less than one, ranging from 0.01 to 0.044. These values mean that less than one worker cancer fatality is estimated to result from direct radiation exposure received during treatment of LLMW under each of the waste management alternatives at this site. The data listed under the column headings "Offsite Population Radiation Exposure" and "Noninvolved Workers Radiation Exposure", as well as the column labeled "Waste Management Workers Radiation Exposure" under the "Disposal" heading can be interpreted in a similar manner.

The columns labeled "Physical Hazards" for waste management workers list the estimated numbers of worker fatalities resulting from physical trauma encountered during construction and operation of the treatment and disposal facilities. These values were estimated using an assumed 10-year period for facility construction followed by a 10-year period of operation.

Similar types of population level impact tables present estimates of the number of cancer incidences and genetic effects in various receptor groups, as shown in Table II.1–9 below.

Table II-1.9 LLMW - Treatment: Estimated Number of Cancer Inciderecs and Genetic Effects

LLMW Alternatives	Number of Sites		Offsite Population				Noninvolved Workers				WM Worker			
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects
No Action	3	-	5.2E+01	8.8E-02	3.8E-04	5.2E-03	2.5E-01	4.2E-04	7.9E-06	2.5E-05	1.1E+02	1.6E-01	2.2E-06	6.7E-03
Decentralized	37	16	2.6E+00	4.5E-03	1.8E-05	2.6E-04	1.2E-02	2.1E-05	3.7E-07	1.2E-06	4.8E+01	6.7E-02	2.2E-04	2.9E-03
Regionalized-1	11	12	1.2E-02	2.0E-05	1.4E-07	1.2E-06	5.6E-05	9.6E-08	3.0E-09	5.6E-09	2.6E+01	3.6E-02	1.1E-06	1.6E-03
Regionalized-2	7	6	1.2E-02	2.0E-05	1.4E-07	1.2E-06	5.6E-05	9.6E-08	3.0E-09	5.6E-09	2.6E+01	3.6E-02	1.1E-06	1.6E-03
Regionalized-3	7	1	1.2E-02	2.0E-05	1.4E-07	1.2E-06	5.6E-05	9.6E-08	3.0E-09	5.6E-09	2.6E+01	3.6E-02	1.1E-06	1.6E-03
Regionalized-4	4	6	1.2E-02	2.0E-05	1.4E-07	1.2E-06	5.6E-05	9.6E-08	3.0E-09	5.6E-09	2.6E+01	3.6E-02	1.1E-06	1.6E-03
Centralized	1	1	1.2E-02	2.0E-05	1.4E-07	1.2E-06	5.6E-05	9.6E-08	3.0E-09	5.6E-09	2.6E+01	3.6E-02	1.1E-06	1.6E-03

Notes:
T = Treatment
D = Disposal

This table presents estimates of the radiation doses received by the receptor groups as well as the numbers of cancer incidences and genetic effects. Note that radiation dose estimates for populations are presented in the tables in units of "person-rem", which is the sum of the radiation dose, measured in units of rems, received by each individual in the receptor group. Numbers of adverse health effects are estimated based on the application of risk factors to the dose estimates produced by the models used in the analysis. The risk factors used, listed below, are from the International Commission on Radiological Protection (ICRP) published in 1990:

Endpoint	Risk Factors for Public Receptors	Risk Factors for Workers
Cancer incidence	0.0017/rem-lifetime	0.0014/rem-lifetime
Cancer fatality	0.0005/rem-lifetime	0.0004/rem-lifetime
Genetic effects	0.0001/rem-lifetime	0.00006/rem-lifetime

For example, for the "Offsite Population," under the No Action Alternative, the estimated dose is 52 person-rem. Multiplying this value by the cancer incidence risk factor for public receptors of 0.0017 cancers/rem-lifetime listed above produces the estimate of 0.088 cancers listed in the table. For "Waste Management Workers," under the Decentralized Alternative, the estimated dose is 48 person-rem. Multiplying this dose by the genetic effects risk factor for workers of 0.00006 genetic effects/rem-lifetime listed above produces the estimate of 2.9E-03 listed in the table. Similar calculations can be made using the dose estimates and the appropriate cancer fatality risk factor to obtain the radiation fatality values listed in Table II.1-8. Note that slight differences in values are due to rounding and that the risk factors for public receptors were used to calculate risks for the "Noninvolved Workers". Also note that the risk factors presented above are used only in converting radiation doses to estimates of adverse health effects; the chemical cancer incidence values listed in the table are calculated in a different manner (see Chapter 5 of Volume I and Appendix D for additional information).

The WM PEIS also evaluated health risk impacts to hypothetical individuals estimated to experience the maximum exposure (i.e., the maximally exposed individual, or MEI) within the offsite population and noninvolved worker receptor groups (for treatment) and the most exposed lifetime of the farm family (for disposal). Table II.1-10 is an example of an MEI table that presents data on cancer fatality probabilities resulting from treatment and disposal. Since the MEI receptors are by definition single individuals, the risk results are *probabilities* that the MEI within each receptor population would experience an adverse health impact. Chapter 5 of Volume I contains a discussion of risk benchmarks that may be helpful in interpreting the risk probability estimates. Note that the radiation doses for MEIs are presented in units of "rem". Similar tables present information on probabilities of cancer incidence and genetic effects.

Table II.1-10 is an example of an MEI table that presents data on cancer fatality probabilities resulting from treatment and disposal.

Table II-1.10 LLMW - Treatment and Disposal: MEI Probability of Cancer Facility

LLMW Alternatives	Number of Sites		Treatment		Disposal
	T	D	Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability	Hypothetical Farm Family Most Exposed Lifetime MEI Cancer Fatality Probability
No Action	3	-	1.4E-07	1.2E-07	- -
Decentralized	37	16	7.2E-09	6.1E-09	8.5E-05
Regionalized-1	11	12	3.3E-11	2.8E-11	- -
Regionalized-2	7	6	3.3E-11	2.8E-11	- -
Regionalized-3	7	1	3.3E-11	2.8E-11	- -
Regionalized-4	4	6	3.3E-11	2.8E-11	- -
Centralized	1	1	3.3E-11	2.8E-11	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered under the Alternative

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Table II.1-10 is an example of a table that presents noncancer health risk data. Noncancer health risk estimates are for single individuals and result from exposure to chemicals that are not believed to cause cancer. The data presented in the table are index values rather than probabilities. Both the Hazard Index (for the "Offsite MEI," "Noninvolved Worker MEI," and the "Hypothetical Farm Family Most Exposed Lifetime MEI") and the Exposure Index (for the waste management worker) are ratios of concentrations. They compare the estimated exposure concentrations of chemicals to concentrations thought to be protective of health (i.e., concentrations that should not produce adverse health effects upon prolonged exposure). If the index or ratio values exceed 1, there is a potential for adverse noncancer health effects. Values below 1 indicate that adverse noncancer health effects are not of concern. Since the values in Table II.1-11 above are much less than 1, these receptors are not at risk for adverse noncancer health effects under the waste management alternatives evaluated at this site.

Table II - 1.11 LLMW - Noncaner Health Risk for Chemical Exposure

LLMW Alternatives	Number of Sites		Treatment			Disposal
	T	D	Offsite MEI Hazard Index	Noninvolved Worker MEI Hazard Index	WM Worker Exposure Index	Hypothetical Farm Family Most Exposed Lifetime Hazard Index
No Action	3	-	2.7E-06	8.1E-06	4.7E-06	- -
Decentralized	37	16	1.8E-07	5.4E-07	6.0E-04	5.5E-01
Regionalized-1	11	12	1.2E-09	3.5E-09	4.7E-06	- -
Regionalized-2	7	6	1.2E-09	3.5E-09	4.7E-06	- -
Regionalized-3	7	1	1.2E-09	3.5E-09	4.7E-06	- -
Regionalized-4	4	6	1.2E-09	3.5E-09	4.7E-06	- -
Centralized	1	1	1.2E-09	3.5E-09	4.7E-06	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this alternative.
MEI = Maximally Exposed Individual
Hazard Index = Sum of hazard quotient values for all noncarcinogenic chemicals. The hazard quotient is the chemical-specific ratio of media exposure concentrations to concentrations believed to have no appreciable adverse effects.
Exposure Index = Ratio of Exposure concentration to chemical-specific occupational threshold limits.

1.4 Description of Air Quality Data Tables

DOE evaluated air quality impacts at each proposed waste management site based on estimated increases in emissions of the six criteria air pollutants, hazardous air pollutants (which include radionuclides), and toxic air pollutants. Pollutant emission estimates were made for the construction and operations and maintenance (O&M) activities of waste management facilities.

The Clean Air Act (42 USC 7401 et seq.) regulates emissions of air pollutants. In those areas where air pollution standards are not met (known as "nonattainment areas"), activities that introduce new sources of emissions from both "stationary" (e.g., treatment, storage and/or disposal facilities) and mobile (e.g., vehicles and construction equipment) sources are regulated under the "General Conformity Rule." In this rule, EPA has established limits for each criteria pollutant for nonattainment areas. An entity which seeks to engage in an activity that will result in emissions equal to or greater than those limits in a nonattainment areas must first obtain a permit.

In "attainment areas" (where air pollution standards are met), only new sources of emissions from stationary sources are regulated. In these areas, regulations for the Prevention of Significant Deterioration (PSD) of ambient air quality apply. Allowable emission increases are known as PSD increments. A permit is required for a new stationary source that equals or exceeds the allowable increase. A permit is not required for criteria pollutant emissions from mobile sources.

Major Types of Air Pollutants

Criteria Air Pollutants: carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), lead (Pb), ozone (O_3), and particulate matter less than 10 microns in diameter (PM_{10})

Hazardous Air Pollutants: 189 hazardous substances (including radionuclides) whose emissions are regulated by the Clean Air Act

Toxic Air Pollutants: Other toxic compounds regulated by EPA and state or local governments

Criteria air pollutants can be emitted from construction equipment and from vehicles that workers use to drive to the construction site. Both are considered to be "mobile sources." Criteria air pollutants are also emitted during operation and maintenance of waste management facilities (stationary sources) and by vehicles that are driven by workers to the facility or used to transport waste (mobile sources). DOE evaluated air quality impacts for these pollutants at each site by comparing estimated increases in tons per year to the allowable emission limits (General conformity Rules in nonattainment areas or PSD increments in attainment areas). Estimated concentrations resulting from criteria air pollutant emissions from facilities were also compared to the National Ambient Air Quality Standards (NAQS) (40 CFR 50).

Thermal destruction of waste will also result in emission of small quantities of hazardous and toxic air pollutants. Hazardous air pollutants, other than radionuclides, and toxic air pollutants were evaluated by comparing estimated ambient concentrations to EPA and State guidelines. Radionuclides from air emissions were evaluated by comparing the annual radiation dose to a maximally exposed individual (MEI) to the National

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Emissions Standard for Hazardous Air Pollutants-10 millirems per year (mrem/yr) (40 CFR 61).

Volume II contains three air quality tables for each site, for each waste type. The first table is similar to example Table II.1-12 provided below, and shows the emissions of criteria air pollutants in tons per year for construction and operations. For construction, the table includes total emissions, and in parenthesis, emissions from construction equipment exhaust and worker vehicles. For operations, the table includes total emissions, and in parenthesis, emissions from stationary-sources (waste management facilities), and mobile-sources (worker and waste shipment vehicles).

Table II.1-12. Emissions in Tons per Year of Criteria Air Pollutants

LLMW Alternatives	**Number of Sites**		**Construction Emissions in Tons/Year (1)**						**Operations & Maintenance Emissions in Tons/Year (2)**					
	T	**D**	**CO**	**NO2**	**Pb**	**PM10**	**SO2**	**VOC**	**CO**	**NO2**	**Pb**	**PM10**	**SO2**	**VOC**
No Action	3	-	12 (1/11)	5 (3/2)	0	0	0	2 (1/1)	9 (1/8)	4 (2/2)	0	0	0	1 (0/1)
Decentralized	37	16	58 (5/53)	24 (13/11)	0	1 (1/0)	1 (1/0)	7 (1/6)	50 (0/50)	15 (5/10)	0	3 (3/0)	0	6 (0/6)
Regionalized	11	12	70 (5/65)	25 (12/13)	0	1 (1/0)	1 (1/0)	9 (1/8)	52 (1/51)	15 (5/10)	0	4 (4/0)	0	6 (0/6)
Centralized	1	1	93 (25/68)	99 (44/54)	0	6 (5/1)	6 (6/0)	38 (6/32)	93 (3/90)	75 (33/42)	0	23 (22/1)	2 (2/0)	25 (0/25)

Notes: T = Treatment D = Disposal
Emissions <1 tons per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions / worker vehicles emission).
(2) Values = total emissions (stationary-source emissions / mobile-source emissions).

The second table is similar to example Table II. 1-13 provided below, and shows the percentages of applicable tons per year standards for emissions listed in the first table. The second table also shows the percentages of applicable National Ambient Air Quality Standards (NAAQSs) for criteria air pollutant concentrations due to releases from incineration. Double dashes are used to show where information is not applicable or not available.

Table II.1–13. Percent of Standard/Guideline for Criteria Air Pollutants

LLMW Alternatives	Number of Sites		Construction						Operations & Maintenance											
			Percent of Tons/Year General Conformity Rule (1)						Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC	CO(4)	NO2(4)	Pb(4)	PM10 (5)	SO2(4)	VOC(4)	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	- -	- -	- -	0	- -	- -	1	4	0	5 (1/4)	0	0	- -	- -	- -	- -	- -	- -
Decentralized	37	16	- -	- -	- -	3(2/1)	- -	- -	1	12	0	4 (1/3)	1	0	0	0	0	0	0	0
Regionalized	11	12	- -	- -	- -	3(2/1)	- -	- -	1	13	0	10 (2/8)	1	0	0	0	0	0	0	0
Centralized	1	1	- -	- -	- -	18(11/7)	- -	- -	3	82	1	25 (5/20)	5	1	0	0	0	0	2	0

Notes: T = Treatment D = Disposal
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) GCR de minimis levels are applied, since PSD regulations are not applicable to construction activities. Values = % of total emissions (% of equipment emissions / % of worker vehicle emissions).
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions for the No Action and minimum treatment (no incineration) alternatives are assumed to be negligible.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.
(5) Nonattainment area for this pollutant, therefore GCR de minimis levels are applied. Values = % of total emissions (% of stationary-source emissions / % of mobile-source emissions).

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The final table is similar to example Table II. 1-14 provided below, and shows the percentages of the applicable concentration standards for hazardous and toxic air pollutants. The percentages of the 10 mrem per year total dose standard for the air pathway under the National Emissions Standards for Hazardous Air Pollutants (NESHAP) are also included in this table.

Table II.1-14. Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

LLMW Alternatives	Number of Sites		Operations & Maintenance						
	T	D	Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form
No Action	3	-	0	0	0	- -	- -	0	- -
Decentralized	37	16	0	0	0	- -	- -	0	- -
Regionalized	11	12	0	0	0	- -	- -	0	- -
Centralized	1	1	1	0	0	- -	- -	0	- -

Notes: T = Treatment D = Disposal

1.5 Description of Water Resources Data Tables

DOE evaluated the effects on water availability from building and operating treatment, storage and disposal facilities. DOE also examined the effects of migration of radionuclides and chemicals from LLMW and LLW disposal facilities on groundwater quality.

Impacts on surface water and groundwater availability were assessed by comparing current water use rates from municipal, surface water, or groundwater sources to projected requirements for construction or operation of waste management facilities. In addition, impacts on surface water were further assessed by examining the effect of potential withdrawals from and discharges to the major offsite water body at a given site. Volume II tables identify projected water usage under any alternative.

In addition, DOE evaluated the impacts to groundwater quality caused by the migration of radionuclides and chemicals that leach from LLMW and LLW disposal facilities over time. DOE calculated concentrations of radionuclides and hazardous components at a hypothetical well located 300 meters from the center of the disposal facility, and compared these to DOE or EPA drinking water standards. For radionuclides, the allowable drinking water concentrations equate to a 4 mrem per year effective dose equivalent.

The drinking water standards are used as comparison criteria for groundwater quality. Although they are not enforceable standards, they are often used as goals for contaminated site cleanup actions under the Comprehensive Environmental Response, Compensation and Liability Act. DOE and EPA established these criteria to protect human health, therefore groundwater concentrations of radionuclides and chemicals at or below these levels are considered to be acceptable.

The concentrations of hazardous constituents in the groundwater from disposal of LLMW are largely due to assumptions on the routing of wastes through the treatment system. As shown in the LLMW flow diagram in Chapter 6 (Figure 6.2-1), some wastes containing solvents were assumed to bypass the thermal treatment processes. The solvents in these wastes were not destroyed, but instead, ended up in the disposal facility. Some of these wastes contain solvents in large enough concentrations to cause drinking water standards to be exceeded when disposed. In practice, LLMW to be disposed would meet EPA standards for treatment and disposal, and therefore should not produce major impacts to groundwater quality. Therefore, although the absolute values of the results for hazardous constituent contamination in groundwater are higher than would result from wastes treated to EPA standards, the results are still useful in showing the *relative* suitability of the sites. Even with the conservative assumptions used in the WM PEIS, drinking water standards were not exceeded at some sites. This may indicate that these sites are better for LLMW disposal than other sites.

The performance of disposal facilities at a specific site would be evaluated in greater detail in DOE's Performance Assessment process under DOE Order 5820.2A. This process would help to ensure that all regulatory requirements are met and significant contamination of groundwater would not occur.

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Volume II contains two types of water resources tables for each site. The first type of table presents the water use in gallons per day for construction and operations, along with the percent of current use and percent of streamflow for the water use. This table also provides the percent of streamflow for wastewater discharges, assuming all water used by the facility is discharged. The first type of table is provided for all five waste types. The second type of table provides results of the analysis of impacts to groundwater quality from the disposal of LLMW and LLW. Concentrations of radionuclides are shown as a percentage of drinking water standards. In addition, tables that show the percent of drinking water standards for hazardous constituents are provided for LLMW. Tables II.1-15 and II.1-16 are examples.

Table II.1-15 Impacts on Water Resources due to Increased Water Use

LLMW Alternatives	T	D	Construction			Operations			
			Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action	3	-	9920	0.1	0.00	11491	0.1	0.00	0.00
Decentralized	37	16	24085	0.1	0.00	14992	0.1	0.00	0.00
Regionalized	11	12	24085	0.1	0.00	14992	0.1	0.00	0.00
Centralized	1	1	7888	0.0	0.00	4686	0.0	0.00	0.00

Notes: T = Treatment D = Disposal
Water supplied by surface water in the Clinch River. Current water use = 18,300,000 gallons/day.
Wastewater discharged to the Clinch River.
Average flow rate of the Clinch River = 3,003,000,000 gallons/day.
- - = Not considered for this site.

Table II.1-16 RH-LLMW - Radionuclide Concentrations in Groundwater (Percent of Drinking Water Standard) for Disposal

LLMW Alternatives	T	D *	Ac 225	Ac 227	Am 241	Am 242	Am 243	C 14	Cs 135	Cs 137	Cm 242	Cm 244	Cm 245	I 129	Pb 210	Np 237	Ni 59	Ni 63	Pd 107	Pu 238	Pu 239	Pu 240	Pu 241
No Action	3	-	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Decentralized	37	16	0	0	0	0	0	0	0	0	0	0	0	0	0	30	0	0	0	0	1000	600	0
Regionalized	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	30	0	0	0	0	1000	600	0
Centralized	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	30	0	0	0	0	1000	600	0

Notes: T = Treatment D = Disposal
* = In addition to the CH-LLMW disposal sites indicated below, disposal of RH-LLMW occurs at four sites (Hanford, INEL, ORR and SRS) for all alternatives except No Action.
- - = No disposal at this site for this alternative.

1.6 Description of Socioeconomic Impacts Data Tables

DOE estimated the effects of expenditures for waste management on the local and national economies. Local economic effects were based on direct expenditures at each site for construction, operation and maintenance, and decontamination of treatment and disposal facilities. The socioeconomic region-of-influence (ROI), where local effects were evaluated, consists essentially of the counties of residence of site employees. The local economy at each site was represented by employment, personal income, and industry data for the ROI counties. Transportation expenditures were not considered in the site level analysis.

Local economic effects were estimated on an annual basis. The impacts resulting from the construction and operation phase expenditures were combined to estimate total project effects at each site. For all alternatives, the construction phase at any site was assumed to take 4 years; the operations phase was assumed to take 15 years (a 10-year operations and maintenance period and a 5-year decontamination period). Five years was added to the operations phase to account for the continued effects on employment and income after each project phase ended. Job and personal income increases are shown for each site in the Volume II site tables.

In addition, proposed waste management activities could affect the social environment by increasing population. Potential population changes in the ROI were estimated using the direct labor requirement to calculate potential worker in-migration. These estimates were used to evaluate the likelihood that population changes would cause social effects, such as changes in community size and diversity, and effects on the provision of necessary social services.

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Volume II contains one socioeconomic impacts table for each site, for each waste type. The table is similar to example Table II. 1-17 presented below, and presents information that is used to assess the impacts of the waste management alternatives on the local economies and social structure. The cost required for the waste management alternatives is provided since this is the factor that drives most of the socioeconomic impacts. The annual number of jobs and the percent annual change in the number of jobs in the ROI are supplied as an indicator of impacts to employment in the region. The annual income attributable to the waste management action, and the percent change in the annual income in the ROI are presented as a measure of economic affects. The percent change in the local population is provided as a measure of the potential for changes in community size and diversity that may produce adverse social affects.

Table II.1-17. Socioeconomic Impacts for Treatment and Disposal

LLMW Alternatives	Number of Sites		Effect of Implementation of Alternatives					
			Cost (Millions) (1)	Jobs		Income		% ROI Population Increase (2)
	T	D		Annual Jobs	% Annual Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	
No Action	3	-	230	187	0.09	2.0	0.03	0.05
Decentralized	37	16	759	772	0.36	8.2	0.13	0.17
Regionalized	11	12	828	842	0.39	9.0	0.14	0.19
Centralized	1	1	3507	3567	1.66	38.1	0.58	0.76

Notes: T = Treatment D = Disposal
(1) In current 1990 dollars.
(2) Compared to 1990 baseline.

Infrastructure Impacts

DOE examined the impacts of the waste management alternatives on land use by comparing the acreage required for new construction treatment and disposal facilities to the acreage either designated for waste operations or suitable for development. Suitable land is the total site acreage, minus the acreage required for known cultural resource areas, sensitive habitats (including wetlands and wildlife management areas), prohibitive topographic features, and surface waters.

In addition, DOE evaluated the impacts on site infrastructure by comparing existing onsite capacities to requirements for water, wastewater treatment, and power. Water and power were evaluated for both construction and operations; wastewater treatment was evaluated only for operations because wastewater from construction activities was assumed to be negligible. Where onsite maximum capacity information was unavailable, the proposed requirement was evaluated as a percentage of current use. Increased site employment was used as an indicator of increased demand on the community infrastructure.

Volume II contains one infrastructure table for each site, for each waste type. These tables provide information on land use, water supply systems, wastewater treatment systems, electrical power supply systems, and site employment. The table shows the acres required for the waste management action and the percent of designated or suitable land areas that is used; the water, wastewater and power demands, and the corresponding percent of current capacity that is required; and construction employment and the percent of current site employment that this construction employment represents. Table II- 1.18 provides an example of a Infrasture Impact Table.

Table II - 1.18 LLMW - Infrastructure Impacts for Treatment and Disposal

LLMW Alternatives	Number of Sites		Effect of Implementation of Alternatives									
			Land Use		Water		Waste Water		Power		Employment (FTE)	
	T	D	Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	% Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Peak Construction Employment	% of Current Employment (1)
No Action	3	-	11.2	0.94	29232	1.62	2066	0.08	4.32	18.76	111	2
Decentralized	37	16	7.5	0.63	11457	0.64	5603	0.22	0.97	4.24	430	10
Regionalized-1	11	12	0.3	0.02	757	0.04	757	0.03	0.11	0.49	39	1
Regionalized-2	7	6	0.3	0.02	757	0.04	757	0.03	0.11	0.49	39	1
Regionalized-3	7	1	0.3	0.02	757	0.04	757	0.03	0.11	0.49	39	1
Regionalized-4	4	6	0.3	0.02	757	0.04	757	0.03	0.11	0.49	39	1
Centralized	1	1	0.3	0.02	757	0.04	757	0.03	0.11	0.49	39	1

Notes:
T = Treatment
D = Disposal
GPD = Gallons per Day
MW = Megawatts
(1) Based on 1991 Site Employment

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1.7 Description of Cost Data Tables

DOE estimated costs for building and operating treatment storage and disposal facilities, and for transportation, from both a life-cycle and process perspective, using 1994 dollars.

Life-Cycle Costs: DOE evaluated facility costs for four phases representing the life-cycle of the facilities and their operations: pre-operations, construction, operations and maintenance, and decontamination and decommissioning.

- Costs for pre-operation activities consist of technology and site adaptation, including bench tests and demonstrations; statutory and regulatory permitting; plant startup and cold run costs; and related conceptual design, safety analysis, project management, and contingencies.

- Facility construction costs consist of building construction, equipment purchase and installation, contractor overhead, and related design; construction management; project management; and contingencies.

- Operations and maintenance costs consist of annual operations labor and material, maintenance labor and equipment, utilities, contractor supervision and overhead, and related project management and contingencies.

- Decontamination and decommissioning costs consist of facility decontamination and demolition, environmental closure, post-closure, and monitoring activities.

Process Costs: DOE also analyzed costs based on treatment, storage, disposal, and transportation activities.

- Treatment costs include costs to build and operate treatment facilities (such as wastewater treatment or incineration) and common support facilities (such as maintenance and certification/shipping facilities).

- Storage capacity, for the purpose of the WM PEIS analysis, was assumed to be sufficient for a number of alternatives as discussed in Chapters 6-10. DOE estimated the costs to build and operate sufficient storage capacity.

- Disposal costs include costs to build and operate front-end administration and receiving facilities for disposal as well as the actual disposal units.

- Transportation costs include the costs associated with the physical movement of the waste from one site to another, for either treatment or disposal. Transportation costs are evaluated for both truck transportation and rail shipments, and are displayed as total transportation costs for each alternative. They are not presented in the site data tables.

Volume II contains one table as shown in Table II.1-19 that displays costs for each of the above components. The table first displays total costs as the sum of facility costs (site cost tables exclude transportation). The next columns display total "facility" costs by life-cycle component, followed by columns that display total "facility" costs by process (eg., treatment, storage, disposal - as applicable).

Table II.1-19 - LLMW - Cost

LLMW Alternatives	Number of Sites		Total Cost (Millions)	Life-Cycle Costs				Functional Area Costs		
	T	D		Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Treatment (Millions)	Storage (Millions)	Disposal (Millions)
No Action	3	-	207	16	53	125	14	88	118	0
Decentralized	37	16	739	72	207	431	29	431	0	308
Regionalized 1	11	12	96	8	18	61	10	96	0	0
Regionalized 2	7	6	96	8	18	61	10	96	0	0
Regionalized 3	7	1	96	8	18	61	10	96	0	0
Regionalized 4	4	6	96	8	18	61	10	96	0	0
Centralized	1	1	96	8	18	61	10	96	0	0

Notes:
T = treatment
D = disposal
The Life -Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum of these may not reflect the true total cost.
(1) In constant 1994 dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

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2.0 Argonne National Laboratory-East (ANL-E)

ANL-E currently is custodian of significant volumes of LLMW, LLW, and TRUW. Each of the waste types is treated independently in the following sections.

2.1 ANL-E Low-Level Mixed Waste

The WM PEIS impact analysis at ANL-E was based on projected LLMW volumes of 8410 cubic meters. Updated data from ANL-E reduced the total inventory and 20 year projected generation of LLMW at ANL-E to 140 cubic meters; therefore, the WM PEIS impact results at ANL-E may be potentially overstated by as much as a factor of 60.

Impact Category

No.	Description	Table No.	Page No.
1.	ANL-E—LLMW—Treatment and Disposal: Estimated Number of Fatalities	II-2.1-1	2-2
2.	ANL-E—LLMW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects	II-2.1-2	2-3
3.	ANL-E—LLMW—Disposal: Estimated Number of Cancer Incidences	II-2.1-3	2-4
4.	ANL-E—LLMW—Treatment and Disposal: MEI Probability of Cancer Fatality	II-2.1-4	2-5
5.	ANL-E—LLMW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects	II-2.1-5	2-6
6.	ANL-E—LLMW—Treatment and Disposal: Noncancer Health Risk from Chemical Exposure	II-2.1-6	2-7
7.	ANL-E—LLMW—Emissions in Tons per Year of Criteria Air Pollutants	II-2.1-7	2-8
8.	ANL-E—LLMW—Percent of Standard/Guideline for Criteria Air Pollutants	II-2.1-8	2-9
9.	ANL-E—LLMW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-2.1-9	2-10
10.	ANL-E—LLMW—Impacts on Water Resources Due to Increased Water Use	II-2.1-10	2-11
11.	ANL-E—LLMW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal (Contact Handled)	II-2.1-11	2-12
12.	ANL-E—LLMW—Percent of Drinking Water Standards for Hazardous Constituents in Groundwater from Disposal (Contact Handled)	II-2.1-12	2-13
13.	ANL-E—LLMW—Socioeconomics Impacts for Treatment and Disposal	II-2.1-13	2-14
14.	ANL-E—LLMW—Infrastructure Impacts for Treatment and Disposal	II-2.1-14	2-15
15.	ANL-E—LLMW—Cost	II-2.1-15	2-16

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Table II-2.1-1. ANL-E—LLMW—Treatment and Disposal: Estimated Number of Fatalities

LLMW Alternatives	Number of Sites		Treatment				Disposal	
			WM Worker		Offsite Population	Noninvolved Workers	WM Worker	
	T	D	Radiation Exposure	Physical Hazards	Radiation Exposure	Radiation Exposure	Radiation Exposure	Physical Hazards
No Action	3	-	4.4E-02	9.1E-02	2.6E-02	1.2E-04	- -	- -
Decentralized	37	16	1.9E-02	2.1E-01	1.3E-03	6.1E-06	1.24E-02	3.91E-02
Regionalized-1	11	12	1.0E-02	4.7E-02	6.0E-06	2.8E-08	- -	- -
Regionalized-2	7	6	1.0E-02	4.7E-02	6.0E-06	2.8E-08	- -	- -
Regionalized-3	7	1	1.0E-02	4.7E-02	6.0E-06	2.8E-08	- -	- -
Regionalized-4	4	6	1.0E-02	4.7E-02	6.0E-06	2.8E-08	- -	- -
Centralized	1	1	1.0E-02	4.7E-02	6.0E-06	2.8E-08	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this Alternative.

Table II-2.1-2. ANL-E—LLMW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

LLMW Alternatives	Number of Sites		Offsite Population				Noninvolved Workers				WM Worker			
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects
No Action	3	-	5.2E+01	8.8E-02	3.8E-04	5.2E-03	2.5E-01	4.2E-04	7.9E-06	2.5E-05	1.1E+02	1.6E-01	2.2E-06	6.7E-03
Decentralized	37	16	2.6E+00	4.5E-03	1.8E-05	2.6E-04	1.2E-02	2.1E-05	3.7E-07	1.2E-06	4.8E+01	6.7E-02	2.2E-04	2.9E-03
Regionalized-1	11	12	1.2E-02	2.0E-05	1.4E-07	1.2E-06	5.6E-05	9.6E-08	3.0E-09	5.6E-09	2.6E+01	3.6E-02	1.1E-06	1.6E-03
Regionalized-2	7	6	1.2E-02	2.0E-05	1.4E-07	1.2E-06	5.6E-05	9.6E-08	3.0E-09	5.6E-09	2.6E+01	3.6E-02	1.1E-06	1.6E-03
Regionalized-3	7	1	1.2E-02	2.0E-05	1.4E-07	1.2E-06	5.6E-05	9.6E-08	3.0E-09	5.6E-09	2.6E+01	3.6E-02	1.1E-06	1.6E-03
Regionalized-4	4	6	1.2E-02	2.0E-05	1.4E-07	1.2E-06	5.6E-05	9.6E-08	3.0E-09	5.6E-09	2.6E+01	3.6E-02	1.1E-06	1.6E-03
Centralized	1	1	1.2E-02	2.0E-05	1.4E-07	1.2E-06	5.6E-05	9.6E-08	3.0E-09	5.6E-09	2.6E+01	3.6E-02	1.1E-06	1.6E-03

Notes:
T = Treatment
D = Disposal

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Table II-2.1-3. ANL-E—LLMW—Disposal: Estimated Number of Cancer Incidences

LLMW Alternatives	Number of Sites		WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	3	-	- -	- -	- -
Decentralized	37	16	3.1E+01	4.3E-02	1.9E-03
Regionalized-1	11	12	- -	- -	- -
Regionalized-2	7	6	- -	- -	- -
Regionalized-3	7	1	- -	- -	- -
Regionalized-4	4	6	- -	- -	- -
Centralized	1	1	- -	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this Alternative.

Table II-2.1-4. ANL-E—LLMW—Treatment and Disposal: MEI Probability of Cancer Fatality

LLMW Alternatives	Number of Sites		Treatment		Disposal
	T	D	Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability	Hypothetical Farm Family Most Exposed Lifetime MEI Cancer Fatality Probability
No Action	3	-	1.4E-07	1.2E-07	- -
Decentralized	37	16	7.2E-09	6.1E-09	8.5E-05
Regionalized-1	11	12	3.3E-11	2.8E-11	- -
Regionalized-2	7	6	3.3E-11	2.8E-11	- -
Regionalized-3	7	1	3.3E-11	2.8E-11	- -
Regionalized-4	4	6	3.3E-11	2.8E-11	- -
Centralized	1	1	3.3E-11	2.8E-11	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered under the Alternative

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Table II-2.1-5. ANL-E—LLMW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects

LLMW Alternatives	Number of Sites		Treatment								Disposal			
			Offsite Population MEI				Noninvolved Worker MEI				Most Exposed Farm Family Lifetime MEI			
	T	D	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability
No Action	3	-	2.8E-04	4.8E-07	2.4E-09	2.8E-08	2.5E-04	4.2E-07	7.1E-09	2.5E-08	- -	- -	- -	- -
Decentralized	37	16	1.4E-05	2.5E-08	1.1E-10	1.4E-09	1.2E-05	2.1E-08	3.4E-10	1.2E-09	1.7E-01	2.9E-04	2.4E-04	1.7E-05
Regionalized-1	11	12	6.6E-08	1.1E-10	9.1E-13	6.6E-12	5.6E-08	9.6E-11	2.7E-12	5.6E-12	- -	- -	- -	- -
Regionalized-2	7	6	6.6E-08	1.1E-10	9.1E-13	6.6E-12	5.6E-08	9.6E-11	2.7E-12	5.6E-12	- -	- -	- -	- -
Regionalized-3	7	1	6.6E-08	1.1E-10	9.1E-13	6.6E-12	5.6E-08	9.6E-11	2.7E-12	5.6E-12	- -	- -	- -	- -
Regionalized-4	4	6	6.6E-08	1.1E-10	9.1E-13	6.6E-12	5.6E-08	9.6E-11	2.7E-12	5.6E-12	- -	- -	- -	- -
Centralized	1	1	6.6E-08	1.1E-10	9.1E-13	6.6E-12	5.6E-08	9.6E-11	2.7E-12	5.6E-12	- -	- -	- -	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered for this alternative.

Table II-2.1-6. ANL-E—LLMW—Treatment and Disposal: Noncancer Health Risk from Chemical Exposure

LLMW Alternatives	Number of Sites		Treatment			Disposal
	T	D	Offsite MEI Hazard Index	Noninvolved Worker MEI Hazard Index	WM Worker Exposure Index	Hypothetical Farm Family Most Exposed Lifetime Hazard Index
No Action	3	-	2.7E-06	8.1E-06	4.7E-06	- -
Decentralized	37	16	1.8E-07	5.4E-07	6.0E-04	5.5E-01
Regionalized-1	11	12	1.2E-09	3.5E-09	4.7E-06	- -
Regionalized-2	7	6	1.2E-09	3.5E-09	4.7E-06	- -
Regionalized-3	7	1	1.2E-09	3.5E-09	4.7E-06	- -
Regionalized-4	4	6	1.2E-09	3.5E-09	4.7E-06	- -
Centralized	1	1	1.2E-09	3.5E-09	4.7E-06	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this alternative.
MEI = Maximally Exposed Individual
Hazard Index = Sum of hazard quotient values for all noncarcinogenic chemicals. The hazard quotient is the chemical-specific ratio of media exposure concentrations to concentrations believed to have no appreciable adverse effects.
Exposure Index = Ratio of Exposure concentration to chemical-specific occupational threshold limits.

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Table II-2.1-7. ANL-E—LLMW—Emissions in Tons per Year of Criteria Air Pollutants

LLMW Alternatives	Number of Sites		Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	27 (13/14)	35 (33/3)	0	3 (3/0)	3 (3/0)	5 (3/2)	7 (1/6)	3 (2/1)	0	0	0	1 (0/1)
Decentralized	37	16	59 (3/56)	20 (9/11)	0	1 (1/0)	1(1/0)	8 (1/7)	33 (0/33)	10 (3/7)	0	2 (2/0)	0	4 (0/4)
Regionalized-1	11	12	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)
Regionalized-2	7	6	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)
Regionalized-3	7	1	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)
Regionalized-4	4	6	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)
Centralized	1	1	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)

Notes:
T = Treatment
D = Disposal
Emissions <1 tons per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions / worker vehicles emission).
(2) Values = total emissions (stationary-source emissions / mobile-source emission).

Table II-2.1-8. ANL-E—LLMW—Percent of Standard/Guideline for Criteria Air Pollutants

LLMW Alternatives	Number of Sites		Construction					
			Percent of Tons/Year General Conformity Rule (1)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	--	142 (131/11)	--	3 (3/0)	--	20 (13/7)
Decentralized	37	16	--	79 (35/44)	--	1 (1/0)	--	30 (3/27)
Regionalized-1	11	12	--	4 (0/4)	--	0	--	3 (0/3)
Regionalized-2	7	6	--	4 (0/4)	--	0	--	3 (0/3)
Regionalized-3	7	1	--	4 (0/4)	--	0	--	3 (0/3)
Regionalized-4	4	6	--	4 (0/4)	--	0	--	3 (0/3)
Centralized	1	1	--	4 (0/4)	--	0	--	3 (0/3)

LLMW Alternatives	Number of Sites		Operations & Maintenance											
			Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
	T	D	CO (4)	NO2 (5)	Pb (4)	PM10 (6)	SO2 (4)	VOC (5)	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	1	12 (7/5)	0	0	0	3 (0/3)	--	--	--	--	--	--
Decentralized	37	16	1	38 (12/26)	0	2 (2/0)	0	16 (0/16)	0	0	0	0	3	0
Regionalized-1	11	12	0	4 (0/4)	0	0	0	2 (0/2)	--	--	--	--	--	--
Regionalized-2	7	6	0	4 (0/4)	0	0	0	2 (0/2)	--	--	--	--	--	--
Regionalized-3	7	1	0	4 (0/4)	0	0	0	2 (0/2)	--	--	--	--	--	--
Regionalized-4	4	6	0	4 (0/4)	0	0	0	2 (0/2)	--	--	--	--	--	--
Centralized	1	1	0	4 (0/4)	0	0	0	2 (0/2)	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) GCR de minimus levels are applied, since PSD regulations are not applicable to construction activities. Values = % of total emissions (% of equipment emissions / % of worker vehicles emission).
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions are assumed to be negligible for all but the Decentralized Alternative.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.
(5) Nonattainment area for ozone. Pollutant is an ozone precursor, therefore GCR de minimus levels are applied. Values = % of total emissions (% of stationary-source emissions / % of mobile-source emissions)
(6) Nonattainment area for this pollutant, therefore GCR de minimus levels are applied. Values = % of total emissions (% of stationary-source emissions / % of mobile-source emissions)

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Table II-2.1-9. ANL-E—LLMW—Percent of Standards/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

LLMW Alternatives	Number of Sites		Operations & Maintenance											
	T	D	Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action	3	-	0	0	0	--	--	0	--	--	0	0	0	0
Decentralized	37	16	0	0	0	--	--	0	--	--	0	0	0	0
Regionalized-1	11	12	0	0	0	--	--	0	--	--	0	0	0	0
Regionalized-2	7	6	0	0	0	--	--	0	--	--	0	0	0	0
Regionalized-3	7	1	0	0	0	--	--	0	--	--	0	0	0	0
Regionalized-4	4	6	0	0	0	--	--	0	--	--	0	0	0	0
Centralized	1	1	0	0	0	--	--	0	--	--	0	0	0	0

LLMW Alternatives	Number of Sites		Operations & Maintenance									
	T	D	Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action	3	-	--	0	0	0	--	0	0	0	--	--
Decentralized	37	16	--	0	0	0	--	0	0	0	--	--
Regionalized-1	11	12	--	0	0	0	--	0	0	0	--	--
Regionalized-2	7	6	--	0	0	0	--	0	0	0	--	--
Regionalized-3	7	1	--	0	0	0	--	0	0	0	--	--
Regionalized-4	4	6	--	0	0	0	--	0	0	0	--	--
Centralized	1	1	--	0	0	0	--	0	0	0	--	--

Notes:
T = Treatment
D = Disposal
-- = Emissions of this hazardous or toxic air pollutant are assumed to be negligible.
Percentages <1% are shown as zeros.

Table II-2.1-10. ANL-E—LLMW—Impacts on Water Resources Due to Increased Water Use

LLMW Alternatives	Number of Sites		Construction			Operations			
	T	D	Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action	3	-	29232	4.7	- -	2066	0.3	- -	<0.1
Decentralized	37	16	11457	1.8	- -	5603	0.9	- -	<0.1
Regionalized-1	11	12	116	<0.1	- -	757	0.1	- -	<0.1
Regionalized-2	7	6	116	<0.1	- -	757	0.1	- -	<0.1
Regionalized-3	7	1	116	<0.1	- -	757	0.1	- -	<0.1
Regionalized-4	4	6	116	<0.1	- -	757	0.1	- -	<0.1
Centralized	1	1	116	<0.1	- -	757	0.1	- -	<0.1

Notes:
T = Treatment
D = Disposal
Water supplied by groundwater in the Niagara Aquifer. Current water use = 626,000 gallons/day.
Wastewater discharged to the Des Plains River.
Average flow rate of the Des Plains River = 582,000,000 gallons/day.
- - = Stream Flow is not considered for this site.
<0.1 indicates that the percentage is less than 0.1%.

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Table II-2.1-11. ANL-E—LLMW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal (Contact Handled)

LLMW Alternatives	Number of Sites		Ac 225	Ac 227	Am 241	Am 242	Am 243	C 14	Cs 135	Cs 137	Cm 242	Cm 244	Cm 245	I 129	Pb 210	Np 237	Ni 59	Ni 63	Pd 107	Pu 238	Pu 239	Pu 240	Pu 241
	T	D																					
No Action	3	-	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
Regionalized-1	11	12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-2	7	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	4	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

LLMW Alternatives	Number of Sites		Po 210	K 40	Pa 231	Ra 223	Ra 226	Sm 151	Se 79	Sr 90	Tc 99	Th 227	Th 228	Th 229	Th 230	Th 232	Sn 126	U 233	U 234	U 235	U 236	U 238	Y 90	Zr 93
	T	D																						
No Action	3	-	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1	11	12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-2	7	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	4	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
- - = No disposal at this site for this alternative.

Table II-2.1-12. ANL-E—LLMW— Percent of Drinking Water Standards for Hazardous Constitutents in Groundwater from Disposal (Contact-Handled)

LLMW Alternatives	T	D	Acetone	Arsenic	Barium	Benzene	Cadmium	Carbon Tetrachloride	Chromium	Cyanide
No Action	3	-	--	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	2000	0	300	0	0
Regionalized-1	11	12	--	--	--	--	--	--	--	--
Regionalized-2	7	6	--	--	--	--	--	--	--	--
Regionalized-3	7	1	--	--	--	--	--	--	--	--
Regionalized-4	4	6	--	--	--	--	--	--	--	--
Centralized	1	1	--	--	--	--	--	--	--	--

LLMW Alternatives	T	D	1,2-dichloro-ethane	Lead	Mercury	Methylene Chloride	Selenium	Silver	1,2,2-trichloro-1,1-trifluoroethane
No Action	3	-	--	--	--	--	--	--	--
Decentralized	37	16	2000	0	0	4000	60	1	0
Regionalized-1	11	12	--	--	--	--	--	--	--
Regionalized-2	7	6	--	--	--	--	--	--	--
Regionalized-3	7	1	--	--	--	--	--	--	--
Regionalized-4	4	6	--	--	--	--	--	--	--
Centralized	1	1	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
"--" = No disposal at this site for this alternative.

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Table II-2.1-13. ANL-E—LLMW—Socioeconomics Impacts for Treatment and Disposal

LLMW Alternatives	Number of Sites		Effect of Implementation of Alternatives					
				Jobs		Income		
	T	D	Cost (Millions) (1)	Annual Jobs	% Annual Change in ROI (2)	ROI Annual Income (Millions)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action	3	-	183	147	0.00	1.7	0.00	0.00
Decentralized	37	16	653	655	0.02	7.6	0.01	0.00
Regionalized-1	11	12	85	85	0.00	1.0	0.00	0.00
Regionalized-2	7	6	85	85	0.00	1.0	0.00	0.00
Regionalized-3	7	1	85	85	0.00	1.0	0.00	0.00
Regionalized-4	4	6	85	85	0.00	1.0	0.00	0.00
Centralized	1	1	85	85	0.00	1.0	0.00	0.00

Notes:
T = Treatment
D = Disposal
(1) In current 1990 dollars
(2) Compared to 1990 baseline

Table II-2.1-14. ANL-E—LLMW—Infrastructure Impacts for Treatment and Disposal

LLMW Alternatives	Number of Sites		Effect of Implementation of Alternatives									
			Land Use		Water		Waste Water		Power		Employment (FTE)	
	T	D	Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	% Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Peak Construction Employment	% of Current Employment (1)
No Action	3	-	11.2	0.94	29232	1.62	2066	0.08	4.32	18.76	111	2
Decentralized	37	16	7.5	0.63	11457	0.64	5603	0.22	0.97	4.24	430	10
Regionalized-1	11	12	0.3	0.02	757	0.04	757	0.03	0.11	0.49	39	1
Regionalized-2	7	6	0.3	0.02	757	0.04	757	0.03	0.11	0.49	39	1
Regionalized-3	7	1	0.3	0.02	757	0.04	757	0.03	0.11	0.49	39	1
Regionalized-4	4	6	0.3	0.02	757	0.04	757	0.03	0.11	0.49	39	1
Centralized	1	1	0.3	0.02	757	0.04	757	0.03	0.11	0.49	39	1

Notes:
T = Treatment
D = Disposal
GPD = Gallons per Day
MW = Megawatts
(1) Based on 1991 Site Employment

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Table II-2.1-15. ANL-E—LLMW—Cost

LLMW Alternatives	Number of Sites		Total Cost (Millions) (1)	Cost by Life-Cycle Component (1)				Cost by Functional Area (1)		
	T	D		Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Treatment (Millions)	Storage (Millions)	Disposal (Millions)
No Action	3	-	207	16	53	125	14	88	118	0
Decentralized	37	16	739	72	207	431	29	431	0	308
Regionalized-1	11	12	96	8	18	61	10	96	0	0
Regionalized-2	7	6	96	8	18	61	10	96	0	0
Regionalized-3	7	1	96	8	18	61	10	96	0	0
Regionalized-4	4	6	96	8	18	61	10	96	0	0
Centralized	1	1	96	8	18	61	10	96	0	0

Notes:
T = Treatment
D = Disposal
The Life-Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum of these may not reflect the true total cost.
(1) In current 1994 dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

2.2 ANL-E LLW

Thirteen tables immediately following, portray the impacts of LLW at ANL-E. These tables are presented as follows:

Impact Category

No.	Description	Table No.	Page No.
1.	ANL-E—LLW—Treatment and Disposal: Estimated Number of Fatalities	II-2.2-1	2-18
2.	ANL-E—LLW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects	II-2.2-2	2-19
3.	ANL-E—LLW—Disposal: Estimated Number of Cancer Incidences and Genetic Effects	II-2.2-3	2-20
4.	ANL-E—LLW—Treatment and Disposal: MEI Probability of Cancer Fatality	II-2.2-4	2-21
5.	ANL-E—LLW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects	II-2.2-5	2-22
7.	ANL-E—LLW—Emissions in Tons per Year of Criteria Air Pollutants	II-2.2-6	2-23
8.	ANL-E—LLW—Percent of Standard/Guideline for Criteria Air Pollutants	II-2.2-7	2-24
9.	ANL-E—LLW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-2.2-8	2-25
10.	ANL-E—LLW—Impacts on Water Resources Due to Increased Water Use	II-2.2-9	2-26
11.	ANL-E—LLW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal (Contact Handled)	II-2.2-10	2-27
12.	ANL-E—LLW—Socioeconomic Impacts for Treatment and Disposal	II-2.2-11	2-28
13.	ANL-E—LLW—Infrastructure Impacts for Treatment and Disposal	II-2.2-12	2-29
14.	ANL-E—LLW—Cost	II-2.2-13	2-30

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Table II-2.2-1. ANL-E—LLW—Treatment and Disposal: Estimated Number of Fatalities

LLW Alternatives	Number of Sites		Treatment				Disposal	
			WM Worker		Offsite Population	Noninvolved Workers	WM Worker	
	T	D	Radiation Exposure	Physical Hazards	Radiation Exposure	Radiation Exposure	Radiation Exposure	Physical Hazards
No Action	10**	6	4.2E-02	7.1E-02	2.3E-06	9.3E-09	- -	- -
Decentralized		16	3.2E-02	5.1E-02	2.5E-06	9.8E-09	4.3E-02	6.3E-02
Regionalized-1		12	3.2E-02	5.1E-02	2.5E-06	9.8E-09	- -	- -
Regionalized-2	11	12	3.2E-02	5.1E-02	2.5E-06	9.8E-09	- -	- -
Regionalized-3		6	3.2E-02	5.1E-02	2.5E-06	9.8E-09	- -	- -
Regionalized-4	7	6	3.2E-02	5.1E-02	2.5E-06	9.8E-09	- -	- -
Regionalized-5	4	6	3.2E-02	5.1E-02	2.5E-06	9.8E-09	- -	- -
Regionalized-6		2	3.2E-02	5.1E-02	2.5E-06	9.8E-09	- -	- -
Regionalized-7		2	3.2E-02	5.1E-02	2.5E-06	9.8E-09	- -	- -
Centralized-1		1	3.2E-02	5.1E-02	2.5E-06	9.8E-09	- -	- -
Centralized-2		1	3.2E-02	5.1E-02	2.5E-06	9.8E-09	- -	- -
Centralized-3	7	1	3.2E-02	5.1E-02	2.5E-06	9.8E-09	- -	- -
Centralized-4	7	1	3.2E-02	5.1E-02	2.5E-06	9.8E-09	- -	- -
Centralized-5	1	1	3.2E-02	5.1E-02	2.5E-06	9.8E-09	- -	- -

Note:
T = Treatment
D = Disposal
- - = Disposal is not considered under the alternative
** Ten sites use existing facilities for Volume Reduction

Table II-2.2-2. ANL-E—LLW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

LLW Alternatives	Number of Sites		Offsite Population			Noninvolved Worker			WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	10**	6	4.7E-03	8.0E-06	4.7E-07	1.9E-05	3.2E-08	1.9E-09	1.1E+02	1.5E-01	6.3E-03
Decentralized		16	5.0E-03	8.5E-06	5.0E-07	2.0E-05	3.3E-08	2.0E-09	7.9E+01	1.1E-01	4.8E-03
Regionalized-1		12	5.0E-03	8.5E-06	5.0E-07	2.0E-05	3.3E-08	2.0E-09	7.9E+01	1.1E-01	4.8E-03
Regionalized-2	11	12	5.0E-03	8.5E-06	5.0E-07	2.0E-05	3.3E-08	2.0E-09	7.9E+01	1.1E-01	4.8E-03
Regionalized-3		6	5.0E-03	8.5E-06	5.0E-07	2.0E-05	3.3E-08	2.0E-09	7.9E+01	1.1E-01	4.8E-03
Regionalized-4	7	6	5.0E-03	8.5E-06	5.0E-07	2.0E-05	3.3E-08	2.0E-09	7.9E+01	1.1E-01	4.8E-03
Regionalized-5	4	6	5.0E-03	8.5E-06	5.0E-07	2.0E-05	3.3E-08	2.0E-09	7.9E+01	1.1E-01	4.8E-03
Regionalized-6		2	5.0E-03	8.5E-06	5.0E-07	2.0E-05	3.3E-08	2.0E-09	7.9E+01	1.1E-01	4.8E-03
Regionalized-7		2	5.0E-03	8.5E-06	5.0E-07	2.0E-05	3.3E-08	2.0E-09	7.9E+01	1.1E-01	4.8E-03
Centralized-1		1	5.0E-03	8.5E-06	5.0E-07	2.0E-05	3.3E-08	2.0E-09	7.9E+01	1.1E-01	4.8E-03
Centralized-2		1	5.0E-03	8.5E-06	5.0E-07	2.0E-05	3.3E-08	2.0E-09	7.9E+01	1.1E-01	4.8E-03
Centralized-3	7	1	5.0E-03	8.5E-06	5.0E-07	2.0E-05	3.3E-08	2.0E-09	7.9E+01	1.1E-01	4.8E-03
Centralized-4	7	1	5.0E-03	8.5E-06	5.0E-07	2.0E-05	3.3E-08	2.0E-09	7.9E+01	1.1E-01	4.8E-03
Centralized-5	1	1	5.0E-03	8.5E-06	5.0E-07	2.0E-05	3.3E-08	2.0E-09	7.9E+01	1.1E-01	4.8E-03

Notes:
T = Treatment
D = Disposal
** Ten sites use existing facilities for Volume Reduction.

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Table II-2.2-3. ANL-E—LLW—Disposal: Estimated Number of Cancer Incidences and Genetic Effects

LLW Alternatives	Number of Sites		WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	10**	6	- -	- -	- -
Decentralized		16	1.1E+02	1.5E-01	6.5E-03
Regionalized-1		12	- -	- -	- -
Regionalized-2	11	12	- -	- -	- -
Regionalized-3		6	- -	- -	- -
Regionalized-4	7	6	- -	- -	- -
Regionalized-5	4	6	- -	- -	- -
Regionalized-6		2	- -	- -	- -
Regionalized-7		2	- -	- -	- -
Centralized-1		1	- -	- -	- -
Centralized-2		1	- -	- -	- -
Centralized-3	7	1	- -	- -	- -
Centralized-4	7	1	- -	- -	- -
Centralized-5	1	1	- -	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered under the alternative.
** Ten sites use existing facilities for Volume Reduction.

Table II-2.2–4. ANL-E—LLW—Treatment and Disposal: MEI Probability of Cancer Fatality

LLW Alternatives	Number of Sites		Treatment		Disposal
	T	D	Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability	Hypothetical Farm Family - Most Exposed Lifetime MEI Cancer Fatality Probability
No Action	10**	6	1.3E-11	9.4E-12	- -
Decentralized		16	1.4E-11	1.0E-11	2.9E-05
Regionalized-1		12	1.4E-11	1.0E-11	- -
Regionalized-2	11	12	1.4E-11	1.0E-11	- -
Regionalized-3		6	1.4E-11	1.0E-11	- -
Regionalized-4	7	6	1.4E-11	1.0E-11	- -
Regionalized-5	4	6	1.4E-11	1.0E-11	- -
Regionalized-6		2	1.4E-11	1.0E-11	- -
Regionalized-7		2	1.4E-11	1.0E-11	- -
Centralized-1		1	1.4E-11	1.0E-11	- -
Centralized-2		1	1.4E-11	1.0E-11	- -
Centralized-3	7	1	1.4E-11	1.0E-11	- -
Centralized-4	7	1	1.4E-11	1.0E-11	- -
Centralized-5	1	1	1.4E-11	1.0E-11	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered under the Alternative.
** Ten sites use existing facilities for Volume Reduction.

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Table II-2.2-5. ANL-E—LLW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects

LLW Alternatives	Number of Sites		Treatment						Disposal		
			Offsite MEI			Noninvolved Worker MEI			Most Exposed Lifetime MEI		
	T	D	Dose (rem)	Radiation Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Radiation Genetic Effects Probability
No Action	10**	6	2.6E-08	4.4E-11	2.6E-12	1.9E-08	3.2E-11	1.9E-12	- -	- -	- -
Decentralized		16	2.8E-08	4.7E-11	2.8E-12	2.0E-08	3.4E-11	2.0E-12	5.7E-02	9.7E-05	5.7E-06
Regionalized-1		12	2.8E-08	4.7E-11	2.8E-12	2.0E-08	3.4E-11	2.0E-12	- -	- -	- -
Regionalized-2	11	12	2.8E-08	4.7E-11	2.8E-12	2.0E-08	3.4E-11	2.0E-12	- -	- -	- -
Regionalized-3		6	2.8E-08	4.7E-11	2.8E-12	2.0E-08	3.4E-11	2.0E-12	- -	- -	- -
Regionalized-4	7	6	2.8E-08	4.7E-11	2.8E-12	2.0E-08	3.4E-11	2.0E-12	- -	- -	- -
Regionalized-5	4	6	2.8E-08	4.7E-11	2.8E-12	2.0E-08	3.4E-11	2.0E-12	- -	- -	- -
Regionalized-6		2	2.8E-08	4.7E-11	2.8E-12	2.0E-08	3.4E-11	2.0E-12	- -	- -	- -
Regionalized-7		2	2.8E-08	4.7E-11	2.8E-12	2.0E-08	3.4E-11	2.0E-12	- -	- -	- -
Centralized-1		1	2.8E-08	4.7E-11	2.8E-12	2.0E-08	3.4E-11	2.0E-12	- -	- -	- -
Centralized-2		1	2.8E-08	4.7E-11	2.8E-12	2.0E-08	3.4E-11	2.0E-12	- -	- -	- -
Centralized-3	7	1	2.8E-08	4.7E-11	2.8E-12	2.0E-08	3.4E-11	2.0E-12	- -	- -	- -
Centralized-4	7	1	2.8E-08	4.7E-11	2.8E-12	2.0E-08	3.4E-11	2.0E-12	- -	- -	- -
Centralized-5	1	1	2.8E-08	4.7E-11	2.8E-12	2.0E-08	3.4E-11	2.0E-12	- -	- -	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered under the alternative.
** Ten sites use existing facilities for Volume Reduction.

Table II-2.2–6. ANL-E—LLW—Emissions in Tons per Year of Criteria Air Pollutants

LLW Alternatives	Number of Sites		Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action	10**	6	10 (3/7)	9 (8/1)	0	1 (1/0)	1 (1/0)	2 (1/1)	4 (0/4)	1 (0/1)	0	0	0	0
Decentralized		16	13 (5/8)	14 (13/2)	0	1 (1/0)	1 (1/0)	2 (1/1)	19 (0/19)	4 (0/4)	0	0	0	2 (0/2)
Regionalized-1		12	8 (1/8)	4 (2/2)	0	0	0	1 (0/1)	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)
Regionalized-2	11	12	8 (1/8)	4 (2/2)	0	0	0	1 (0/1)	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)
Regionalized-3		6	8 (1/8)	4 (2/2)	0	0	0	1 (0/1)	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)
Regionalized-4	7	6	8 (1/8)	4 (2/2)	0	0	0	1 (0/1)	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)
Regionalized-5	4	6	8 (1/8)	4 (2/2)	0	0	0	1 (0/1)	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)
Regionalized-6		2	8 (1/8)	4 (2/2)	0	0	0	1 (0/1)	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)
Regionalzied-7		2	8 (1/8)	4 (2/2)	0	0	0	1 (0/1)	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)
Centralized-1		1	8 (1/8)	4 (2/2)	0	0	0	1 (0/1)	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)
Centralized-2		1	8 (1/8)	4 (2/2)	0	0	0	1 (0/1)	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)
Centralized-3	7	1	8 (1/8)	4 (2/2)	0	0	0	1 (0/1)	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)
Centralized-4	7	1	8 (1/8)	4 (2/2)	0	0	0	1 (0/1)	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)
Centralized-5	1	1	8 (1/8)	4 (2/2)	0	0	0	1 (0/1)	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)

Notes:
T = Treatment
D = Disposal
Emissions <1 ton per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions/worker vehicles emission)
(2) Values = total emissions (stationary-source emissions/mobile-source emission)
** Ten sites use existing facilities for Volume Reduction.

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Table II-2.2-7. ANL-E—LLW—Percent of Standard/Guideline for Criteria Air Pollutants

LLW Alternatives	Number of Sites		Construction					
			Percent of Tons/Year General Conformity Rule (1)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC
No Action	10**	6	--	36 (31/5)	--	0	--	6 (3/3)
Decentralized		16	--	58 (52/6)	--	1 (1/0)	--	9 (5/4)
Regionalized-1		12	--	12 (6/6)	--	0	--	4 (1/4)
Regionalized-2	11	12	--	12 (6/6)	--	0	--	4 (1/4)
Regionalized-3		6	--	12 (6/6)	--	0	--	4 (1/4)
Regionalized-4	7	6	--	12 (6/6)	--	0	--	4 (1/4)
Regionalized-5	4	6	--	12 (6/6)	--	0	--	4 (1/4)
Regionalized-6		2	--	12 (6/6)	--	0	--	4 (1/4)
Regionalzied-7		2	--	12 (6/6)	--	0	--	4 (1/4)
Centralized-1		1	--	12 (6/6)	--	0	--	4 (1/4)
Centralized-2		1	--	12 (6/6)	--	0	--	4 (1/4)
Centralized-3	7	1	--	12 (6/6)	--	0	--	4 (1/4)
Centralized-4	7	1	--	12 (6/6)	--	0	--	4 (1/4)
Centralized-5	1	1	--	12 (6/6)	--	0	--	4 (1/4)

LLW Alternatives	Number of Sites		Operations & Maintenance											
			Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
	T	D	CO (4)	NO2 (5)	Pb (4)	PM10 (6)	SO2 (4)	VOC (5)	CO	NO2	Pb	PM10	SO2	VOC
No Action	10**	6	0	4 (0/4)	0	0	0	2 (0/2)	--	--	--	--	--	--
Decentralized		16	0	17 (2/15)	0	0	0	9 (0/9)	--	--	--	--	--	--
Regionalized-1		12	0	4 (0/4)	0	0	0	2 (0/2)	--	--	--	--	--	--
Regionalized-2	11	12	0	4 (0/4)	0	0	0	2 (0/2)	--	--	--	--	--	--
Regionalized-3		6	0	4 (0/4)	0	0	0	2 (0/2)	--	--	--	--	--	--
Regionalized-4	7	6	0	4 (0/4)	0	0	0	2 (0/2)	--	--	--	--	--	--
Regionalized-5	4	6	0	4 (0/4)	0	0	0	2 (0/2)	--	--	--	--	--	--
Regionalized-6		2	0	4 (0/4)	0	0	0	2 (0/2)	--	--	--	--	--	--
Regionalzied-7		2	0	4 (0/4)	0	0	0	2 (0/2)	--	--	--	--	--	--
Centralized-1		1	0	4 (0/4)	0	0	0	2 (0/2)	--	--	--	--	--	--
Centralized-2		1	0	4 (0/4)	0	0	0	2 (0/2)	--	--	--	--	--	--
Centralized-3	7	1	0	4 (0/4)	0	0	0	2 (0/2)	--	--	--	--	--	--
Centralized-4	7	1	0	4 (0/4)	0	0	0	2 (0/2)	--	--	--	--	--	--
Centralized-5	1	1	0	4 (0/4)	0	0	0	2 (0/2)	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) GCR de minimus levels are applied, since PSD regulations are not applicable to construction activities. Values = % of total emissions (% of equipment emissions / % of worker vehicle emissions).
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions for all alternatives are assumed to be negligible.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.
(5) Nonattainment area for ozone. Pollutant is an ozone precursor, therefore GCR de minimus levels are applied. Values = % of total emissions (% of stationary-source emissions / % of mobile-source emissions).
(6) Nonattainment area for this pollutant, therefore GCR de minimus levels are applied. Values = % of total emissions (% of stationary-source emissions / % of mobile-source emissions).
** Ten sites use existing facilities for Volume Reduction.

Table II-2.2-8. ANL-E—LLW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

LLW Alternatives	Number of Sites		Operations & Maintenance											
	T	D	Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action	10**	6	0	--	--	--	--	--	--	--	--	--	--	--
Decentralized		16	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-1		12	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-2	11	12	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-3		6	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	7	6	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-5	4	6	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-6		2	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-1		1	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-4	7	1	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	0	--	--	--	--	--	--	--	--	--	--	--

LLW Alternatives	Number of Sites		Operations & Maintenance									
	T	D	Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action	10**	6	--	--	--	--	--	--	--	--	--	--
Decentralized		16	--	--	--	--	--	--	--	--	--	--
Regionalized-1		12	--	--	--	--	--	--	--	--	--	--
Regionalized-2	11	12	--	--	--	--	--	--	--	--	--	--
Regionalized-3		6	--	--	--	--	--	--	--	--	--	--
Regionalized-4	7	6	--	--	--	--	--	--	--	--	--	--
Regionalized-5	4	6	--	--	--	--	--	--	--	--	--	--
Regionalized-6		2	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	--	--	--	--	--	--	--	--	--	--
Centralized-1		1	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--	--	--	--	--
Centralized-4	7	1	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--	--	--	--	--

Notes:
T= Treatment
D = Disposal
- - = Emissions of this hazardous or toxic air pollutant are assumed to be negligible.
Percentages <1% are shown as zeros.
** Ten sites use existing facilities for Volume Reduction.

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Table II-2.2–9. ANL-E—LLW—Impacts on Water Resources Due to Increased Water Use

LLW Alternatives	Number of Sites		Construction			Operations			
	T	D	Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action	10**	6	1875	0.3	- -	640	0.1	- -	<0.1
Decentralized		16	12053	1.9	- -	1014	0.2	- -	<0.1
Regionalized-1		12	2099	0.3	- -	646	0.1	- -	<0.1
Regionalized-2	11	12	2099	0.3	- -	646	0.1	- -	<0.1
Regionalized-3		6	2099	0.3	- -	646	0.1	- -	<0.1
Regionalized-4	7	6	2099	0.3	- -	646	0.1	- -	<0.1
Regionalized-5	4	6	2099	0.3	- -	646	0.1	- -	<0.1
Regionalized-6		2	2099	0.3	- -	646	0.1	- -	<0.1
Regionalized-7		2	2099	0.3	- -	646	0.1	- -	<0.1
Centralized-1		1	2099	0.3	- -	646	0.1	- -	<0.1
Centralized-2		1	2099	0.3	- -	646	0.1	- -	<0.1
Centralized-3	7	1	2099	0.3	- -	646	0.1	- -	<0.1
Centralized-4	7	1	2099	0.3	- -	646	0.1	- -	<0.1
Centralized-5	1	1	2099	0.3	- -	646	0.1	- -	<0.1

Notes:
T = Treatment
D = Disposal
Water supplied by groundwater in the Niagara Aquifer. Current water use = 626,000 gallons/day.
Wastewater discharged to the Des Plains River. Average flow rate of the Des Plains River = 582,000,000 gallons/day.
** Ten sites use existing facilities for Volume Reduction.
- - = Stream Flow is not considered for this site.
<0.1 indicates that the percentage is less than 0.1%.

Table II-2.2–10. ANL-E—LLW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal

LLW Alternatives	Number of Sites T	Number of Sites D	Ac 225	Ac 227	Am 241	Am 242	Am 243	C 14	Cs 135	Cs 137	Cm 242	Cm 244	Cm 245	I 129	Pb 210	Np 237	Ni 59	Ni 63	Pd 107	Pu 238	Pu 239	Pu 240	Pu 241
No Action	10**	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized		16	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Regionalized-1		12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-2	11	12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-3		6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	7	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-5	4	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-6		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-1		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-4	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

LLW Alternatives	Number of Sites T	Number of Sites D	Po 210	K 40	Pa 231	Ra 223	Ra 226	Sm 151	Se 79	Sr 90	Tc 99	Th 227	Th 228	Th 229	Th 230	Th 232	Sn 126	U 233	U 234	U 235	U 236	U 238	Y 90	Zr 93
No Action	10**	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized		16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1		12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-2	11	12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-3		6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	7	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-5	4	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-6		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-1		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-4	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
** Ten sites use existing facilities for Volume Reduction
-- = Disposal is not considered for this Alternative.

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Table II-2.2-11. ANL-E—LLW—Socioeconomic Impacts for Treatment and Disposal

LLW Alternatives	Number of Sites		Effect of Implementation of Alternatives					
				Jobs		Income		
	T	D	Cost (Millions) (1)	Jobs	% Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action	10**	6	125	100	0.00	1.2	0.00	0.00
Decentralized		16	344	344	0.01	4.0	0.00	0.00
Regionalized-1		12	94	94	0.00	1.1	0.00	0.00
Regionalized-2	11	12	94	94	0.00	1.1	0.00	0.00
Regionalized-3		6	94	94	0.00	1.1	0.00	0.00
Regionalized-4	7	6	94	94	0.00	1.1	0.00	0.00
Regionalized-5		6	94	94	0.00	1.1	0.00	0.00
Regionalized-6		2	94	94	0.00	1.1	0.00	0.00
Regionalized-7		2	94	94	0.00	1.1	0.00	0.00
Centralized-1		1	94	94	0.00	1.1	0.00	0.00
Centralized-2		1	94	94	0.00	1.1	0.00	0.00
Centralized-3	7	1	94	94	0.00	1.1	0.00	0.00
Centralized-4	7	1	94	94	0.00	1.1	0.00	0.00
Centralized-5	1	1	94	94	0.00	1.1	0.00	0.00

Notes:
T = Treatment
D = Disposal
(1) In constant 1990 dollars.
(2) Compared to 1990 baseline.
** Ten sites use existing facilities for Volume Reduction.

Table II-2.2-12. ANL-E—LLW—Infrastructure Impacts for Treatment and Disposal

LLW Alternatives	Number of Sites		Effect of Implementation of Alternatives									
			Land Use		Water		Waste Water		Power		Employment (FTE)	
	T	D	Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	% Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Peak Construction Employment	% of Current Employment (1)
No Action	10**	6	0.8	0.06	1875	0.10	640	0.02	0.11	0.49	53	1
Decentralized		16	4.1	0.33	12053	0.67	1014	0.04	1.70	7.40	195	4
Regionalized-1		12	1.5	0.12	2099	0.12	646	0.02	0.21	0.90	59	1
Regionalized-2	11	12	1.5	0.12	2099	0.12	646	0.02	0.21	0.90	59	1
Regionalized-3		6	1.5	0.12	2099	0.12	646	0.02	0.21	0.90	59	1
Regionalized-4	7	6	1.5	0.12	2099	0.12	646	0.02	0.21	0.90	59	1
Regionalized-5	4	6	1.5	0.12	2099	0.12	646	0.02	0.21	0.90	59	1
Regionalized-6		2	1.5	0.12	2099	0.12	646	0.02	0.21	0.90	59	1
Regionalized-7		2	1.5	0.12	2099	0.12	646	0.02	0.21	0.90	59	1
Centralized-1		1	1.5	0.12	2099	0.12	646	0.02	0.21	0.90	59	1
Centralized-2		1	1.5	0.12	2099	0.12	646	0.02	0.21	0.90	59	1
Centralized-3	7	1	1.5	0.12	2099	0.12	646	0.02	0.21	0.90	59	1
Centralized-4	7	1	1.5	0.12	2099	0.12	646	0.02	0.21	0.90	59	1
Centralized-5	1	1	1.5	0.12	2099	0.12	646	0.02	0.21	0.90	59	1

Notes:
T = Treatment
D = Disposal
GPD = Gallons per Day
MW = Megawatts Electric
FTE = Full Time Equivalent
(1) Based on 1990 Site Employment.
** Ten sites use existing facilities for Volume Reduction.

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Table II-2.2-13. ANL-E—LLW—Cost

LLW Alternatives	Number of Sites		Total Cost (Millions) (1)	Cost by Life-Cycle Component (1)				Cost by Functional Area (1)		
	T	D		Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Treatment (Millions)	Storage (Millions)	Disposal (Millions)
No Action	10**	6	142	8	28	101	5	142	0	0
Decentralized		16	389	30	93	177	89	106	0	283
Regionalized-1		12	106	9	30	61	6	106	0	0
Regionalized-2	11	12	106	9	30	61	6	106	0	0
Regionalized-3		6	106	9	30	61	6	106	0	0
Regionalized-4	7	6	106	9	30	61	6	106	0	0
Regionalized-5	4	6	106	9	30	61	6	106	0	0
Regionalized-6		2	106	9	30	61	6	106	0	0
Regionalized-7		2	106	9	30	61	6	106	0	0
Centralized-1		1	106	9	30	61	6	106	0	0
Centralized-2		1	106	9	30	61	6	106	0	0
Centralized-3	7	1	106	9	30	61	6	106	0	0
Centralized-4	7	1	106	9	30	61	6	106	0	0
Centralized-5	1	1	106	9	30	61	6	106	0	0

Notes:
** Ten sites use existing facilities for Volume Reduction
T = Treatment
D = Disposal
The Life Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum may not reflect the true total cost.
(1) In Current 1994 Dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

2.3 ANL-E TRUW

Twelve tables immediately following portray the impacts of TRUW at ANL-E. These impacts are presented in the following tables.

Impact Category

No.	Description	Table No.	Page No.
1.	ANL-E—TRUW—Treatment: Estimated Number of Fatalities	II-2.3-1	2-32
2.	ANL-E—TRUW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects	II-2.3-2	2-33
4.	ANL-E—TRUW—Treatment: MEI Probability of Cancer Fatality	II-2.3-3	2-34
5.	ANL-E—TRUW—Treatment: MEI Probability of Cancer Incidences and Genetic Effects	II-2.3-4	2-35
6.	ANL-E—TRUW—Treatment: Noncancer Health Risk From Chemical Exposure	II-2.3-5	2-36
7.	ANL-E—TRUW—Emissions in Tons per Year of Criteria Air Pollutants	II-2.3-6	2-37
8.	ANL-E—TRUW—Percent of Standard/Guideline for Criteria Air Pollutants	II-2.3-7	2-38
9.	ANL-E—TRUW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-2.3-8	2-39
10.	ANL-E—TRUW—Impacts on Water Resources Due to Increased Water Use	II-2.3-9	2-40
12.	ANL-E—TRUW—Socioeconomic Impacts for Treatment	II-2.3-10	2-41
13.	ANL-E—TRUW—Infrastructure Impacts for Treatment	II-2.3-11	2-42
14.	ANL-E—TRUW—Cost	II-2.3-12	2-43

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Table II-2.3-1. ANL-E—TRUW—Treatment: Estimated Number of Fatalities

TRUW Alternatives	Treatment						
	Number of Sites		Treat STD	WM Worker		Offsite Population Radiation Exposure	Noninvolved Workers Radiation Exposure
	CH Treat	RH Treat		Radiation Exposure	Physical Hazards		
No Action **	16	5	WIPP WAC	9.8E-07	2.8E-02	6.2E-07	3.2E-09
Decentralized ***	16	5	WIPP WAC	8.8E-03	1.2E-01	2.0E-06	1.0E-08
Regionalized-1	5	2	Reduce Gas	8.8E-03	4.5E-02	1.7E-06	9.0E-09
Regionalized-2	5	2	LDR	8.8E-03	4.5E-02	1.7E-06	9.0E-09
Regionalized-3	3	2	LDR	8.8E-03	4.5E-02	1.7E-06	9.0E-09
Centralized	WIPP	2	LDR	8.8E-03	4.5E-02	1.7E-06	9.0E-09

Notes:
** For No Action Alternative, storage is indefinite; no disposal at WIPP is assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at 16 sites, then transfered to interim storage at 10 sites, then to WIPP.

Table II-2.3-2. ANL-E—TRUW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

TRUW Alternatives	Number of Sites		Treat STD	Offsite Population				Noninvolved Workers				WM Workers			
	CH Treat	RH Treat		Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects
No Action**	16	5	WIPP WAC	1.2E-03	2.1E-06	3.8E-10	1.2E-07	6.5E-06	1.1E-08	8.0E-12	6.5E-10	2.5E-03	3.4E-06	4.8E-10	1.5E-07
Decentralized***	16	5	WIPP WAC	4.0E-03	6.7E-06	1.5E-09	4.0E-07	2.1E-05	3.5E-08	3.1E-11	2.1E-09	2.2E+01	3.1E-02	1.9E-09	1.3E-03
Regionalized-1	5	2	Reduce Gas	3.5E-03	5.9E-06	2.9E-09	3.5E-07	1.8E-05	3.1E-08	6.0E-11	1.8E-09	2.2E+01	3.1E-02	2.8E-09	1.3E-03
Regionalized-2	5	2	LDR	3.5E-03	5.9E-06	2.9E-09	3.5E-07	1.8E-05	3.1E-08	6.0E-11	1.8E-09	2.2E+01	3.1E-02	2.8E-09	1.3E-03
Regionalized-3	3	2	LDR	3.5E-03	5.9E-06	2.9E-09	3.5E-07	1.8E-05	3.1E-08	6.0E-11	1.8E-09	2.2E+01	3.1E-02	2.8E-09	1.3E-03
Centralized	WIPP	2	LDR	3.5E-03	5.9E-06	2.9E-09	3.5E-07	1.8E-05	3.1E-08	6.0E-11	1.8E-09	2.2E+01	3.1E-02	2.8E-09	1.3E-03

Notes:
** For No Action Alternative, storage is indefinite; no disposal at WIPP is assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
T = Treatment
D = Disposal

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Table II-2.3-3. ANL-E—TRUW—Treatment: MEI Probability of Cancer Fatality

TRUW Alternatives	Number of Sites		Treat STD	Treatment	
	CH Treat	RH Treat		Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability
No Action**	16	5	WIPP WAC	3.5E-12	3.2E-12
Decentralized***	16	5	WIPP WAC	1.1E-11	1.0E-11
Regionalized-1	5	2	Reduce Gas	9.7E-12	9.0E-12
Regionalized-2	5	2	LDR	9.7E-12	9.0E-12
Regionalized-3	3	2	LDR	9.7E-12	9.0E-12
Centralized	WIPP	2	LDR	9.7E-12	9.0E-12

Notes:
MEI = Maximally Exposed Individual
** For No Action Alternative, storage is indefinite; no disposal of WIPP is assumed, for all other alternatives disposal at WIPP is assumed.
***In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then transferred to interim storage at 10 sites, then to WIPP.

Table II-2.3-4. ANL-E—TRUW—Treatment: MEI Probability of Cancer Incidences and Genetic Effects

TRUW Alternatives	Number of Sites		Treat STD	Treatment							
				Offsite MEI				Noninvolved Worker MEI			
	CH Treat	RH Treat		Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability
No Action **	16	5	WIPP WAC	6.9E-09	1.2E-11	0.0E+00	6.9E-13	6.5E-09	1.1E-11	0.0E+00	6.5E-13
Decentralized ***	16	5	WIPP WAC	2.2E-08	3.7E-11	0.0E+00	2.2E-12	2.1E-08	3.5E-11	2.8E-14	2.1E-12
Regionalized-1	5	2	Reduce Gas	1.9E-08	3.3E-11	1.3E-14	1.9E-12	1.8E-08	3.1E-11	5.4E-14	1.8E-12
Regionalized-2	5	2	LDR	1.9E-08	3.3E-11	1.3E-14	1.9E-12	1.8E-08	3.1E-11	5.4E-14	1.8E-12
Regionalized-3	3	2	LDR	1.9E-08	3.3E-11	1.3E-14	1.9E-12	1.8E-08	3.1E-11	5.4E-14	1.8E-12
Centralized	WIPP	2	LDR	1.9E-08	3.3E-11	1.3E-14	1.9E-12	1.8E-08	3.1E-11	5.4E-14	1.8E-12

Notes:
** For No Action Alternative, storage is indefinite; no disposal at WIPP is assumed for all other alternatives, disposal of WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites then to WIPP.
MEI = Maximally Exposed Individual

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Table II-2.3-5. ANL-E—TRUW—Treatment: Noncancer Health Risk From Chemical Exposure

TRUW Alternatives	Number of Sites		Treat STD	Treatment		
	CH Treat	RH Treat		Offsite MEI Hazard Index	Noninvolved Worker MEI Hazard Index	WM Worker Exposure Index
No Action**	16	5	WIPP WAC	7.7E-13	2.3E-12	1.9E-08
Decentralized***	16	5	WIPP WAC	5.9E-12	1.7E-11	3.8E-08
Regionalized-1	5	2	Reduce Gas	1.0E-11	3.0E-11	1.4E-07
Regionalized-2	5	2	LDR	1.0E-11	3.0E-11	1.4E-07
Regionalized-3	3	2	LDR	1.0E-11	3.0E-11	1.4E-07
Centralized	WIPP	2	LDR	1.0E-11	3.0E-11	1.4E-07

Notes:
MEI = Maximally Exposed Individual
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
Hazard Index = Sum of hazard quotient values for all noncarcinogenic chemicals. The Hazard Quotient is the chemical-specific ratio of media exposure concentrations to concentrations exposure concentrations to concentrations believed to have no appreciable adverse effects.
Exposure Index = Ratio of exposure concentration to chemical-specific occupational threshold limits.

Table II-2.3-6. ANL-E—TRUW—Emissions in Tons per Year of Criteria Air Pollutants

TRUW Alternatives	Number of Sites		Treat STD	Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
	CH Treat	RH Treat		CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action**	16	5	WIPP WAC	- -	- -	- -	- -	- -	- -	6 (0/6)	1 (0/1)	0	0	0	1 (0/1)
Decentralized***	16	5	WIPP WAC	34 (2/32)	12 (6/6)	0	0	1 (1/0)	5 (1/4)	10 (0/10)	2 (0/2)	0	0	0	1 (0/1)
Regionalized-1	5	2	Reduce Gas	32 (2/30)	10 (4/6)	0	0	0	4 (0/4)	7 (0/7)	1 (0/1)	0	0	0	1 (0/1)
Regionalized-2	5	2	LDR	22 (2/20)	10 (6/4)	0	1 (1/0)	1 (1/0)	3 (1/2)	9 (0/9)	2 (0/2)	0	0	0	1 (0/1)
Regionalized-3	3	2	LDR	22 (2/20)	10 (6/4)	0	1 (1/0)	1 (1/0)	3 (1/2)	9 (0/9)	2 (0/2)	0	0	0	1 (0/1)
Centralized	WIPP	2	LDR	22 (2/20)	10 (6/4)	0	1 (1/0)	1 (1/0)	3 (1/2)	9 (0/9)	2 (0/2)	0	0	0	1 (0/1)

Notes:
Emissions <1 ton per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions / worker vehicles emission)
(2) Values = total emissions (stationary-source emissions / mobile-source emission)
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

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Table II-2.3-7. ANL-E—TRUW—Percent of Standard/Guideline for Criteria Air Pollutants

TRUW Alternatives	Number of Sites		Treat STD	Construction					
				Percent of Tons/Year General Conformity Rule (1)					
	CH Treat	RH Treat		CO	NO2	Pb	PM10	SO2	VOC
No Action	16	5	WIPP WAC	--	--	--	--	--	--
Decentralized	16	5	WIPP WAC	--	49 (23/26)	--	1 (0/0)	--	17 (2/15)
Regionalized-1	5	2	Reduce Gas	--	40 (16/24)	--	0	--	16 (2/14)
Regionalized-2	5	2	LDR	--	34 (25/9)	--	1 (1/0)	--	8 (2/6)
Regionalized-3	3	2	LDR	--	34 (25/9)	--	1 (1/0)	--	8 (2/6)
Centralized	WIPP	2	LDR	--	34 (25/9)	--	1 (1/0)	--	8 (2/6)

TRUW Alternatives	Number of Sites		Treat STD	Operations & Maintenance											
				Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
	CH Treat	RH Treat		CO (4)	NO2 (5)	Pb (4)	PM10 (6)	SO2 (4)	VOC (5)	CO	NO2	Pb	PM10	SO2	VOC
No Action	16	5	WIPP WAC	0	5 (0/5)	0	0	0	3 (0/3)	--	--	--	--	--	--
Decentralized	16	5	WIPP WAC	0	9 (1/8)	0	0	0	5 (0/5)	--	--	--	--	--	--
Regionalized-1	5	2	Reduce Gas	0	5 (0/5)	0	0	0	3 (0/3)	--	--	--	--	--	--
Regionalized-2	5	2	LDR	0	8 (0/8)	0	0	0	5 (0/5)	--	--	--	--	--	--
Regionalized-3	3	2	LDR	0	8 (0/8)	0	0	0	5 (0/5)	--	--	--	--	--	--
Centralized	WIPP	2	LDR	0	8 (0/8)	0	0	0	5 (0/5)	--	--	--	--	--	--

Notes:
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) GCR only applies to pollutants in nonattainment.
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions for all alternatives assumed to be negligible.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.
(5) Nonattainment area for ozone. Pollutant is an ozone precursor, therefore GCR de minimus levels are applied. Values = % of total emissions (% of stationary-source emissions / % of mobile-source emissions).
(6) Nonattainment area for this pollutant, therefore GCR de minimus levels are applied. Values = % of total emissions (% of stationary-source emissions / % of mobile-source emissions).
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

Table II-2.3-8. ANL-E—TRUW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

TRUW Alternatives	Number of Sites		Treat STD	Operations & Maintenance											
	CH Treat	RH Treat		Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action**	16	5	WIPP - WAC	0	--	--	--	0	0	--	--	--	--	--	--
Decentralized***	16	5	WIPP - WAC	0	--	--	--	0	0	--	--	--	--	--	--
Regionalized-1	5	2	Reduce Gas	0	--	--	--	0	0	--	--	--	--	--	--
Regionalized-2	5	2	LDR	0	--	--	--	0	0	--	--	--	--	--	--
Regionalized-3	3	2	LDR	0	--	--	--	0	0	--	--	--	--	--	--
Centralized	WIPP	2	LDR	0	--	--	--	0	0	--	--	--	--	--	--

TRUW Alternatives	Number of Sites		Treat STD	Operations & Maintenance									
	CH Treat	RH Treat		Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action**	16	5	WIPP - WAC	0	0	--	--	--	0	0	--	--	--
Decentralized***	16	5	WIPP - WAC	0	0	--	--	--	0	0	--	--	--
Regionalized-1	5	2	Reduce Gas	0	0	--	--	--	0	0	--	--	--
Regionalized-2	5	2	LDR	0	0	--	--	--	0	0	--	--	--
Regionalized-3	3	2	LDR	0	0	--	--	--	0	0	--	--	--
Centralized	WIPP	2	LDR	0	0	--	--	--	0	0	--	--	--

Notes:

** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.

*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

-- = Emissions of this hazardous or toxic air pollutant are assumed to be negligible.

Percentages <1% are shown as zeros. CH = contact handled. RH = remote handled.

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Table II-2.3-9. ANL-E—TRUW—Impacts on Water Resources Due to Increased Water Use

TRUW Alternatives	Number of Sites		Treat STD	Construction			Operations			
	CH Treat	RH Treat		Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action**	16	5	WIPP WAC	- -	- -	- -	921	0.1	- -	<0.1
Decentralized***	16	5	WIPP WAC	4769	0.8	- -	1509	0.2	- -	<0.1
Regionalized-1	5	2	Reduce Gas	3207	0.5	- -	941	0.2	- -	<0.1
Regionalized-2	5	2	LDR	3726	0.6	- -	941	0.2	- -	<0.1
Regionalized-3	3	2	LDR	3726	0.6	- -	941	0.2	- -	<0.1
Centralized	WIPP	2	LDR	3726	0.6	- -	941	0.2	- -	<0.1

Notes:
Water supplied by groundwater in the Niagara Aquifer. Current water use = 626,000 gallons/day.
Wastewater discharged to the Des Plains River.
Average flow rate of the Des Plains River = 582,000,000 gallons/day.
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
- - = Stream Flow is not considered for this site.
<0.1 indicates that the percentage is less than 0.1%.

Table II-2.3-10. ANL-E—TRUW—Socioeconomic Impacts for Treatment

TRUW Alternatives	Number of Sites		Effect of Implementation of Alternatives						
					Jobs		Income		
	CH Treat	RH Treat	Treat STD	Cost (Millions) (1)	Annual Jobs	% Annual Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action**	16	5	WIPP WAC	91	73	0.00	0.9	0.00	0.0
Decentralized***	16	5	WIPP WAC	292	292	0.01	3.4	0.00	0.0
Regionalized-1	5	2	Reduce Gas	198	199	0.01	2.3	0.00	0.0
Regionalized-2	5	2	LDR	295	295	0.01	3.4	0.00	0.0
Regionalized-3	3	2	LDR	295	295	0.01	3.4	0.00	0.0
Centralized	WIPP	2	LDR	295	295	0.01	3.4	0.00	0.0

Notes:
(1) In current 1990 dollars.
(2) Compared to 1990 baseline.
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

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Table II-2.3-11. ANL-E—TRUW—Infrastructure Impacts for Treatment

TRUW Alternatives	Number of Sites		Treat STD	Effect of Implementation of Alternatives									
				Land Use		Water		Waste Water		Power		Employment (FTE)	
	CH Treat	RH Treat		Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Peak Construction Employment	% of Current Employment (1)
No Action**	16	5	WIPP WAC	0	0.00	921	0.05	921	0.05	0.09	0.41	0	0.00
Decentralized***	16	5	WIPP WAC	2.7	0.23	4769	0.26	1509	0.06	0.44	1.93	172	3.90
Regionalized-1	5	2	Reduce Gas	1.4	0.12	3207	0.18	941	0.04	0.27	1.17	114	2.60
Regionalized-2	5	2	LDR	1.8	0.17	3726	0.21	941	0.04	0.31	1.34	207	4.60
Regionalized-3	3	2	LDR	1.8	0.17	3726	0.21	941	0.04	0.31	1.34	207	4.60
Centralized	WIPP	2	LDR	1.8	0.17	3726	0.21	941	0.04	0.31	1.34	207	4.60

Notes:
GPD = Gallons per Day
MW = Megawatts Electric
FTE = Full Time Equivalent
(1) Based on 1990 Site Employment.
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

Table II-2.3-12. ANL-E—TRUW—Cost

TRUW Alternatives	Number of Sites		Treat STD (2)	Total Cost (Millions) (1)	Life-Cycle Component				Functional Area		
	CH Treat	RH Treat			Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Retrieval Characterization (Millions)	Treatment (Millions)	Storage (Millions)
No Action**	11	5	WIPP - WAC	104	0	0	86	18	0	92	12
Decentralized***	16	5	WIPP - WAC	330	25	89	183	33	0	308	22
Regionalized-1	5	2	Reduce Gas	224	18	56	140	10	0	224	0
Regionalized-2	5	2	LDR	334	24	118	178	14	0	334	0
Regionalized-3	3	2	LDR	334	24	118	178	14	0	334	0
Centralized	WIPP	2	LDR	334	24	118	178	14	0	334	0

Notes:
** For No Action Alternative, storage is indefinite; no disposal at WIPP to be assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
The Life Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum may not reflect the true total cost.
(1) In Current 1994 Dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.
(2) Treatment standard (STD) applied: treat to WIPP Waste Acceptance Criteria (WIPP WAC), treat for reduced gas generation (Reduce Gas), treat to Land Disposal Restrictions (LDR).

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3.0 BNL Site

BNL currently is custodian of significant volumes of LLMW. The waste type is treated independently in the following section.

3.1 BNL LLMW

The WM PEIS impact analysis at BNLwas based on projected LLMW volumes of 195 cubic meters. Updated data from BNL reduced the total inventory and 20 year projected generation of LLMW at BNL to 20 cubic meters; therefore, the WM PEIS impact results at BNL are expected to be conservative.

Impact Category

No.	Description	Table No.	Page No.
1.	BNL—LLMW—Treatment and Disposal: Estimated Number of Fatalities	II-3.1-1	3-2
2.	BNL—LLMW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects	II-3.1-2	3-3
3.	BNL—LLMW—Disposal: Estimated Number of Cancer Incidences	II-3.1-3	3-4
4.	BNL—LLMW—Treatment and Disposal: MEI Probability of Cancer Fatality	II-3.1-4	3-5
5.	BNL—LLMW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects	II-3.1-5	3-6
6.	BNL—LLMW—Treatment and Disposal: Noncancer Health Risk from Chemical Exposure	II-3.1-6	3-7
7.	BNL—LLMW—Emissions in Tons per Year of Criteria Air Pollutants	II-3.1-7	3-8
8.	BNL—LLMW—Percent of Standard/Guideline for Criteria Air Pollutants	II-3.1-8	3-9
9.	BNL—LLMW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-3.1-9	3-10
10.	BNL—LLMW—Impacts on Water Resources Due to Increased Water Use	II-3.1-10	3-11
11.	BNL—LLMW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal	II-3.1-11	3-12
12.	BNL—LLMW—Percent of Drinking Water Standards for Hazardous Constituents in Groundwater from Disposal (Contact-Handled)	II-3.1-12	3-13
13.	BNL—LLMW—Socioeconomics Impacts for Treatment and Disposal	II-3.1-13	3-14
14.	BNL—LLMW—Infrastructure Impacts for Treatment and Disposal	II-3.1-14	3-15
15.	BNL—LLMW—Cost	II-3.1-15	3-16

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Table II-3.1-1. BNL—LLMW—Treatment and Disposal: Estimated Number of Fatalities

LLMW Alternatives	Number of Sites		Treatment				Disposal	
			WM Worker		Offsite Population	Noninvolved Workers	WM Worker	
	T	D	Radiation Exposure	Physical Hazards	Radiation Exposure	Radiation Exposure	Radiation Exposure	Physical Hazards
No Action	3	-	1.5E-04	7.5E-03	2.3E-04	1.4E-06	- -	- -
Decentralized	37	16	1.2E-04	1.6E-02	1.2E-05	7.1E-08	6.1E-05	1.5E-03
Regionalized-1	11	12	5.7E-05	4.0E-03	5.2E-08	3.2E-10	- -	- -
Regionalized-2	7	6	5.7E-05	4.0E-03	5.2E-08	3.2E-10	- -	- -
Regionalized-3	7	1	5.7E-05	4.0E-03	5.2E-08	3.2E-10	- -	- -
Regionalized-4	4	6	5.7E-05	4.0E-03	5.2E-08	3.2E-10	- -	- -
Centralized	1	1	5.7E-05	4.0E-03	5.2E-08	3.2E-10	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this Alternative.

Table II-3.1-2. BNL—LLMW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

LLMW Alternatives	Number of Sites		Offsite Population				Noninvolved Workers				WM Worker			
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects
No Action	3	-	4.6E-01	7.8E-04	1.6E-05	4.6E-05	2.8E-03	4.8E-06	5.5E-07	2.8E-07	3.7E-01	5.2E-04	3.1E-08	2.2E-05
Decentralized	37	16	2.4E-02	4.1E-05	7.3E-07	2.4E-06	1.4E-04	2.4E-07	2.5E-08	1.4E-08	3.1E-01	4.3E-04	1.9E-06	1.8E-05
Regionalized-1	11	12	1.0E-04	1.8E-07	9.0E-09	1.0E-08	6.4E-07	1.1E-09	3.1E-10	6.4E-11	1.4E-01	2.0E-04	1.6E-08	8.5E-06
Regionalized-2	7	6	1.0E-04	1.8E-07	9.0E-09	1.0E-08	6.4E-07	1.1E-09	3.1E-10	6.4E-11	1.4E-01	2.0E-04	1.6E-08	8.5E-06
Regionalized-3	7	1	1.0E-04	1.8E-07	9.0E-09	1.0E-08	6.4E-07	1.1E-09	3.1E-10	6.4E-11	1.4E-01	2.0E-04	1.6E-08	8.5E-06
Regionalized-4	4	6	1.0E-04	1.8E-07	9.0E-09	1.0E-08	6.4E-07	1.1E-09	3.1E-10	6.4E-11	1.4E-01	2.0E-04	1.6E-08	8.5E-06
Centralized	1	1	1.0E-04	1.8E-07	9.0E-09	1.0E-08	6.4E-07	1.1E-09	3.1E-10	6.4E-11	1.4E-01	2.0E-04	1.6E-08	8.5E-06

Notes:
T = Treatment
D = Disposal

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Table II-3.1-3. BNL—LLMW—Disposal: Estimated Number of Cancer Incidences

LLMW Alternatives	Number of Sites		WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	3	-	- -	- -	- -
Decentralized	37	16	1.5E-01	2.1E-04	9.2E-06
Regionalized-1	11	12	- -	- -	- -
Regionalized-2	7	6	- -	- -	- -
Regionalized-3	7	1	- -	- -	- -
Regionalized-4	4	6	- -	- -	- -
Centralized	1	1	- -	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this Alternative.

Table II-3.1-4. BNL—LLMW—Treatment and Disposal: MEI Probability of Cancer Fatality

LLMW Alternatives	Number of Sites		Treatment		Disposal
	T	D	Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability	Hypothetical Farm Family Most Exposed Lifetime MEI Cancer Fatality Probability
No Action	3	-	3.1E-09	1.6E-09	- -
Decentralized	37	16	1.6E-10	7.9E-11	1.1E-05
Regionalized-1	11	12	7.0E-13	3.6E-13	- -
Regionalized-2	7	6	7.0E-13	3.6E-13	- -
Regionalized-3	7	1	7.0E-13	3.6E-13	- -
Regionalized-4	4	6	7.0E-13	3.6E-13	- -
Centralized	1	1	7.0E-13	3.6E-13	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered under the Alternative

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Table II-3.1-5. BNL—LLMW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects

LLMW Alternatives	Number of Sites		Treatment								Disposal			
			Offsite Population MEI				Noninvolved Worker MEI				Most Exposed Farm Family Lifetime MEI			
	T	D	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability
No Action	3	-	6.1E-06	1.0E-08	2.6E-10	6.1E-10	3.1E-06	5.3E-09	2.6E-10	3.1E-10	- -	- -	- -	- -
Decentralized	37	16	3.2E-07	5.4E-10	1.2E-11	3.23-11	1.6E-07	2.7E-10	1.2E-11	1.6E-11	2.1E-02	3.6E-05	8.1E-06	2.1E-06
Regionalized-1	11	12	1.4E-09	2.4E-12	1.5E-13	1.4E-13	7.1E-10	1.2E-12	1.5E-13	7.1E-14	- -	- -	- -	- -
Regionalized-2	7	6	1.4E-09	2.4E-12	1.5E-13	1.4E-13	7.1E-10	1.2E-12	1.5E-13	7.1E-14	- -	- -	- -	- -
Regionalized-3	7	1	1.4E-09	2.4E-12	1.5E-13	1.4E-13	7.1E-10	1.2E-12	1.5E-13	7.1E-14	- -	- -	- -	- -
Regionalized-4	4	6	1.4E-09	2.4E-12	1.5E-13	1.4E-13	7.1E-10	1.2E-12	1.5E-13	7.1E-14	- -	- -	- -	- -
Centralized	1	1	1.4E-09	2.4E-12	1.5E-13	1.4E-13	7.1E-10	1.2E-12	1.5E-13	7.1E-14	- -	- -	- -	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered for this alternative.

Table II-3.1-6. BNL—LLMW—Treatment and Disposal: Noncancer Health Risk from Chemical Exposure

LLMW Alternatives	Number of Sites		Treatment			Disposal
	T	D	Offsite MEI Hazard Index	Noninvolved Worker MEI Hazard Index	WM Worker Exposure Index	Hypothetical Farm Family Most Exposed Lifetime Hazard Index
No Action	3	-	2.6E-07	2.6E-07	4.4E-07	- -
Decentralized	37	16	1.8E-08	1.8E-08	5.0E-05	1.6E-01
Regionalized-1	11	12	1.1E-10	1.1E-10	4.4E-07	- -
Regionalized-2	7	6	1.1E-10	1.1E-10	4.4E-07	- -
Regionalized-3	7	1	1.1E-10	1.1E-10	4.4E-07	- -
Regionalized-4	4	6	1.1E-10	1.1E-10	4.4E-07	- -
Centralized	1	1	1.1E-10	1.1E-10	4.4E-07	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this alternative.
MEI = Maximally Exposed Individual
Hazard Index = Sum of hazard quotient values for all noncarcinogenic chemicals. The hazard quotient is the chemical-specific ratio of media exposure concentrations to concentrations believed to have no appreciable adverse effects.
Exposure Index = Ratio of Exposure concentration to chemical-specific occupational threshold limits.

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Table II-3.1-7. BNL—LLMW—Emissions in Tons per Year of Criteria Air Pollutants

LLMW Alternatives	Number of Sites		Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	2 (1/1)	2 (2/0)	0	0	0	0	1 (0/1)	0	0	0	0	0
Decentralized	37	16	11 (0/11)	3 (1/2)	0	0	0	1 (0/1)	2 (0/2)	0	0	0	0	0
Regionalized-1	11	12	0	0	0	0	0	0	1 (0/1)	0	0	0	0	0
Regionalized-2	7	6	0	0	0	0	0	0	1 (0/1)	0	0	0	0	0
Regionalized-3	7	1	0	0	0	0	0	0	1 (0/1)	0	0	0	0	0
Regionalized-4	4	6	0	0	0	0	0	0	1 (0/1)	0	0	0	0	0
Centralized	1	1	0	0	0	0	0	0	1 (0/1)	0	0	0	0	0

Notes:
T = Treatment
D = Disposal
Emissions <1 tons per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions / worker vehicles emission).
(2) Values = total emissions (stationary-source emissions / mobile-source emission).

Table II-3.1-8. BNL—LLMW—Percent of Standard/Guideline for Criteria Air Pollutants

LLMW Alternatives	Number of Sites		Construction					
			Percent of Tons/Year General Conformity Rule (1)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	--	8 (7/1)	--	--	--	2 (1/1)
Decentralized	37	16	--	14 (5/9)	--	--	--	6 (1/5)
Regionalized-1	11	12	--	0	--	--	--	0
Regionalized-2	7	6	--	0	--	--	--	0
Regionalized-3	7	1	--	0	--	--	--	0
Regionalized-4	4	6	--	0	--	--	--	0
Centralized	1	1	--	0	--	--	--	0

LLMW Alternatives	Number of Sites		Operations & Maintenance											
			Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
	T	D	CO (4)	NO2 (5)	Pb (4)	PM10 (4)	SO2 (4)	VOC (5)	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	0	1 (0/1)	0	0	0	0	--	--	--	--	--	--
Decentralized	37	16	0	2 (0/2)	0	0	0	1 (0/1)	0	0	0	0	0	0
Regionalized-1	11	12	0	1 (0/1)	0	0	0	0	--	--	--	--	--	--
Regionalized-2	7	6	0	1 (0/1)	0	0	0	0	--	--	--	--	--	--
Regionalized-3	7	1	0	1 (0/1)	0	0	0	0	--	--	--	--	--	--
Regionalized-4	4	6	0	1 (0/1)	0	0	0	0	--	--	--	--	--	--
Centralized	1	1	0	1 (0/1)	0	0	0	0	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide. VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) GCR de minimus levels are applied, since PSD regulations are not applicable to construction activities. Values = % of total emissions (% of equipment emissions / % of worker vehicles emission).
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions are assumed to be negligible for all but the Decentralized Alternative.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.
(5) Nonattainment area for ozone. Pollutant is an ozone precursor, therefore GCR de minimus levels are applied. Values = % of total emissions (% of stationary-source emissions / % of mobile-source emissions).

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Table II-3.1-9. BNL—LLMW—Percent of Standards/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

LLMW Alternatives	Number of Sites		Operations & Maintenance											
	T	D	Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action	3	-	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Decentralized	37	16	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Regionalized-1	11	12	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Regionalized-2	7	6	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Regionalized-3	7	1	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Regionalized-4	4	6	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Centralized	1	1	0	0	0	- -	- -	0	- -	- -	0	0	0	0

LLMW Alternatives	Number of Sites		Operations & Maintenance									
	T	D	Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action	3	-	- -	0	0	0	- -	0	0	0	- -	- -
Decentralized	37	16	- -	0	0	0	- -	0	0	0	- -	- -
Regionalized-1	11	12	- -	0	0	0	- -	0	0	0	- -	- -
Regionalized-2	7	6	- -	0	0	0	- -	0	0	0	- -	- -
Regionalized-3	7	1	- -	0	0	0	- -	0	0	0	- -	- -
Regionalized-4	4	6	- -	0	0	0	- -	0	0	0	- -	- -
Centralized	1	1	- -	0	0	0	- -	0	0	0	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Emissions of this hazardous or toxic air pollutant are assumed to be negligible.
Percentages <1% are shown as zeros.

Table II-3.1-10. BNL—LLMW—Impacts on Water Resources Due to Increased Water Use

LLMW Alternatives	Number of Sites		Construction			Operations			
	T	D	Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action	3	-	1736	<0.1	- -	117	<0.1	- -	<0.1
Decentralized	37	16	2083	<0.1	- -	370	<0.1	- -	<0.1
Regionalized-1	11	12	0	<0.1	- -	42	<0.1	- -	<0.1
Regionalized-2	7	6	0	<0.1	- -	42	<0.1	- -	<0.1
Regionalized-3	7	1	0	<0.1	- -	42	<0.1	- -	<0.1
Regionalized-4	4	6	0	<0.1	- -	42	<0.1	- -	<0.1
Centralized	1	1	0	<0.1	- -	42	<0.1	- -	<0.1

Notes:
T = Treatment
D = Disposal
Water supplied by groundwater in the Upper Glacial Aquifer and Magothy Aquifer. Current water use = 4,500,000 gall
Wastewater discharged to the Peconic River.
Average flow rate of the Peconic River = 1,000,000 gallons/day.
- - = Stream Flow is not considered for this site.
<0.1 indicates that the percentage is less than 0.1%.

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Table II-3.1-11. BNL—LLMW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal (Contact-Handled)

LLMW Alternatives	Number of Sites T	Number of Sites D	Ac 225	Ac 227	Am 241	Am 242	Am 243	C 14	Cs 135	Cs 137	Cm 242	Cm 244	Cm 245	I 129	Pb 210	Np 237	Ni 59	Ni 63	Pd 107	Pu 238	Pu 239	Pu 240	Pu 241
No Action	3	-	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1	11	12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-2	7	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	4	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

LLMW Alternatives	Number of Sites T	Number of Sites D	Po 210	K 40	Pa 231	Ra 223	Ra 226	Sm 151	Se 79	Sr 90	Tc 99	Th 227	Th 228	Th 229	Th 230	Th 232	Sn 126	U 233	U 234	U 235	U 236	U 238	Y 90	Zr 93
No Action	3	-	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1	11	12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-2	7	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	4	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
- - = No disposal at this site for this alternative.

Table II-3.1-12. BNL—LLMW—Percent of Drinking Water Standards for Hazardous Constituents in Groundwater from Disposal (Contact-Handled)

LLMW Alternatives	T	D	Acetone	Arsenic	Barium	Benzene	Cadmium	Carbon Tetrachloride	Chromium	Cyanide
No Action	3	-	--	--	--	--	--	--	--	--
Decentralized	37	16	0	2	0	200	0	6	0	0
Regionalized-1	11	12	--	--	--	--	--	--	--	--
Regionalized-2	7	6	--	--	--	--	--	--	--	--
Regionalized-3	7	1	--	--	--	--	--	--	--	--
Regionalized-4	4	6	--	--	--	--	--	--	--	--
Centralized	1	1	--	--	--	--	--	--	--	--

LLMW Alternatives	T	D	1,2-dichloro-ethane	Lead	Mercury	Methylene Chloride	Selenium	Silver	1,2,2-trichloro-1,1-trifluoroethane
No Action	3	-	--	--	--	--	--	--	--
Decentralized	37	16	70	0	0	70	30	7	0
Regionalized-1	11	12	--	--	--	--	--	--	--
Regionalized-2	7	6	--	--	--	--	--	--	--
Regionalized-3	7	1	--	--	--	--	--	--	--
Regionalized-4	4	6	--	--	--	--	--	--	--
Centralized	1	1	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
"--" = No disposal at this site for this alternative.

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Table II-3.1-13. BNL—LLMW—Socioeconomics Impacts for Treatment and Disposal

LLMW Alternatives	Number of Sites		Effect of Implementation of Alternatives					
				Jobs		Income		
	T	D	Cost (Millions) (1)	Annual Jobs	% Annual Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action	3	-	22	18	0.00	0.2	0.00	0.00
Decentralized	37	16	88	92	0.01	1.0	0.00	0.00
Regionalized-1	11	12	7	8	0.00	0.1	0.00	0.00
Regionalized-2	7	6	7	8	0.00	0.1	0.00	0.00
Regionalized-3	7	1	7	8	0.00	0.1	0.00	0.00
Regionalized-4	4	6	7	8	0.00	0.1	0.00	0.00
Centralized	1	1	7	8	0.00	0.1	0.00	0.00

Notes:
T = Treatment
D = Disposal
(1) In current 1990 dollars.
(2) Compared to 1990 baseline.

Table II-3.1-14. BNL—LLMW—Infrastructure Impacts for Treatment and Disposal

LLMW Alternatives	Number of Sites		Effect of Implementation of Alternatives									
			Land Use		Water		Waste Water		Power		Employment (FTE)	
	T	D	Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	% Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Peak Construction Employment	% of Current Employment (1)
No Action	3	-	1.0	0.03	1736	0.03	117	0.01	0.23	0.49	10	0.3
Decentralized	37	16	1.6	0.04	2083	0.03	370	0.02	0.2	0.42	86	2
Regionalized-1	11	12	0.0	0.00	42	0.00	42	0.00	0.06	0.12	0	0
Regionalized-2	7	6	0.0	0.00	42	0.00	42	0.00	0.06	0.12	0	0
Regionalized-3	7	1	0.0	0.00	42	0.00	42	0.00	0.06	0.12	0	0
Regionalized-4	4	6	0.0	0.00	42	0.00	42	0.00	0.06	0.12	0	0
Centralized	1	1	0.0	0.00	42	0.00	42	0.00	0.06	0.12	0	0

Notes:
T = Treatment
D = Disposal
GPD = Gallons per Day
MW = Megawatts
(1) Based on 1991 Site Employment

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Table II-3.1-15. BNL—LLMW—Cost

LLMW Alternatives	Number of Sites		Total Cost (Millions) (1)	Cost by Life-Cycle Component (1)				Cost by Functional Area (1)		
	T	D		Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Treatment (Millions)	Storage (Millions)	Disposal (Millions)
No Action	3	-	25	2	1	9	0.1	11	15	0
Decentralized	37	16	100	14	44	21	6	100	0	0
Regionalized-1	11	12	8	0	0	4	5	8	0	0
Regionalized-2	7	6	8	0	0	4	5	8	0	0
Regionalized-3	7	1	8	0	0	4	5	8	0	0
Regionalized-4	4	6	8	0	0	4	5	8	0	0
Centralized	1	1	8	0	0	4	5	8	0	0

Notes:
T = Treatment
D = Disposal
The Life-Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum of these may not reflect the true total cost.
(1) In current 1994 dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

3.2 BNL LLW

Analysis of LLW impacts at BNL assumed that there was no inventory or 20-year projected volume of LLW, based upon the 1992 IDB. Updated information from the site indicates that there are 400 cubic meters in inventory and a projected 20-year volume of 4000 cubic meters. No analysis was conducted for LLW at BNL.

4.0 FEMP

FEMP currently is custodian of significant volumes of LLMW and LLW. Each of the waste types is treated independently in the following sections.

4.1 FEMP LLMW

Fifteen tables immediately following portray the impacts of LLMW at FEMP. These tables are presented as follows:

Impact Category

No.	Description	Table No.	Page No.
1.	FEMP—LLMW—Treatment and Disposal: Estimated Number of Fatalities	II-4.1-1	4-2
2.	FEMP—LLMW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects	II-4.1-2	4-3
3.	FEMP—LLMW—Disposal: Estimated Number of Cancer Incidences	II-4.1-3	4-4
4.	FEMP—LLMW—Treatment and Disposal: MEI Probability of Cancer Fatality	II-4.1-4	4-5
5.	FEMP—LLMW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects	II-4.1-5	4-6
6.	FEMP—LLMW—Treatment and Disposal: Noncancer Health Risk from Chemical Exposure	II-4.1-6	4-7
7.	FEMP—LLMW—Emissions in Tons per Year of Criteria Air Pollutants	II-4.1-7	4-8
8.	FEMP—LLMW—Percent of Standard/Guideline for Criteria Air Pollutants	II-4.1-8	4-9
9.	FEMP—LLMW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-4.1-9	4-10
10.	FEMP—LLMW—Impacts on Water Resources Due to Increased Water Use	II-4.1-10	4-11
11.	FEMP—LLMW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal (Contact-Handled)	II-4.1-11	4-12
12.	FEMP—LLMW—Percent of Drinking Water Standards for Hazardous Constituents in Groundwater from Disposal (Contact-Handled)	II-4.1-12	4-13
13.	FEMP—LLMW—Socioeconomics Impacts for Treatment and Disposal	II-4.1-13	4-14
14.	FEMP—LLMW—Infrastructure Impacts for Treatment and Disposal	II-4.1-14	4-15
15.	FEMP—LLMW—Cost	II-4.1-15	4-16

Table II-4.1-1. FEMP—LLMW—Treatment and Disposal: Estimated Number of Fatalities

LLMW Alternatives	Number of Sites		Treatment				Disposal	
			WM Worker		Offsite Population	Noninvolved Workers	WM Worker	
	T	D	Radiation Exposure	Physical Hazards	Radiation Exposure	Radiation Exposure	Radiation Exposure	Physical Hazards
No Action	3	-	6.1E-04	5.1E-02	6.3E-04	4.7E-06	- -	- -
Decentralized	37	16	2.9E-04	1.6E-01	2.6E-05	1.9E-07	2.9E-04	9.0E-03
Regionalized-1	11	12	2.7E-02	3.2E-01	7.0E-04	4.7E-06	2.9E-05	9.0E-03
Regionalized-2	7	6	2.5E-04	8.8E-02	1.4E-07	1.1E-09	- -	- -
Regionalized-3	7	1	2.5E-04	8.8E-02	1.4E-07	1.1E-09	- -	- -
Regionalized-4	4	6	2.5E-04	8.8E-02	1.4E-07	1.1E-09	- -	- -
Centralized	1	1	2.5E-04	8.8E-02	1.4E-07	1.1E-09	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this Alternative.

Table II-4.1-2. FEMP—LLMW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

LLMW Alternatives	Number of Sites		Offsite Population				Noninvolved Workers				WM Worker			
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects
No Action	3	-	1.3E+00	2.2E-03	6.7E-05	1.3E-04	9.5E-03	1.6E-05	4.7E-06	9.5E-07	1.5E+00	2.2E-03	3.9E-06	9.2E-05
Decentralized	37	16	5.2E-02	8.8E-05	2.8E-06	5.2E-06	3.9E-04	6.5E-07	2.0E-07	3.9E-08	7.3E-01	1.0E-03	7.3E-05	4.4E-05
Regionalized-1	11	12	1.4E+00	2.4E-03	7.9E-06	1.4E-04	9.4E-03	1.6E-05	5.5E-07	9.4E-07	6.8E+01	9.5E-02	3.5E-04	4.1E-03
Regionalized-2	7	6	2.9E-04	4.9E-07	9.2E-08	2.9E-08	2.1E-06	3.6E-09	6.4E-09	2.1E-10	6.3E-01	8.8E-04	1.5E-06	3.8E-05
Regionalized-3	7	1	2.9E-04	4.9E-07	9.2E-08	2.9E-08	2.1E-06	3.6E-09	6.4E-09	2.1E-10	6.3E-01	8.8E-04	1.5E-06	3.8E-05
Regionalized-4	4	6	2.9E-04	4.9E-07	9.2E-08	2.9E-08	2.1E-06	3.6E-09	6.4E-09	2.1E-10	6.3E-01	8.8E-04	1.5E-06	3.8E-05
Centralized	1	1	2.9E-04	4.9E-07	9.2E-08	2.9E-08	2.1E-06	3.6E-09	6.4E-09	2.1E-10	6.3E-01	8.8E-04	1.5E-06	3.8E-05

Notes:
T = Treatment
D = Disposal

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Table II-4.1-3. FEMP—LLMW—Disposal: Estimated Number of Cancer Incidences

LLMW Alternatives	Number of Sites		WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	3	-	- -	- -	- -
Decentralized	37	16	7.2E-01	1.0E-03	4.3E-05
Regionalized-1	11	12	7.2E-01	1.0E-03	4.3E-05
Regionalized-2	7	6	- -	- -	- -
Regionalized-3	7	1	- -	- -	- -
Regionalized-4	4	6	- -	- -	- -
Centralized	1	1	- -	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this Alternative.

Table II-4.1–4. FEMP—LLMW—Treatment and Disposal: MEI Probability of Cancer Fatality

LLMW Alternatives	Number of Sites		Treatment		Disposal
	T	D	Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability	Hypothetical Farm Family Most Exposed Lifetime MEI Cancer Fatality Probability
No Action	3	-	1.2E-08	4.2E-09	- -
Decentralized	37	16	4.9E-10	1.7E-10	3.8E-05
Regionalized-1	11	12	1.3E-08	4.1E-09	3.8E-05
Regionalized-2	7	6	2.7E-12	9.4E-13	- -
Regionalized-3	7	1	2.7E-12	9.4E-13	- -
Regionalized-4	4	6	2.7E-12	9.4E-13	- -
Centralized	1	1	2.7E-12	9.4E-13	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered under the Alternative

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Table II-4.1-5. FEMP—LLMW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects

LLMW Alternatives	Number of Sites		Treatment								Disposal			
			Offsite Population MEI				Noninvolved Worker MEI				Most Exposed Farm Family Lifetime MEI			
	T	D	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability
No Action	3	-	2.4E-05	4.1E-08	2.1E-09	2.4E-09	8.3E-06	1.4E-08	2.1E-09	8.3E-10	--	--	--	--
Decentralized	37	16	9.7E-07	1.7E-09	8.9E-11	9.7E-11	3.4E-07	5.8E-10	8.9E-11	3.4E-11	7.6E-02	1.3E-04	1.4E-05	7.6E-06
Regionalized-1	11	12	2.6E-05	4.5E-08	2.5E-10	2.6E-09	8.3E-06	1.4E-08	2.5E-10	8.3E-10	7.6E-02	1.3E-04	1.4E-05	7.6E-06
Regionalized-2	7	6	5.4E-09	9.2E-12	2.9E-12	5.4E-13	1.9E-09	3.2E-12	2.9E-12	1.9E-13	--	--	--	--
Regionalized-3	7	1	5.4E-09	9.2E-12	2.9E-12	5.4E-13	1.9E-09	3.2E-12	2.9E-12	1.9E-13	--	--	--	--
Regionalized-4	4	6	5.4E-09	9.2E-12	2.9E-12	5.4E-13	1.9E-09	3.2E-12	2.9E-12	1.9E-13	--	--	--	--
Centralized	1	1	5.4E-09	9.2E-12	2.9E-12	5.4E-13	1.9E-09	3.2E-12	2.9E-12	1.9E-13	--	--	--	--

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
-- = Disposal is not considered for this alternative.

Table II-4.1-6. FEMP—LLMW—Treatment and Disposal: Noncancer Health Risk from Chemical Exposure

LLMW Alternatives	Number of Sites		Treatment			Disposal
	T	D	Offsite MEI Hazard Index	Noninvolved Worker MEI Hazard Index	WM Worker Exposure Index	Hypothetical Farm Family Most Exposed Lifetime Hazard Index
No Action	3	-	1.5E-06	1.5E-06	7.1E-06	- -
Decentralized	37	16	1.2E-07	1.2E-07	5.6E-04	2.4E-01
Regionalized-1	11	12	3.8E-07	3.8E-07	1.2E-03	2.4E-01
Regionalized-2	7	6	6.3E-10	6.3E-10	6.7E-06	- -
Regionalized-3	7	1	6.3E-10	6.3E-10	6.7E-06	- -
Regionalized-4	4	6	6.3E-10	6.3E-10	6.7E-06	- -
Centralized	1	1	6.3E-10	6.3E-10	6.7E-06	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this alternative.
MEI = Maximally Exposed Individual
Hazard Index = Sum of hazard quotient values for all noncarcinogenic chemicals. The hazard quotient is the chemical-specific ratio of media exposure concentrations to concentrations believed to have no appreciable adverse effects.
Exposure Index = Ratio of Exposure concentration to chemical-specific occupational threshold limits.

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Table II-4.1-7. FEMP—LLMW—Emissions in Tons per Year of Criteria Air Pollutants

LLMW Alternatives	Number of Sites		Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	16 (8/8)	22 (20/2)	0	2 (2/0)	2 (2/0)	2 (1/1)	3 (0/3)	2 (1/1)	0	0	0	0
Decentralized	37	16	38 (6/32)	23 (16/7)	0	1 (1/0)	2 (2/0)	6 (2/4)	18 (0/18)	5 (1/4)	0	0	0	2 (0/2)
Regionalized-1	11	12	57 (8/49)	30 (20/10)	0	2 (2/0)	2 (2/0)	8 (2/6)	29 (0/29)	9 (3/6)	0	2 (2/0)	0	4 (0/4)
Regionalized-2	7	6	9 (0/9)	3 (1/2)	0	0	0	1 (0/1)	8 (0/8)	2 (0/2)	0	0	0	1 (0/1)
Regionalized-3	7	1	9 (0/9)	3 (1/2)	0	0	0	1 (0/1)	8 (0/8)	2 (0/2)	0	0	0	1 (0/1)
Regionalized-4	4	6	9 (0/9)	3 (1/2)	0	0	0	1 (0/1)	8 (0/8)	2 (0/2)	0	0	0	1 (0/1)
Centralized	1	1	9 (0/9)	3 (1/2)	0	0	0	1 (0/1)	8 (0/8)	2 (0/2)	0	0	0	1 (0/1)

Notes:
T = Treatment
D = Disposal
Emissions <1 tons per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions / worker vehicles emission).
(2) Values = total emissions (stationary-source emissions / mobile-source emission).

Table II-4.1-8. FEMP—LLMW—Percent of Standard/Guideline for Criteria Air Pollutants

LLMW Alternatives	Number of Sites		Construction					
			Percent of Tons/Year General Conformity Rule (1)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	--	22 (20/2)	--	--	--	6 (4/2)
Decentralized	37	16	--	22 (16/6)	--	--	--	11 (3/8)
Regionalized-1	11	12	--	30 (20/10)	--	--	--	16 (4/12)
Regionalized-2	7	6	--	3 (1/2)	--	--	--	2 (0/2)
Regionalized-3	7	1	--	3 (1/2)	--	--	--	2 (0/2)
Regionalized-4	4	6	--	3 (1/2)	--	--	--	2 (0/2)
Centralized	1	1	--	3 (1/2)	--	--	--	2 (0/2)

LLMW Alternatives	Number of Sites		Operations & Maintenance											
			Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
	T	D	CO (4)	NO2 (5)	Pb (4)	PM10 (4)	SO2 (4)	VOC (5)	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	0	2 (1/1)	0	1	0	1 (0/1)	--	--	--	--	--	--
Decentralized	37	16	0	5 (1/4)	0	2	0	4 (0/4)	0	0	0	0	0	0
Regionalized-1	11	12	0	9 (3/6)	0	12	0	7 (0/7)	0	0	0	0	3	0
Regionalized-2	7	6	0	2 (0/2)	0	0	0	2 (0/2)	--	--	--	--	--	--
Regionalized-3	7	1	0	2 (0/2)	0	0	0	2 (0/2)	--	--	--	--	--	--
Regionalized-4	4	6	0	2 (0/2)	0	0	0	2 (0/2)	--	--	--	--	--	--
Centralized	1	1	0	2 (0/2)	0	0	0	2 (0/2)	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) GCR de minimus levels are applied, since PSD regulations are not applicable to construction activities. Values = % of total emissions (% of equipment emissions / % of worker vehicles emission).
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions are assumed to be negligible for all but the Decentralized Alternative.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.
(5) Nonattainment area for ozone. Pollutant is an ozone precursor, therefore GCR de minimus levels are applied. Values = % of total emissions (% of stationary-source emissions / % of mobile-source emissions).

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Table II-4.1-9. FEMP—LLMW—Percent of Standards/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

LLMW Alternatives	Number of Sites		Operations & Maintenance											
	T	D	Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action	3	-	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Decentralized	37	16	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Regionalized-1	11	12	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Regionalized-2	7	6	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Regionalized-3	7	1	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Regionalized-4	4	6	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Centralized	1	1	0	0	0	- -	- -	0	- -	- -	0	0	0	0

LLMW Alternatives	Number of Sites		Operations & Maintenance									
	T	D	Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action	3	-	- -	0	0	0	- -	0	0	0	- -	- -
Decentralized	37	16	- -	0	0	0	- -	0	0	0	- -	- -
Regionalized-1	11	12	- -	0	0	0	- -	0	0	0	- -	- -
Regionalized-2	7	6	- -	0	0	0	- -	0	0	0	- -	- -
Regionalized-3	7	1	- -	0	0	0	- -	0	0	0	- -	- -
Regionalized-4	4	6	- -	0	0	0	- -	0	0	0	- -	- -
Centralized	1	1	- -	0	0	0	- -	0	0	0	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Emissions of this hazardous or toxic air pollutant are assumed to be negligible.
Percentages <1% are shown as zeros.

Table II-4.1-10. FEMP—LLMW—Impacts on Water Resources Due to Increased Water Use

LLMW Alternatives	Number of Sites		Construction			Operations			
	T	D	Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action	3	-	17682	4.4	- -	1013	0.3	- -	<0.1
Decentralized	37	16	17543	4.4	- -	2799	0.7	- -	0.20
Regionalized-1	11	12	23556	5.9	- -	4630	1.2	- -	0.30
Regionalized-2	7	6	2104	0.5	- -	1296	0.3	- -	<0.1
Regionalized-3	7	1	2104	0.5	- -	1296	0.3	- -	<0.1
Regionalized-4	4	6	2104	0.5	- -	1296	0.3	- -	<0.1
Centralized	1	1	2104	0.5	- -	1296	0.3	- -	<0.1

Notes:
T = Treatment
D = Disposal
Water supplied by groundwater in the Miami Valley Aquifer. Current water use = 400,000 gallons/day.
Wastewater discharged to the Great Miami River.
Average flow rate of the Great Miami River = 1,832,000 gallons/day.
- - = Stream Flow is not considered for this site.
<0.1 indicates that the percentage is less than 0.1%.

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Table II-4.1-11. FEMP—LLMW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal (Contact-Handled)

LLMW Alternatives	Number of Sites T	Number of Sites D	Ac 225	Ac 227	Am 241	Am 242	Am 243	C 14	Cs 135	Cs 137	Cm 242	Cm 244	Cm 245	I 129	Pb 210	Np 237	Ni 59	Ni 63	Pd 107	Pu 238	Pu 239	Pu 240	Pu 241
No Action	3	-	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Decentralized	37	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-2	7	6	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-3	7	1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-4	4	6	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Centralized	1	1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

LLMW Alternatives	Number of Sites T	Number of Sites D	Po 210	K 40	Pa 231	Ra 223	Ra 226	Sm 151	Se 79	Sr 90	Tc 99	Th 227	Th 228	Th 229	Th 230	Th 232	Sn 126	U 233	U 234	U 235	U 236	U 238	Y 90	Zr 93
No Action	3	-	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Decentralized	37	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	400	0	0
Regionalized-1	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	400	0	0
Regionalized-2	7	6	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-3	7	1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-4	4	6	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Centralized	1	1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

Notes:
T = Treatment
D = Disposal
- - = No disposal at this site for this alternative.

Table II-4.1-12. FEMP—LLMW—Percent of Drinking Water Standards for Hazardous Constituents in Groundwater from Disposal (Contact-Handled)

LLMW Alternatives	T	D	Acetone	Arsenic	Barium	Benzene	Cadmium	Carbon Tetrachloride	Chromium	Cyanide
No Action	3	-	--	--	--	--	--	--	--	--
Decentralized	37	16	0	4	0	200	0	90	90	0
Regionalized-1	11	12	0	4	0	200	0	90	90	0
Regionalized-2	7	6	--	--	--	--	--	--	--	--
Regionalized-3	7	1	--	--	--	--	--	--	--	--
Regionalized-4	4	6	--	--	--	--	--	--	--	--
Centralized	1	1	--	--	--	--	--	--	--	--

LLMW Alternatives	T	D	1,2-dichloro-ethane	Lead	Mercury	Methylene Chloride	Selenium	Silver	1,2,2-trichloro-1,1-trifluoroethane
No Action	3	-	--	--	--	--	--	--	--
Decentralized	37	16	70	0	0	80	40	30	0
Regionalized-1	11	12	70	0	0	80	40	30	0
Regionalized-2	7	6	--	--	--	--	--	--	--
Regionalized-3	7	1	--	--	--	--	--	--	--
Regionalized-4	4	6	--	--	--	--	--	--	--
Centralized	1	1	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
"--" = No disposal at this site for this alternative.

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Table II-4.1-13. FEMP—LLMW—Socioeconomics Impacts for Treatment and Disposal

LLMW Alternatives	Number of Sites		Effect of Implementation of Alternatives					
				Jobs		Income		
	T	D	Cost (Millions) (1)	Annual Jobs	% Annual Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action	3	-	95	83	0.01	0.9	0.00	0.01
Decentralized	37	16	339	371	0.05	4.2	0.02	0.02
Regionalized-1	11	12	516	564	0.07	6.4	0.03	0.04
Regionalized-2	7	6	138	151	0.02	1.7	0.01	0.01
Regionalized-3	7	1	138	151	0.02	1.7	0.01	0.01
Regionalized-4	4	6	138	151	0.02	1.7	0.01	0.01
Centralized	1	1	138	151	0.02	1.7	0.01	0.01

Notes:
T = Treatment
D = Disposal
(1) In current 1990 dollars.
(2) Compared to 1990 baseline.

Table II-4.1-14. FEMP—LLMW—Infrastructure Impacts for Treatment and Disposal

LLMW Alternatives	Number of Sites		Effect of Implementation of Alternatives									
			Land Use		Water		Waste Water		Power		Employment (FTE)	
	T	D	Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	% Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Peak Construction Employment	% of Current Employment (1)
No Action	3	-	6.2	2.25	17682	1.11	1013	0.04	2.65	8.04	59	3
Decentralized	37	16	8.5	3.11	17543	1.10	2799	0.12	2.16	6.54	244	13
Regionalized-1	11	12	12.3	4.46	23556	1.47	4630	0.20	0.76	2.30	379	20
Regionalized-2	7	6	1.4	0.49	2104	0.13	1296	0.06	0.76	2.30	71	4
Regionalized-3	7	1	1.4	0.49	2104	0.13	1296	0.06	0.76	2.30	71	4
Regionalized-4	4	6	1.4	0.49	2104	0.13	1296	0.06	0.76	2.30	71	4
Centralized	1	1	1.4	0.49	2104	0.13	1296	0.06	0.76	2.30	71	4

Notes:
T = Treatment
D = Disposal
GPD = Gallons per Day
MW = Megawatts
(1) Based on 1991 Site Employment

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Table II-4.1-15. FEMP—LLMW—Cost

LLMW Alternatives	Number of Sites		Total Cost (Millions) (1)	Cost by Life-Cycle Component (1)				Cost by Functional Area (1)		
	T	D		Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Treatment (Millions)	Storage (Millions)	Disposal (Millions)
No Action	3	-	107	9	30	60	8	48	59	0
Decentralized	37	16	384	42	118	198	24	343	0	41
Regionalized-1	11	12	584	76	185	302	30	543	0	41
Regionalized-2	7	6	156	11	36	98	10	156	0	0
Regionalized-3	7	1	156	11	36	98	10	156	0	0
Regionalized-4	4	6	156	11	36	98	10	156	0	0
Centralized	1	1	156	11	36	98	10	156	0	0

Notes:
T = Treatment
D = Disposal
The Life-Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum of these may not reflect the true total cost.
(1) In current 1994 dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

4.2 FEMP LLW

Thirteen tables immediately following portray the impacts of LLW at FEMP. These tables are presented as follows:

Impact Category

No.	Description	Table No.	Page No.
1.	FEMP—LLW—Treatment and Disposal: Estimated Number of Fatalities	II-4.2-1	4-18
2.	FEMP—LLW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects	II-4.2-2	4-19
3.	FEMP—LLW—Disposal: Estimated Number of Cancer Incidences and Genetic Effects	II-4.2-3	4-20
4.	FEMP—LLW—Treatment and Disposal: MEI Probability of Cancer Fatality	II-4.2-4	4-21
5.	FEMP—LLW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects	II-4.2-5	4-22
7.	FEMP—LLW—Emissions in Tons per Year of Criteria Air Pollutants	II-4.2-6	4-23
8.	FEMP—LLW—Percent of Standard/Guideline for Criteria Air Pollutants	II-4.2-7	4-24
9.	FEMP—LLW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-4.2-8	4-25
10.	FEMP—LLW—Impacts on Water Resources Due to Increased Water Use	II-4.2-9	4-26
11.	FEMP—LLW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal	II-4.2-10	4-27
12.	FEMP—LLW—Socioeconomic Impacts for Treatment and Disposal	II-4.2-11	4-28
13.	FEMP—LLW—Infrastructure Impacts for Treatment and Disposal	II-4.2-12	4-29
14.	FEMP—LLW—Cost	II-4.2-13	4-30

Table II-4.2-1. FEMP—LLW—Treatment and Disposal: Estimated Number of Fatalities

LLW Alternatives	Number of Sites		Treatment				Disposal	
			WM Worker		Offsite Population	Noninvolved Workers	WM Worker	
	T	D	Radiation Exposure	Physical Hazards	Radiation Exposure	Radiation Exposure	Radiation Exposure	Physical Hazards
No Action	10**	6	- -	- -	- -	- -	- -	- -
Decentralized		16	- -	- -	- -	- -	- -	- -
Regionalized-1		12	- -	- -	- -	- -	- -	- -
Regionalized-2	11	12	6.5E-03	1.1E-01	2.3E-01	5.2E-04	- -	- -
Regionalized-3		6	- -	- -	- -	- -	- -	- -
Regionalized-4	7	6	- -	- -	- -	- -	- -	- -
Regionalized-5	4	6	- -	- -	- -	- -	- -	- -
Regionalized-6		2	- -	- -	- -	- -	- -	- -
Regionalized-7		2	- -	- -	- -	- -	- -	- -
Centralized-1		1	- -	- -	- -	- -	- -	- -
Centralized-2		1	- -	- -	- -	- -	- -	- -
Centralized-3	7	1	- -	- -	- -	- -	- -	- -
Centralized-4	7	1	- -	- -	- -	- -	- -	- -
Centralized-5	1	1	- -	- -	- -	- -	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Treatment and/or Disposal is not considered under the alternative
** Ten sites use existing facilities for Volume Reduction

Table II-4.2-2. FEMP—LLW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

LLW Alternatives	Number of Sites		Offsite Population			Noninvolved Worker			WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	10**	6	--	--	--	--	--	--	--	--	--
Decentralized		16	--	--	--	--	--	--	--	--	--
Regionalized-1		12	--	--	--	--	--	--	--	--	--
Regionalized-2	11	12	4.6E+02	7.9E-01	4.6E-02	1.0E+00	1.8E-03	1.0E-04	1.6E+01	2.3E-02	9.7E-04
Regionalized-3		6	--	--	--	--	--	--	--	--	--
Regionalized-4	7	6	--	--	--	--	--	--	--	--	--
Regionalized-5	4	6	--	--	--	--	--	--	--	--	--
Regionalized-6		2	--	--	--	--	--	--	--	--	--
Regionalized-7		2	--	--	--	--	--	--	--	--	--
Centralized-1		1	--	--	--	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--	--	--	--
Centralized-4	7	1	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
** Ten sites use existing facilities for Volume Reduction.

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Table II-4.2-3. FEMP—LLW—Disposal: Estimated Number of Cancer Incidences and Genetic Effects

LLW Alternatives	Number of Sites		WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	10**	6	- -	- -	- -
Decentralized		16	- -	- -	- -
Regionalized-1		12	- -	- -	- -
Regionalized-2	11	12	- -	- -	- -
Regionalized-3		6	- -	- -	- -
Regionalized-4	7	6	- -	- -	- -
Regionalized-5	4	6	- -	- -	- -
Regionalized-6		2	- -	- -	- -
Regionalized-7		2	- -	- -	- -
Centralized-1		1	- -	- -	- -
Centralized-2		1	- -	- -	- -
Centralized-3	7	1	- -	- -	- -
Centralized-4	7	1	- -	- -	- -
Centralized-5	1	1	- -	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered under the alternative.
** Ten sites use existing facilities for Volume Reduction.

Table II-4.2–4. FEMP—LLW—Treatment and Disposal: MEI Probability of Cancer Fatality

LLW Alternatives	Number of Sites		Treatment		Disposal
	T	D	Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability	Hypothetical Farm Family - Most Exposed Lifetime MEI Cancer Fatality Probability
No Action	10**	6	- -	- -	- -
Decentralized		16	- -	- -	- -
Regionalized-1		12	- -	- -	- -
Regionalized-2	11	12	4.4E-06	4.5E-07	- -
Regionalized-3		6	- -	- -	- -
Regionalized-4	7	6	- -	- -	- -
Regionalized-5	4	6	- -	- -	- -
Regionalized-6		2	- -	- -	- -
Regionalized-7		2	- -	- -	- -
Centralized-1		1	- -	- -	- -
Centralized-2		1	- -	- -	- -
Centralized-3	7	1	- -	- -	- -
Centralized-4	7	1	- -	- -	- -
Centralized-5	1	1	- -	- -	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Treatment and/or disposal is not considered under the Alternative.
** Ten sites use existing facilities for Volume Reduction.

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Table II-4.2-5. FEMP—LLW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects

LLW Alternatives	Number of Sites		Treatment						Disposal		
			Offsite MEI			Noninvolved Worker MEI			Most Exposed Lifetime MEI		
	T	D	Dose (rem)	Radiation Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Radiation Genetic Effects Probability
No Action	10**	6	--	--	--	--	--	--	--	--	--
Decentralized		16	--	--	--	--	--	--	--	--	--
Regionalized-1		12	--	--	--	--	--	--	--	--	--
Regionalized-2	11	12	8.8E-03	1.5E-05	8.8E-07	9.0E-04	1.5E-06	9.0E-08	--	--	--
Regionalized-3		6	--	--	--	--	--	--	--	--	--
Regionalized-4	7	6	--	--	--	--	--	--	--	--	--
Regionalized-5	4	6	--	--	--	--	--	--	--	--	--
Regionalized-6		2	--	--	--	--	--	--	--	--	--
Regionalized-7		2	--	--	--	--	--	--	--	--	--
Centralized-1		1	--	--	--	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--	--	--	--
Centralized-4	7	1	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Treatment and Disposal is not considered under the alternative.
** Ten sites use existing facilities for Volume Reduction.

Table II-4.2-6. FEMP—LLW—Emissions in Tons per Year of Criteria Air Pollutants

LLW Alternatives	Number of Sites		Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action	10**	6	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized		16	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized - 1		12	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized - 2	11	12	28 (1/27)	9 (4/5)	0	0	0	4 (0/3)	16 (0/16)	3 (0/3)	0	0	0	2 (0/2)
Regionalized - 3		6	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized - 4	7	6	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized - 5	4	6	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized - 6		2	--	--	--	--	--	--	--	--	--	--	--	--
Regionalzied - 7		2	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-1		1	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-4	7	1	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
Emissions <1 ton per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions/worker vehicles emission)
(2) Values = total emissions (stationary-source emissions/mobile-source emission)
** Ten sites use existing facilities for Volume Reduction.

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Table II-4.2-7. FEMP—LLW—Percent of Standard/Guideline for Criteria Air Pollutants

LLW Alternatives	Number of Sites		Construction					
			Percent of Tons/Year General Conformity Rule (1)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC
No Action	10**	6	--	0	--	--	--	0
Decentralized		16	--	0	--	--	--	0
Regionalized-1		12	--	0	--	--	--	0
Regionalized-2	11	12	--	9 (4/5)	--	--	--	7 (1/6)
Regionalized-3		6	--	0	--	--	--	0
Regionalized-4	7	6	--	0	--	--	--	0
Regionalized-5	4	6	--	0	--	--	--	0
Regionalized-6		2	--	0	--	--	--	0
Regionalzied-7		2	--	0	--	--	--	0
Centralized-1		1	--	0	--	--	--	0
Centralized-2		1	--	0	--	--	--	0
Centralized-3	7	1	--	0	--	--	--	0
Centralized-4	7	1	--	0	--	--	--	0
Centralized-5	1	1	--	0	--	--	--	0

LLW Alternatives	Number of Sites		Operations & Maintenance											
			Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
	T	D	CO (4)	NO2 (5)	Pb (4)	PM10 (6)	SO2 (4)	VOC (5)	CO	NO2	Pb	PM10	SO2	VOC
No Action	10**	6	0	0	0	0	0	0	--	--	--	--	--	--
Decentralized		16	0	0	0	0	0	0	--	--	--	--	--	--
Regionalized-1		12	0	0	0	0	0	0	--	--	--	--	--	--
Regionalized-2	11	12	0	3 (0/3)	0	2 (2/0)	1 (1/0)	4 (0/4)	0	0	0	0	0	0
Regionalized-3		6	0	0	0	0	0	0	--	--	--	--	--	--
Regionalized-4	7	6	0	0	0	0	0	0	--	--	--	--	--	--
Regionalized-5	4	6	0	0	0	0	0	0	--	--	--	--	--	--
Regionalized-6		2	0	0	0	0	0	0	--	--	--	--	--	--
Regionalzied-7		2	0	0	0	0	0	0	--	--	--	--	--	--
Centralized-1		1	0	0	0	0	0	0	--	--	--	--	--	--
Centralized-2		1	0	0	0	0	0	0	--	--	--	--	--	--
Centralized-3	7	1	0	0	0	0	0	0	--	--	--	--	--	--
Centralized-4	7	1	0	0	0	0	0	0	--	--	--	--	--	--
Centralized-5	1	1	0	0	0	0	0	0	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) GCR de minimus levels are applied, since PSD regulations are not applicable to construction activities. Values = % of total emissions (% of equipment emissions / % of worker vehicle emissions).
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions for all alternatives are assumed to be negligible.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.
(5) Nonattainment area for ozone. Pollutant is an ozone precursor, therefore GCR de minimus levels are applied. Values = % of total emissions (% of stationary-source emissions / % of mobile-source emissions).
(6) Nonattainment area for this pollutant, therefore GCR de minimus levels are applied. Values = % of total emissions (% of stationary-source emissions / % of mobil emissions).
** Ten sites use existing facilities for Volume Reduction.

Table II-4.2-8. FEMP—LLW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

LLW Alternatives	Number of Sites		Operations & Maintenance											
	T	D	Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action	10**	6	0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Decentralized		16	0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-1		12	0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-2	11	12	9	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-3		6	0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-4	7	6	0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-5	4	6	0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-6		2	0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-7		2	0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Centralized-1		1	0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Centralized-2		1	0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Centralized-3	7	1	0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Centralized-4	7	1	0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Centralized-5	1	1	0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

LLW Alternatives	Number of Sites		Operations & Maintenance									
	T	D	Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action	10**	6	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Decentralized		16	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-1		12	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-2	11	12	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-3		6	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-4	7	6	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-5	4	6	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-6		2	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-7		2	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Centralized-1		1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Centralized-2		1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Centralized-3	7	1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Centralized-4	7	1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Centralized-5	1	1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

Notes:
T= Treatment
D = Disposal
- - = Emissions of this hazardous or toxic air pollutant are assumed to be negligible.
Percentages <1% are shown as zeros.
** Ten sites use existing facilities for Volume Reduction.

Table II-4.2-9. FEMP—LLW—Impacts on Water Resources Due to Increased Water Use

LLW Alternatives	Number of Sites		Construction			Operations			
	T	D	Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action	10**	6	- -	- -	- -	- -	- -	- -	- -
Decentralized		16	- -	- -	- -	- -	- -	- -	- -
Regionalized-1		12	- -	- -	- -	- -	- -	- -	- -
Regionalized-2	11	12	5254	1.3	- -	2403	0.6	- -	<0.1
Regionalized-3		6	- -	- -	- -	- -	- -	- -	- -
Regionalized-4	7	6	- -	- -	- -	- -	- -	- -	- -
Regionalized-5	4	6	- -	- -	- -	- -	- -	- -	- -
Regionalized-6		2	- -	- -	- -	- -	- -	- -	- -
Regionalized-7		2	- -	- -	- -	- -	- -	- -	- -
Centralized-1		1	- -	- -	- -	- -	- -	- -	- -
Centralized-2		1	- -	- -	- -	- -	- -	- -	- -
Centralized-3	7	1	- -	- -	- -	- -	- -	- -	- -
Centralized-4	7	1	- -	- -	- -	- -	- -	- -	- -
Centralized-5	1	1	- -	- -	- -	- -	- -	- -	- -

Notes:
T = Treatment
D = Disposal
Water supplied by groundwater in the Miami Valley Aquifer. Current water use = 400,000 gallons/day.
Wastewater discharged to the Great Miami River. Average flow rate of the Great Miami River = 1,823,000,000 gallons/day.
** Ten sites use existing facilities for Volume Reduction.
- - = FEMP is only considered under the Regionalized 2 Alternative; Under the Regionalized 2 Alternative Stream Flow is not considered.
<0.1 indicates that the percentage is less than 0.1%.

Table II-4.2-10. FEMP—LLW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal

LLW Alternatives	Number of Sites T	Number of Sites D	Ac 225	Ac 227	Am 241	Am 242	Am 243	C 14	Cs 135	Cs 137	Cm 242	Cm 244	Cm 245	I 129	Pb 210	Np 237	Ni 59	Ni 63	Pd 107	Pu 238	Pu 239	Pu 240	Pu 241
No Action	10**	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized		16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1		12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-2	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-3		6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	7	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-5	4	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-6		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-1		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-4	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

LLW Alternatives	Number of Sites T	Number of Sites D	Po 210	K 40	Pa 231	Ra 223	Ra 226	Sm 151	Se 79	Sr 90	Tc 99	Th 227	Th 228	Th 229	Th 230	Th 232	Sn 126	U 233	U 234	U 235	U 236	U 238	Y 90	Zr 93
No Action	10**	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized		16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1		12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-2	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-3		6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	7	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-5	4	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-6		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-1		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-4	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
** Ten sites use existing facilities for Volume Reduction
-- = Disposal is not considered for this Alternative.

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Table II-4.2-11. FEMP—LLW—Socioeconomic Impacts for Treatment and Disposal

LLW Alternatives	Number of Sites		Effect of Implementation of Alternatives					
				Jobs		Income		
	T	D	Cost (Millions) (1)	Jobs	% Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1	% ROI Population Increase (2)
No Action	10**	6	- -	- -	- -	- -	- -	- -
Decentralized		16	- -	- -	- -	- -	- -	- -
Regionalized-1		12	- -	- -	- -	- -	- -	- -
Regionalized-2	11	12	276	301	0.04	3.4	0.01	0.02
Regionalized-3		6	- -	- -	- -	- -	- -	- -
Regionalized-4	7	6	- -	- -	- -	- -	- -	- -
Regionalized-5		6	- -	- -	- -	- -	- -	- -
Regionalized-6		2	- -	- -	- -	- -	- -	- -
Regionalized-7		2	- -	- -	- -	- -	- -	- -
Centralized-1		1	- -	- -	- -	- -	- -	- -
Centralized-2		1	- -	- -	- -	- -	- -	- -
Centralized-3	7	1	- -	- -	- -	- -	- -	- -
Centralized-4	7	1	- -	- -	- -	- -	- -	- -
Centralized-5	1	1	- -	- -	- -	- -	- -	- -

Notes:
T = Treatment
D = Disposal
(1) In constant 1990 dollars.
(2) Compared to 1990 baseline.
- - = Treatment and Disposal is not considered under the Alternative.

Table II-4.2-12. FEMP—LLW—Infrastructure Impacts for Treatment and Disposal

LLW Alternatives	Number of Sites		Effect of Implementation of Alternatives									
			Land Use		Water		Waste Water		Power		Employment (FTE)	
	T	D	Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	% Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Peak Construction Employment	% of Current Employment (1)
No Action	10**	6	--	--	--	--	--	--	--	--	--	--
Decentralized		16	--	--	--	--	--	--	--	--	--	--
Regionalized-1		12	--	--	--	--	--	--	--	--	--	--
Regionalized-2	11	12	3.9	1.40	5254	0.33	2403	0.11	0.50	1.52	207	11
Regionalized-3		6	--	--	--	--	--	--	--	--	--	--
Regionalized-4	7	6	--	--	--	--	--	--	--	--	--	--
Regionalized-5	4	6	--	--	--	--	--	--	--	--	--	--
Regionalized-6		2	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	--	--	--	--	--	--	--	--	--	--
Centralized-1		1	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--	--	--	--	--
Centralized-4	7	1	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
GPD = Gallons per Day
MW = Megawatts Electric
FTE = Full Time Equivalent
(1) Based on 1991 Site Employment.
** Ten sites use existing facilities for Volume Reduction.

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Table II-4.2-13. FEMP—LLW—Cost

LLW Alternatives	Number of Sites		Total Cost (Millions) (1)	Cost by Life-Cycle Component (1)				Cost by Functional Area (1)		
	T	D		Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Treatment (Millions)	Storage (Millions)	Disposal (Millions)
No Action	10**	6	--	--	--	--	--	--	--	--
Decentralized		16	--	--	--	--	--	--	--	--
Regionalized-1		12	--	--	--	--	--	--	--	--
Regionalized-2	11	12	312	50	81	163	18	312	0	0
Regionalized-3		6	--	--	--	--	--	--	--	--
Regionalized-4	7	6	--	--	--	--	--	--	--	--
Regionalized-5	4	6	--	--	--	--	--	--	--	--
Regionalized-6		2	--	--	--	--	--	--	--	--
Regionalized-7		2	--	--	--	--	--	--	--	--
Centralized-1		1	--	--	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--	--	--
Centralized-4	7	1	--	--	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--	--	--

Notes:
** Ten sites use existing facilities for Volume Reduction
T = Treatment
D = Disposal
The Life Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum may not reflect the true total cost.
(1) In Current 1994 Dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

5.0 Hanford Site

Hanford currently is custodian of significant volumes of LLMW, LLW, TRUW, HLW, and HW. Each of the waste types is treated independently in the following sections.

5.1 Hanford LLMW

Seventeen tables immediately following portray impacts of LLMW at INEL. These tables are presented as follows:

Impact Category

No.	Description	Table No.	Page No.
1.	Hanford—LLMW—Treatment and Disposal: Estimated Number of Fatalities	II-5.1-1	5-3
2.	Hanford—LLMW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects	II-5.1-2	5-4
3.	Hanford—LLMW—Disposal: Estimated Number of Cancer Incidences	II-5.1-3	5-5
4.	Hanford—LLMW—Treatment and Disposal: MEI Probability of Cancer Fatality	II-5.1-4	5-6
5.	Hanford—LLMW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects	II-5.1-5	5-7
6.	Hanford—LLMW—Treatment and Disposal: Noncancer Health Risk from Chemical Exposure	II-5.1-6	5-8
7.	Hanford—LLMW—Emissions in Tons per Year of Criteria Air Pollutants	II-5.1-7	5-9
8.	Hanford—LLMW—Percent of Standard/Guideline for Criteria Air Pollutants	II-5.1-8	5-10
9.	Hanford—LLMW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-5.1-9	5-11
10.	Hanford—LLMW—Impacts on Water Resources Due to Increased Water Use	II-5.1-10	5-12
11.	Hanford—LLMW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal (Contact-Handled)	II-5.1-11	5-13
12.	Hanford—LLMW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria for Disposal (Remote-Handled)	II-5.1-12	5-14
13.	Hanford—LLMW—Percent of Drinking Water Standards for Hazardous Constituents in Groundwater from Disposal (Contact-Handled)	II-5.1-13	5-15
14.	Hanford—LLMW—Percent of Drinking Water Standards for Hazardous Constituents in Groundwater from Disposal (Remote-Handled)	II-5.1-14	5-16

15.	Hanford—LLMW—Socioeconomics Impacts for Treatment and Disposal	II-5.1-15	5-17
16.	Hanford—LLMW—Infrastructure Impacts for Treatment and Disposal	II-5.1-16	5-18
17.	Hanford—LLMW—Cost	II-5.1-17	5-19

Table II-5.1-1. Hanford—LLMW—Treatment and Disposal: Estimated Number of Fatalities

LLMW Alternatives	Number of Sites		Treatment				Disposal	
			WM Worker		Offsite Population	Noninvolved Workers	WM Worker	
	T	D	Radiation Exposure	Physical Hazards	Radiation Exposure	Radiation Exposure	Radiation Exposure	Physical Hazards
No Action	3	-	1.3E-01	1.2E-01	1.5E-02	6.2E-04	- -	- -
Decentralized	37	16	1.0E-01	5.2E-01	1.5E-03	5.6E-05	2.0E-01	7.3E-02
Regionalized-1	11	12	1.2E-01	4.8E-01	1.4E-03	5.2E-05	2.0E-01	7.3E-02
Regionalized-2	7	6	1.4E-01	5.0E-01	1.3E-02	1.8E-04	2.1E-01	7.6E-02
Regionalized-3	7	1	1.4E-01	5.0E-01	1.3E-02	1.8E-04	9.3E-12	2.6E-05
Regionalized-4	4	6	1.4E-01	5.0E-01	1.3E-02	1.8E-04	2.1E-01	7.6E-02
Centralized	1	1	4.9E-01	1.7E+00	2.5E-02	3.3E-04	3.6E-01	1.5E-01

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this Alternative.

Table II-5.1-2. Hanford—LLMW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

LLMW Alternatives	Number of Sites		Offsite Population				Noninvolved Workers				WM Worker			
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects
No Action	3	-	3.0E+01	5.2E-02	2.5E-05	3.0E-03	1.2E+00	2.1E-03	1.5E-05	1.2E-04	3.2E+02	4.5E-01	6.7E-05	1.9E-02
Decentralized	37	16	2.9E+00	5.0E-03	1.1E-06	2.9E-04	1.0E-01	1.9E-04	6.7E-07	1.1E-05	2.5E+02	3.5E-01	1.4E-03	1.5E-02
Regionalized -1	11	12	2.7E+00	4.7E-03	1.1E-06	2.7E-04	1.0E-01	1.8E-04	6.5E-07	1.0E-05	3.0E+02	4.1E-01	1.3E-03	1.8E-02
Regionalized-2	7	6	2.6E+01	4.5E-02	1.2E-06	2.6E-03	3.5E-01	6.0E-04	7.1E-07	3.5E-05	3.5E+02	4.9E-01	1.5E-03	2.1E-02
Regionalized-3	7	1	2.6E+01	4.5E-02	1.2E-06	2.6E-03	3.5E-01	6.0E-04	7.1E-07	3.5E-05	3.5E+02	4.9E-01	1.5E-03	2.1E-02
Regionalized-4	4	6	2.7E+01	4.5E-02	1.2E-06	2.7E-03	3.6E-01	6.1E-04	7.4E-07	3.6E-05	3.7E+02	5.1E-01	1.6E-03	2.2E-02
Centralized	1	1	5.0E+01	8.5E-02	1.2E-05	5.0E-03	6.6E-01	1.1E-03	7.3E-06	6.6E-05	1.2E+03	1.7E+00	1.8E-02	7.4E-02

Notes:
T = Treatment
D = Disposal

Table II-5.1-3. Hanford—LLMW—Disposal: Estimated Number of Cancer Incidences

LLMW Alternatives	Number of Sites		WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	3	-	- -	- -	- -
Decentralized	37	16	5.1E+02	7.0E-01	3.0E-02
Regionalized-1	11	12	5.0E+02	7.0E-01	3.0E-02
Regionalized-2	7	6	5.3E+02	7.4E-01	3.2E-02
Regionalized-3	7	1	- -	- -	- -
Regionalized-4	4	6	5.3E+02	7.4E-01	3.2E-02
Centralized	1	1	9.1E+02	1.3E+00	5.4E-02

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for No Action Alternative for LLMW.

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Table II-5.1–4. Hanford—LLMW—Treatment and Disposal: MEI Probability of Cancer Fatality

LLMW Alternatives	Number of Sites		Treatment		Disposal
	T	D	Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability	Hypothetical Farm Family Most Exposed Lifetime MEI Cancer Fatality Probability
No Action	3	-	3.1E-07	1.1E-06	- -
Decentralized	37	16	3.0E-08	9.7E-08	2.4E-04
Regionalized-1	11	12	2.8E-08	8.9E-08	2.2E-04
Regionalized-2	7	6	2.7E-07	3.1E-07	3.3E-04
Regionalized-3	7	1	2.7E-07	3.1E-07	- -
Regionalized-4	4	6	2.7E-07	3.1E-07	3.5E-04
Centralized	1	1	5.2E-07	5.7E-07	4.9E-03

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered under the Alternative

Table II-5.1-5. Hanford—LLMW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects

LLMW Alternatives	Number of Sites		Treatment								Disposal			
			Offsite Population MEI				Noninvolved Worker MEI				Most Exposed Farm Family Lifetime MEI			
	T	D	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects probability
No Action	3	-	6.2E-04	1.1E-06	8.2E-10	6.2E-08	2.1E-03	3.6E-06	2.9E-08	2.1E-07	- -	- -	- -	- -
Decentralized	37	16	6.0E-05	1.0E-07	3.8E-11	6.0E-09	1.9E-04	3.3E-07	1.3E-09	1.9E-08	4.7E-01	8.0E-04	1.2E-04	4.7E-05
Regionalized-1	11	12	5.6E-05	9.6E-08	3.6E-11	5.6E-09	1.8E-04	3.0E-07	1.3E-09	1.8E-08	4.3E-01	7.3E-04	1.1E-04	4.3E-05
Regionalized-2	7	6	5.4E-04	9.2E-07	4.0E-11	5.4E-08	6.1E-04	1.0E-06	1.4E-09	6.1E-08	6.6E-01	1.1E-03	1.1E-04	6.6E-05
Regionalized-3	7	1	5.4E-04	9.2E-07	4.0E-11	5.4E-08	6.1E-04	1.0E-06	1.4E-09	6.1E-08	- -	- -	- -	- -
Regionalized-4	4	6	5.5E-04	9.3E-07	4.1E-11	5.5E-08	6.3E-04	1.1E-06	1.5E-09	6.3E-08	7.0E-01	1.2E-03	1.2E-04	7.0E-05
Centralized	1	1	1.0E-03	1.8E-06	4.1E-10	1.0E-07	1.1E-03	2.0E-06	1.4E-08	1.1E-07	9.7E+00	1.6E-02	2.4E-04	9.7E-04

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered for the No Action Alternative for LLMW

Table II-5.1-6. Hanford—LLMW—Treatment and Disposal: Noncancer Health Risk from Chemical Exposure

LLMW Alternatives	Number of Sites		Treatment			Disposal
	T	D	Offsite MEI Hazard Index	Noninvolved Worker MEI Hazard Index	WM Worker Exposure Index	Hypothetical Farm Family Most Exposed Lifetime Hazard Index
No Action	3	-	8.9E-07	3.1E-05	9.0E-05	- -
Decentralized	37	16	5.1E-08	1.8E-06	3.6E-03	1.4E+00
Regionalized-1	11	12	5.0E-08	1.7E-06	3.6E-03	1.4E+00
Regionalized-2	7	6	5.5E-08	1.9E-06	4.0E-03	1.6E+00
Regionalized-3	7	1	5.5E-08	1.9E-06	4.0E-03	- -
Regionalized-4	4	6	5.6E-08	2.0E-06	4.0E-03	1.6E+00
Centralized	1	1	4.5E-07	1.6E-05	2.6E-02	2.4E+00

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for No Action Alternative for LLMW.
MEI = Maximally Exposed Individual
Hazard Index = Sum of hazard quotient values for all noncarcinogenic chemicals. The hazard quotient is the chemical-specific ratio of media exposure concentrations to concentrations believed to have no appreciable adverse effects.
Exposure Index = Ratio of Exposure concentration to chemical-specific occupational threshold limits.

Table II-5.1-7. Hanford—LLMW—Emissions in Tons per Year of Criteria Air Pollutants

LLMW Alternatives	Number of Sites		Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	12 (1/11)	5 (3/2)	0	0	0	2 (1/1)	9 (1/8)	4 (2/2)	0	0	0	1 (0/1)
Decentralized	37	16	58 (5/53)	24 (13/11)	0	1 (1/0)	1 (1/0)	7 (1/6)	50 (0/50)	15 (5/10)	0	3 (3/0)	0	6 (0/6)
Regionalized-1	11	12	70 (5/65)	25 (12/13)	0	1 (1/0)	1 (1/0)	9 (1/8)	52 (1/51)	15 (5/10)	0	4 (4/0)	0	6 (0/6)
Regionalized-2	7	6	91 (5/86)	30 (13/17)	0	1 (1/0)	1 (1/0)	12 (2/10)	64 (1/63)	19 (6/13)	0	4 (4/0)	0	8 (0/8)
Regionalized-3	7	1	57 (3/54)	19 (8/11)	0	1 (1/0)	1 (1/0)	7 (1/6)	37 (1/36)	13 (6/7)	0	4 (4/0)	0	4 (0/4)
Regionalized-4	4	6	91 (5/86)	30 (13/17)	0	1 (1/0)	1 (1/0)	12 (2/10)	64 (1/63)	19 (6/13)	0	4 (4/0)	0	8 (0/8)
Centralized	1	1	293 (25/268)	118 (64/54)	0	6 (5/1)	6 (6/0)	38 (6/32)	213 (3/210)	75 (33/42)	0	23 (22/1)	2 (2/0)	25 (0/25)

Notes:
T = Treatment
D = Disposal
Emissions <1 tons per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions / worker vehicles emission).
(2) Values = total emissions (stationary-source emissions / mobile-source emission).

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Table II-5.1-8. Hanford—LLMW—Percent of Standard/Guideline for Criteria Air Pollutants

LLMW Alternatives	Number of Sites		Construction					
			Percent of Tons/Year General Conformity Rule (1)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	- -	- -	- -	- -	- -	- -
Decentralized	37	16	- -	- -	- -	- -	- -	- -
Regionalized-1	11	12	- -	- -	- -	- -	- -	- -
Regionalized-2	7	6	- -	- -	- -	- -	- -	- -
Regionalized-3	7	1	- -	- -	- -	- -	- -	- -
Regionalized-4	4	6	- -	- -	- -	- -	- -	- -
Centralized	1	1	- -	- -	- -	- -	- -	- -

LLMW Alternatives	Number of Sites		Operations & Maintenance											
			Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
	T	D	CO (4)	NO2 (4)	Pb (4)	PM10 (4)	SO2 (4)	VOC (4)	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	1	4	0	2	0	0	- -	- -	- -	- -	- -	- -
Decentralized	37	16	1	12	0	22	1	0	0	0	0	0	0	0
Regionalized-1	11	12	1	13	0	23	1	0	0	0	0	0	0	0
Regionalized-2	7	6	1	14	0	25	1	0	0	0	0	0	0	0
Regionalized-3	7	1	1	14	0	25	1	0	0	0	0	0	0	0
Regionalized-4	4	6	1	14	0	25	1	0	0	0	0	0	0	0
Centralized	1	1	3	82	1	147	5	1	0	0	0	0	2	0

Notes:
T = Treatment
D = Disposal
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) Hanford is in an attainment area for all criteria pollutants, therefore the GCR doe not apply.
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions for the No Action and minimum treatment (no incineration) alternatives are assumed to be negligible.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.

Table II-5.1-9. Hanford—LLMW—Percent of Standards/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

LLMW Alternatives	Number of Sites		Operations & Maintenance											
	T	D	Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-ichloro ethane	Lead
No Action	3	-	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Decentralized	37	16	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Regionalized-1	11	12	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Regionalized-2	7	6	1	0	0	- -	- -	0	- -	- -	0	0	0	0
Regionalized-3	7	1	1	0	0	- -	- -	0	- -	- -	0	0	0	0
Regionalized-4	4	6	1	0	0	- -	- -	0	- -	- -	0	0	0	0
Centralized	1	1	1	0	0	- -	- -	0	- -	- -	0	0	0	0

LLMW Alternatives	Number of Sites		Operations & Maintenance									
	T	D	Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2 Trichloro,1,1	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action	3	-	- -	0	0	0	- -	0	0	0	- -	- -
Decentralized	37	16	- -	0	0	0	- -	0	0	0	- -	- -
Regionalized-1	11	12	- -	0	0	0	- -	0	0	0	- -	- -
Regionalized-2	7	6	- -	0	0	0	- -	0	0	0	- -	- -
Regionalized-3	7	1	- -	0	0	0	- -	0	0	0	- -	- -
Regionalized-4	4	6	- -	0	0	0	- -	0	0	0	- -	- -
Centralized	1	1	- -	0	0	0	- -	0	0	0	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Emissions of this hazardous or toxic air pollutant are assumed to be negligible.
Percentages <1% are shown as zeros.

Table II-5.1-10. Hanford—LLMW—Impacts on Water Resources Due to Increased Water Use

LLMW Alternatives	Number of Sites		Construction			Operations			
	T	D	Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action	3	-	3038	<0.1	<0.1	2573	<0.1	<0.1	- -
Decentralized	37	16	17456	0.2	<0.1	9054	0.1	<0.1	- -
Regionalized-1	11	12	17521	0.2	<0.1	8801	0.1	<0.1	- -
Regionalized-2	7	6	18548	0.2	<0.1	10166	0.1	<0.1	- -
Regionalized-3	7	1	13231	0.1	<0.1	7690	0.1	<0.1	- -
Regionalized-4	4	6	18548	0.2	<0.1	10166	0.1	<0.1	- -
Centralized	1	1	87637	0.9	<0.1	43085	0.5	<0.1	- -

Notes:
T = Treatment
D = Disposal
Water supplied by surface water in the Columbia River. Current water use = 9,567,000 gallons/day.
Average flow rate of the Columbia River = 77,560,000,000 gallons/day.
- - = Wastewater discharged to evaporation ponds.
<0.1 indicates that the percentage is less than 0.1%.

Table II-5.1-11. Hanford—LLMW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal (Contact-Handled)

LLMW Alternatives	Number of Sites T	Number of Sites D	Ac 225	Ac 227	Am 241	Am 242	Am 243	C 14	Cs 135	Cs 137	Cm 242	Cm 244	Cm 245	I 129	Pb 210	Np 237	Ni 59	Ni 63	Pd 107	Pu 238	Pu 239	Pu 240	Pu 241	Po 210
No Action	3	-	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-2	7	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centralized	1	1	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

LLMW Alternatives	Number of Sites T	Number of Sites D	Po 210	K 40	Pa 231	Ra 223	Ra 226	Sm 151	Se 79	Sr 90	Tc 99	Th 227	Th 228	Th 229	Th 230	Th 232	Sn 126	U 233	U 234	U 235	U 236	U 238	Y 90	Zr 93
No Action	3	-	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	1	0	0	500	0	0
Regionalized-1	11	12	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	1	0	0	400	0	0
Regionalized-2	7	6	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	2	0	0	700	0	0
Regionalized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	4	6	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	2	0	0	700	0	0
Centralized	1	1	0	0	3	0	0	0	0	0	40	0	0	0	0	0	0	0	40	3	0	10000	0	0

Notes:
T = Treatment
D = Disposal
-- = No disposal at this site for this alternative.

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Table II-5.1-12. Hanford—LLMW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria for Disposal (Remote-Handled)

LLMW Alternatives	T	D *	Ac 225	Ac 227	Am 241	Am 242	Am 243	C 14	Cs 135	Cs 137	Cm 242	Cm 244	Cm 245	I 129	Pb 210	Np 237	Ni 59	Ni 63	Pd 107	Pu 238	Pu 239	Pu 240	Pu 241
No Action	3	-	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-2	7	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-3	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-4	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centralized	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

LLMW Alternatives	T	D *	Po 210	K 40	Pa 231	Ra 223	Ra 226	Sm 151	Se 79	Sr 90	Tc 99	Th 227	Th 228	Th 229	Th 230	Th 232	Sn 126	U 233	U 234	U 235	U 236	U 238	Y 90	Zr 93
No Action	3	-	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-2	7	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-3	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-4	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centralized	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Notes:
T = Treatment
D = Disposal
* = In addition to the CH-LLMW disposal sites indicated below, disposal of RH-LLMW occurs at four sites (Hanford, INEL, ORR and SRS) for all alternatives except No Action.
"--" = No disposal at this site for this alternative.

Table II-5.1-13. Hanford—LLMW—Percent of Drinking Water Standards for Hazardous Constituents in Groundwater from Disposal (Contact-Handled)

LLMW Alternatives	T	D	Acetone	Arsenic	Barium	Benzene	Cadmium	Carbon Tetrachloride	Chromium	Cyanide
No Action	3	-	--	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	1000	0	600	0	0
Regionalized-1	11	12	0	0	0	1000	0	600	0	0
Regionalized-2	7	6	0	0	0	1000	0	600	0	0
Regionalized-3	7	1	--	--	--	--	--	--	--	--
Regionalized-4	4	6	0	0	0	1000	0	700	0	0
Centralized	1	1	0	0	0	1000	0	1000	0	0

LLMW Alternatives	T	D	1,2-dichloro-ethane	Lead	Mercury	Methylene Chloride	Selenium	Silver	1,2,2-trichloro-1,1-trifluoroethane
No Action	3	-	--	--	--	--	--	--	--
Decentralized	37	16	800	0	0	900	0	200	0
Regionalized-1	11	12	700	0	0	900	0	200	0
Regionalized-2	7	6	800	0	0	900	0	300	0
Regionalized-3	7	1	--	--	--	--	--	--	--
Regionalized-4	4	6	800	0	0	1000	0	300	0
Centralized	1	1	2000	0	0	4000	0	400	0

Notes:
T = Treatment
D = Disposal
"--" = No disposal at this site for this alternative.

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Table II-5.1-14. Hanford—LLMW—Percent of Drinking Water Standards for Hazardous Constituents in Groundwater from Disposal (Remote-Handled)

LLMW Alternatives	T	D *	Acetone	Arsenic	Barium	Benzene	Cadmium	Carbon Tetrachloride	Chromium
No Action	3	-	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	0	0	0	0
Regionalized-1	11	12	0	0	0	0	0	0	0
Regionalized-2	7	6	0	0	0	0	0	0	0
Regionalized-3	7	1	0	0	0	0	0	0	0
Regionalized-4	4	6	0	0	0	0	0	0	0
Centralized	1	1	0	0	0	0	0	0	0

LLMW Alternatives	T	D *	1,2-dichloro-ethane	Lead	Mercury	Methylene Chloride	Selenium	Silver	1,2,2-trichloro-1,1-trifluoroethane
No Action	3	-	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	0	0	0	0
Regionalized-1	11	12	0	0	0	0	0	0	0
Regionalized-2	7	6	0	0	0	0	0	0	0
Regionalized-3	7	1	0	0	0	0	0	0	0
Regionalized-4	4	6	0	0	0	0	0	0	0
Centralized	1	1	0	0	0	0	0	0	0

Notes:
T = Treatment
D = Disposal
* = In addition to the CH-LLMW disposal sites indicated below, disposal of RH-LLMW occurs at four sites (Hanford, INEL, ORR and SRS) for all alternatives except No Action.
"--" = No disposal at this site for this alternative.

Table II-5.1-15. Hanford—LLMW—Socioeconomics Impacts for Treatment and Disposal

LLMW Alternatives	Number of Sites		Effect of Implementation of Alternatives					
				Jobs		Income		
	T	D	Cost (Millions) (1)	Annual Jobs	% Annual Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action	3	-	230	187	0.09	2.0	0.03	0.05
Decentralized	37	16	759	772	0.36	8.2	0.13	0.18
Regionalized-1	11	12	828	842	0.39	9.0	0.14	0.20
Regionalized-2	7	6	864	878	0.41	9.4	0.14	0.22
Regionalized-3	7	1	631	642	0.30	6.9	0.11	0.14
Regionalized-4	4	6	864	878	0.41	9.4	0.14	0.24
Centralized	1	1	3507	3567	1.66	38.1	0.58	0.76

Notes:
T = Treatment
D = Disposal
(1) In current 1990 dollars.
(2) Compared to 1990 baseline.

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Table II-5.1-16. Hanford—LLMW—Infrastructure Impacts for Treatment and Disposal

LLMW Alternatives	T	D	Effect of Implementation of Alternatives									
			Land Use		Water		Waste Water		Power		Employment (FTE)	
			Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	% Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Peak Construction Employment	% of Current Employment (1)
No Action	3	-	1.8	0.01	3038	0.00	2573	1.29	1.14	0.21	86	1
Decentralized	37	16	10.2	0.07	17456	0.02	9054	4.53	1.57	0.24	409	3
Regionalized-1	11	12	10.4	0.07	17521	0.02	8801	4.40	1.56	0.28	506	4
Regionalized-2	7	6	10.9	0.08	18548	0.02	10166	5.08	1.58	0.29	667	5
Regionalized-3	7	1	8.1	0.06	13232	0.02	7690	3.85	1.18	0.21	417	3
Regionalized-4	4	6	10.9	0.08	18548	0.02	10166	5.08	1.66	0.30	473	3
Centralized	1	1	50.2	0.35	87637	0.11	43085	21.54	8.33	1.52	2081	14

Notes:
T = Treatment
D = Disposal
GPD = Gallons per Day
MW = Megawatts
(1) Based on 1991 Site Employment

Table II-5.1-17. Hanford—LLMW—Cost

LLMW Alternatives	Number of Sites		Total Cost (Millions) (1)	Cost by Life-Cycle Component (1)				Cost by Functional Area (1)		
	T	D		Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Treatment (Millions)	Storage (Millions)	Disposal (Millions)
No Action	3	-	260	18	37	182	23	113	147	0
Decentralized	37	16	859	79	187	543	50	610	0	249
Regionalized-1	11	12	937	83	240	548	56	697	0	240
Regionalized-2	7	6	977	98	234	585	60	714	0	263
Regionalized-3	7	1	714	76	207	400	31	714	0	0
Regionalized-4	4	6	977	98	234	585	60	714	0	263
Centralized	1	1	3968	347	1017	2311	294	2926	0	1042

Notes:
T = Treatment
D = Disposal
The Life-Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum of these may not reflect the true total cost.
(1) In current 1994 dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

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5.2 Hanford LLW

Thirteen of the 14 impact categories apply to LLW at Hanford. These impacts are presented in the following tables.

Impact Category

No.	Description	Table No.	Page No.
1.	Hanford—LLW—Treatment and Disposal: Estimated Number of Fatalities	II-5.2-1	5-21
2.	Hanford—LLW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects	II-5.2-2	5-22
3.	Hanford—LLW—Disposal: Estimated Number of Cancer Incidences and Genetic Effects	II-5.2-3	5-23
4.	Hanford—LLW—Treatment and Disposal: MEI Probability of Cancer Fatality	II-5.2-4	5-24
5.	Hanford—LLW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects	II-5.2-5	5-25
7.	Hanford—LLW—Emissions in Tons per Year of Criteria Air Pollutants	II-5.2-6	5-26
8.	Hanford—LLW—Percent of Standard/Guideline for Criteria Air Pollutants	II-5.2-7	5-27
9.	Hanford—LLW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-5.2-8	5-28
10.	Hanford—LLW—Impacts on Water Resources Due to Increased Water Use	II-5.2-9	5-29
11.	Hanford—LLW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal	II-5.2-10	5-30
12.	Hanford—LLW—Socioeconomic Impacts for Treatment and Disposal	II-5.2-11	5-31
13.	Hanford—LLW—Infrastructure Impacts for Treatment and Disposal	II-5.2-12	5-32
14.	Hanford—LLW—Cost	II-5.2-13	5-33

Table II-5.2-1. Hanford—LLW—Treatment and Disposal: Estimated Number of Fatalities

LLW Alternatives	Number of Sites		Treatment				Disposal	
			WM Worker		Offsite Population	Noninvolved Workers	WM Worker	
	T	D	Radiation Exposure	Physical Hazards	Radiation Exposure	Radiation Exposure	Radiation Exposure	Physical Hazards
No Action	10**	6	1.5E-01	1.7E-01	4.2E-07	1.5E-08	6.7E-01	4.4E-01
Decentralized		16	9.9E-02	1.2E-01	2.7E-06	9.6E-08	3.7E-01	1.8E-01
Regionalized-1		12	9.9E-02	1.2E-01	2.7E-06	9.6E-08	3.7E-01	1.8E-01
Regionalized-2	11	12	2.0E-01	3.2E-01	3.6E-06	1.3E-07	3.1E-01	1.2E-01
Regionalized-3		6	9.9E-02	1.2E-01	2.7E-06	9.6E-08	3.7E-01	1.8E-01
Regionalized-4	7	6	2.1E-01	3.3E-01	5.0E-02	4.9E-04	3.1E-01	1.2E-01
Regionalized-5	4	6	2.1E-01	3.3E-01	5.0E-02	4.9E-04	3.1E-01	1.2E-01
Regionalized-6		2	9.9E-02	1.2E-01	2.7E-06	9.6E-08	1.1E+00	6.0E-01
Regionalized-7		2	1.0E-01	1.8E-01	4.2E-06	1.5E-07	- -	- -
Centralized-1		1	9.9E-02	1.2E-01	2.7E-06	9.6E-08	2.8E+00	1.4E+00
Centralized-2		1	1.0E-01	1.8E-01	4.2E-06	1.5E-07	- -	- -
Centralized-3	7	1	2.1E-01	3.3E-01	5.0E-02	6.1E-04	1.8E+00	8.9E-01
Centralized-4	7	1	2.1E-01	3.3E-01	5.0E-02	6.1E-04	- -	- -
Centralized-5	1	1	1.5E+00	2.1E+00	7.5E-02	9.7E-04	1.8E+00	8.8E-01

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered under the Alternative
** Ten sites use existing facilities for Volume Reduction

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Table II-5.2-2. Hanford—LLW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

LLW Alternatives	Number of Sites		Offsite Population			Noninvolved Worker			WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	10**	6	8.3E-04	1.4E-06	8.3E-08	3.0E-05	5.1E-08	3.0E-09	3.9E+02	5.4E-01	2.3E-02
Decentralized		16	5.4E-03	9.1E-06	5.4E-07	1.9E-04	3.3E-07	1.9E-08	2.5E+02	3.5E-01	1.5E-02
Regionalized-1		12	5.4E-03	9.1E-06	5.4E-07	1.9E-04	3.3E-07	1.9E-08	2.5E+02	3.5E-01	1.5E-02
Regionalized-2	11	12	7.1E-03	1.2E-05	7.1E-07	2.6E-04	4.4E-07	2.6E-08	4.9E+02	6.9E-01	3.0E-02
Regionalized-3		6	5.4E-03	9.1E-06	5.4E-07	1.9E-04	3.3E-07	1.9E-08	2.5E+02	3.5E-01	1.5E-02
Regionalized-4	7	6	9.4E+01	1.6E-01	9.4E-03	9.7E-01	1.7E-03	9.7E-05	5.2E+02	7.2E-01	3.1E-02
Regionalized-5	4	6	9.4E+01	1.6E-01	9.4E-03	9.7E-01	1.7E-03	9.7E-05	5.2E+02	7.2E-01	3.1E-02
Regionalized-6		2	5.4E-03	9.1E-06	5.4E-07	1.9E-04	3.3E-07	1.9E-08	2.5E+02	3.5E-01	1.5E-02
Regionalized-7		2	8.3E-03	1.4E-05	8.3E-07	3.0E-04	5.1E-07	3.0E-08	2.6E+02	3.6E-01	1.6E-02
Centralized-1		1	5.4E-03	9.1E-06	5.4E-07	1.9E-04	3.3E-07	1.9E-08	2.5E+02	3.5E-01	1.5E-02
Centralized-2		1	8.3E-03	1.4E-05	8.3E-07	3.0E-04	5.1E-07	3.0E-08	2.6E+02	3.6E-01	1.6E-02
Centralized-3	7	1	1.0E+02	1.7E-01	1.0E-02	1.2E+00	2.1E-03	1.2E-04	5.2E+02	7.2E-01	3.1E-02
Centralized-4	7	1	1.0E+02	1.7E-01	1.0E-02	1.2E+00	2.1E-03	1.2E-04	5.2E+02	7.2E-01	3.1E-02
Centralized-5	1	1	1.5E+02	2.5E-01	1.5E-02	1.9E+00	3.3E-03	1.9E-04	3.8E+03	5.3E+00	2.3E-01

Notes:
T = Treatment
D = Disposal
** Ten sites use existing facilities for Volume Reduction.

Table II-5.2-3. Hanford—LLW—Disposal: Estimated Number of Cancer Incidences and Genetic Effects

LLW Alternatives	Number of Sites		WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	10**	6	1.7E+03	2.3E+00	1.0E-01
Decentralized		16	9.3E+02	1.3E+00	5.6E-02
Regionalized-1		12	9.3E+02	1.3E+00	5.6E-02
Regionalized-2	11	12	7.8E+02	1.1E+00	4.7E-02
Regionalized-3		6	9.3E+02	1.3E+00	5.6E-02
Regionalized-4	7	6	7.8E+02	1.1E+00	4.7E-02
Regionalized-5	4	6	7.8E+02	1.1E+00	4.7E-02
Regionalized-6		2	2.9E+03	4.0E+00	1.7E-01
Regionalized-7		2	- -	- -	- -
Centralized-1		1	6.9E+03	9.7E+00	4.2E-01
Centralized-2		1	- -	- -	- -
Centralized-3	7	1	4.4E+03	6.2E+00	2.7E-01
Centralized-4	7	1	- -	- -	- -
Centralized-5	1	1	4.4E+03	6.2E+00	2.6E-01

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered under the alternative.
** Ten sites use existing facilities for Volume Reduction.

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Table II-5.2–4. Hanford—LLW—Treatment and Disposal: MEI Probability of Cancer Fatality

LLW Alternatives	Number of Sites		Treatment		Disposal
	T	D	Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability	Hypothetical Farm Family - Most Exposed Lifetime MEI Cancer Fatality Probability
No Action	10**	6	8.6E-12	2.6E-11	1.4E-03
Decentralized		16	5.5E-11	1.7E-10	2.5E-04
Regionalized-1		12	5.5E-11	1.7E-10	2.5E-04
Regionalized-2	11	12	7.3E-11	2.2E-10	1.1E-03
Regionalized-3		6	5.5E-11	1.7E-10	2.5E-04
Regionalized-4	7	6	9.6E-07	8.5E-07	3.4E-03
Regionalized-5	4	6	9.6E-07	8.5E-07	3.4E-03
Regionalized-6		2	5.5E-11	1.7E-10	4.1E-03
Regionalized-7		2	8.5E-11	2.6E-10	- -
Centralized-1		1	5.5E-11	1.7E-10	1.2E-03
Centralized-2		1	8.5E-11	2.6E-10	- -
Centralized-3	7	1	1.0E-06	1.1E-06	2.3E-03
Centralized-4	7	1	1.0E-06	1.1E-06	- -
Centralized-5	1	1	1.5E-06	1.7E-06	2.3E-03

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered under the Alternative.
** Ten sites use existing facilities for Volume Reduction.

Table II-5.2–5. Hanford—LLW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects

LLW Alternatives	Number of Sites		Treatment						Disposal		
			Offsite MEI			Noninvolved Worker MEI			Most Exposed Lifetime MEI		
	T	D	Dose (rem)	Radiation Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Radiation Genetic Effects Probability
No Action	10**	6	1.7E-08	2.9E-11	1.7E-12	5.2E-08	8.9E-11	5.2E-12	2.8E+00	4.8E-03	2.8E-04
Decentralized		16	1.1E-07	1.9E-10	1.1E-11	3.3E-07	5.6E-10	3.3E-11	5.0E-01	8.6E-04	5.0E-05
Regionalized-1		12	1.1E-07	1.9E-10	1.1E-11	3.3E-07	5.6E-10	3.3E-11	5.0E-01	8.6E-04	5.0E-05
Regionalized-2	11	12	1.5E-07	2.5E-10	1.5E-11	4.4E-07	7.5E-10	4.4E-11	2.3E+00	3.9E-03	2.3E-04
Regionalized-3		6	1.1E-07	1.9E-10	1.1E-11	3.3E-07	5.6E-10	3.3E-11	5.0E-01	8.6E-04	5.0E-05
Regionalized-4	7	6	1.9E-03	3.3E-06	1.9E-07	1.7E-03	2.9E-06	1.7E-07	6.8E+00	1.2E-02	6.8E-04
Regionalized-5	4	6	1.9E-03	3.3E-06	1.9E-07	1.7E-03	2.9E-06	1.7E-07	6.8E+00	1.2E-02	6.8E-04
Regionalized-6		2	1.1E-07	1.9E-10	1.1E-11	3.3E-07	5.6E-10	3.3E-11	8.1E+00	1.4E-02	8.1E-04
Regionalized-7		2	1.7E-07	2.9E-10	1.7E-11	5.2E-07	8.8E-10	5.2E-11	- -	- -	- -
Centralized-1		1	1.1E-07	1.9E-10	1.1E-11	3.3E-07	5.6E-10	3.3E-11	2.4E+00	4.1E-03	2.4E-04
Centralized-2		1	1.7E-07	2.9E-10	1.7E-11	5.2E-07	8.8E-10	5.2E-11	- -	- -	- -
Centralized-3	7	1	2.1E-03	3.5E-06	2.1E-07	2.1E-03	3.6E-06	2.1E-07	4.6E+00	7.8E-03	4.6E-04
Centralized-4	7	1	2.1E-03	3.5E-06	2.1E-07	2.1E-03	3.6E-06	2.1E-07	- -	- -	- -
Centralized-5	1	1	3.1E-03	5.2E-06	3.1E-07	3.4E-03	5.8E-06	3.4E-07	4.6E+00	7.8E-03	4.6E-04

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered under the alternative.
** Ten sites use existing facilities for Volume Reduction.

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Table II-5.2-6. Hanford—LLW—Emissions in Tons per Year of Criteria Air Pollutants

LLW Alternatives	Number of Sites		Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action	10**	6	20 (11/9)	33 (30/2)	0	2 (2/0)	3 (3/0)	4 (3/1)	44 (0/44)	9 (0/9)	0	0	0	5 (0/5)
Decentralized		16	44 (7/37)	26 (18/7)	0	1 (1/0)	2 (2/0)	6 (2/4)	47 (0/47)	9 (0/9)	0	0	0	6 (0/6)
Regionalized-1		12	44 (7/37)	26 (18/7)	0	1 (1/0)	2 (2/0)	6 (2/4)	47 (0/47)	9 (0/9)	0	0	0	6 (0/6)
Regionalized-2	11	12	80 (7/73)	34 (19/15)	0	2 (2/0)	2 (2/0)	11 (2/9)	79 (0/79)	17 (1/16)	0	0	0	9 (0/9)
Regionalized-3		6	44 (7/37)	26 (18/7)	0	1 (1/0)	2 (2/0)	6 (2/4)	47 (0/47)	9 (0/9)	0	0	0	6 (0/6)
Regionalized-4	7	6	84 (8/76)	36 (21/150)	0	2 (2/0)	2 (2/0)	11 (2/9)	81 (0/81)	16 (0/16)	0	0	0	10 (0/10)
Regionalized-5	4	6	84 (8/76)	36 (21/15)	0	2 (2/0)	2 (2/0)	11 (2/9)	81(0/81)	16 (0/16)	0	0	0	10 (0/10)
Regionalized-6		2	99 (13/86)	51 (34/17)	0	3 (3/0)	3 (3/0)	13 (3/10)	115 (1/114)	28 (2/26)	0	0	0	14 (0/14)
Regionalzied-7		2	13 (2/11)	8 (6/2)	0	0	1 (1/0)	2 (1/1)	13 (0/13)	4 (0/4)	0	0	0	2 (0/2)
Centralized-1		1	197 (37/160)	128 (96/32)	0	8 (8/0)	9 (9/0)	28 (9/19)	238 (3/235)	71 (7/64)	0	2 (1/1)	0	30 (1/29)
Centralized-2		1	13 (2/11)	8 (6/2)	0	0	1 (1/0)	2 (1/1)	13 (0/13)	4 (0/4)	0	0	0	2 (0/2)
Centralized-3	7	1	186 (29/157)	108 (77/31)	0	6 (6/0)	7 (7/0)	26 (7/19)	202 (3/199)	47 (7/40)	0	1 (1/0)	0	25 (1/24)
Centralized-4	7	1	66 (6/60)	27 (15/12)	0	1 (1/0)	1 (1/0)	8 (1/7)	70 (0/70)	30 (0/30)	0	1 (0/1)	0	10 (0/10)
Centralized-5	1	1	431 (58/373)	225 (151/74)	0	13 (12/1)	14 (14/0)	60 (15/45	442 (2/440)	116 (11/105)	0	7 (5/2)	0	54 (0/54)

Notes:
T = Treatment
D = Disposal
Emissions <1 ton per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions/worker vehicles emission)
(2) Values = total emissions (stationary-source emissions/mobile-source emission)
** Ten sites use existing facilities for Volume Reduction.

Table II-5.2-7. Hanford—LLW—Percent of Standard/Guideline for Criteria Air Pollutants

LLW Alternatives	Number of Sites		Construction					
			Percent of Tons/Year General Conformity Rule (1)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC
No Action	10**	6	--	--	--	--	--	--
Decentralized		16	--	--	--	--	--	--
Regionalized-1		12	--	--	--	--	--	--
Regionalized-2	11	12	--	--	--	--	--	--
Regionalized-3		6	--	--	--	--	--	--
Regionalized-4	7	6	--	--	--	--	--	--
Regionalized-5	4	6	--	--	--	--	--	--
Regionalized-6		2	--	--	--	--	--	--
Regionalzied-7		2	--	--	--	--	--	--
Centralized-1		1	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--
Centralized-4	7	1	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--

LLW Alternatives	Number of Sites		Operations & Maintenance											
			Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
	T	D	CO (4)	NO2 (4)	Pb (4)	PM10 (4)	SO2 (4)	VOC (4)	CO	NO2	Pb	PM10	SO2	VOC
No Action	10**	6	0	1	0	0	0	0	--	--	--	--	--	--
Decentralized		16	0	0	0	0	0	0	--	--	--	--	--	--
Regionalized-1		12	0	0	0	0	0	0	--	--	--	--	--	--
Regionalized-2	11	12	0	1	0	1	0	0	0	0	0	0	0	0
Regionalized-3		6	0	0	0	0	0	0	--	--	--	--	--	--
Regionalized-4	7	6	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-5	4	6	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-6		2	1	6	0	3	0	0	--	--	--	--	--	--
Regionalzied-7		2	0	0	0	0	0	0	--	--	--	--	--	--
Centralized-1		1	3	19	0	8	0	1	--	--	--	--	--	--
Centralized-2		1	0	0	0	0	0	0	--	--	--	--	--	--
Centralized-3	7	1	3	19	0	8	0	1	0	0	0	0	0	0
Centralized-4	7	1	0	1	0	1	0	0	0	0	0	0	0	0
Centralized-5	1	1	2	27	0	36	1	1	0	0	0	0	0	0

Notes:
T = Treatment
D = Disposal
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) Hanford is in an attainment area for all criteria pollutants, therefore the GCR do not apply.
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions for the No Action and minimum treatment (no incineration) alternatives are assumed to be negligible.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.
** Ten sites use existing facilities for Volume Reduction.

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Table II-5.2-8. Hanford—LLW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

LLW Alternatives	Number of Sites		Operations & Maintenance											
	T	D	Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action	10**	6	0	--	--	--	--	--	--	--	--	--	--	--
Decentralized		16	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-1		12	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-2	11	12	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-3		6	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	7	6	2	--	--	--	--	--	--	--	--	--	--	--
Regionalized-5	4	6	2	--	--	--	--	--	--	--	--	--	--	--
Regionalized-6		2	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-1		1	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	2	--	--	--	--	--	--	--	--	--	--	--
Centralized-4	7	1	2	--	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	3	--	--	--	--	--	--	--	--	--	--	--

LLW Alternatives	Number of Sites		Operations & Maintenance									
	T	D	Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action	10**	6	--	--	--	--	--	--	--	--	--	--
Decentralized		16	--	--	--	--	--	--	--	--	--	--
Regionalized-1		12	--	--	--	--	--	--	--	--	--	--
Regionalized-2	11	12	--	--	--	--	--	--	--	--	--	--
Regionalized-3		6	--	--	--	--	--	--	--	--	--	--
Regionalized-4	7	6	--	--	--	--	--	--	--	--	--	--
Regionalized-5	4	6	--	--	--	--	--	--	--	--	--	--
Regionalized-6		2	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	--	--	--	--	--	--	--	--	--	--
Centralized-1		1	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--	--	--	--	--
Centralized-4	7	1	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--	--	--	--	--

Notes:
T= Treatment
D = Disposal
- - = Emissions of this hazardous or toxic air pollutant are assumed to be negligible.
Percentages <1% are shown as zeros.
** Ten sites use existing facilities for Volume Reduction.

Table II-5.2-9. Hanford—LLW—Impacts on Water Resources Due to Increased Water Use

LLW Alternatives	Number of Sites		Construction			Operations			
	T	D	Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action	10**	6	9236	0.1	<0.1	13096	0.1	<0.1	- -
Decentralized		16	17930	0.2	<0.1	8772	0.1	<0.1	- -
Regionalized-1		12	17930	0.2	<0.1	8772	0.1	<0.1	- -
Regionalized-2	11	12	22349	0.2	<0.1	10996	0.1	<0.1	- -
Regionalized-3		6	17930	0.2	<0.1	8772	0.1	<0.1	- -
Regionalized-4	7	6	22172	0.2	<0.1	11331	0.1	<0.1	- -
Regionalized-5	4	6	22172	0.2	<0.1	11331	0.1	<0.1	- -
Regionalized-6		2	32371	0.3	<0.1	12256	0.1	<0.1	- -
Regionalized-7		2	6887	0.1	<0.1	1615	<0.1	<0.1	- -
Centralized-1		1	82007	0.9	<0.1	16522	0.2	<0.1	- -
Centralized-2		1	6887	0.1	<0.1	1615	<0.1	<0.1	- -
Centralized-3	7	1	86265	0.9	<0.1	31870	0.3	<0.1	- -
Centralized-4	7	1	16326	0.2	<0.1	7153	0.1	<0.1	- -
Centralized-5	1	1	199473	2.1	<0.1	101650	1.1	<0.1	- -

Notes:
T = Treatment
D = Disposal
Water supplied by surface water in the Columbia River. Current water use = 9,567,000 gallons/day.
Average flow rate of the Columbia River = 77,560,000,000 gallons/day.
** Ten sites use existing facilities for Volume Reduction.
- - = Construction is not considered under No Action Alternative; Wastewater discharged to evaporation ponds.
<0.1 indicates that the percentage is less than 0.1%.

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Table II-5.2-10. Hanford—LLW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal

LLW Alternatives	Number of Sites T	Number of Sites D	Ac 225	Ac 227	Am 241	Am 242	Am 243	C 14	Cs 135	Cs 137	Cm 242	Cm 244	Cm 245	I 129	Pb 210	Np 237	Ni 59	Ni 63	Pd 107	Pu 238	Pu 239	Pu 240	Pu 241
No Action	10**	6	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Decentralized		16	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1		12	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-2	11	12	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-3		6	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-4	7	6	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-5	4	6	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-6		2	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-7		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-1		2	0	2	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0
Centralized-2		1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	0	4	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0
Centralized-4	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	0	4	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0

LLW Alternatives	Number of Sites T	Number of Sites D	Po 210	K 40	Pa 231	Ra 223	Ra 226	Sm 151	Se 79	Sr 90	Tc 99	Th 227	Th 228	Th 229	Th 230	Th 232	Sn 126	U 233	U 234	U 235	U 236	U 238	Y 90	Zr 93
No Action	10**	6	0	0	1	0	0	0	0	0	10	0	0	0	0	0	0	0	10	1	0	3000	0	0
Decentralized		16	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	600	0	0
Regionalized-1		12	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	600	0	0
Regionalized-2	11	12	0	0	2	0	0	0	0	0	4	0	0	0	0	0	0	0	8	2	0	3000	0	0
Regionalized-3		6	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	600	0	0
Regionalized-4	7	6	0	0	2	0	0	0	0	0	30	0	0	0	0	0	0	0	30	2	0	8000	0	0
Regionalized-5	4	6	0	0	2	0	0	0	0	0	30	0	0	0	0	0	0	0	30	2	0	8000	0	0
Regionalized-6		2	0	0	8	0	0	0	0	1	10	0	0	0	1	0	0	0	40	7	0	9000	0	0
Regionalized-7		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-1		2	0	0	2	0	0	0	0	0	3	0	0	0	0	0	0	0	9	0	0	3000	0	0
Centralized-2		1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	0	0	4	0	0	0	0	0	6	0	0	0	0	0	0	0	20	4	0	5000	0	0
Centralized-4	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	0	0	4	0	0	0	0	0	6	0	0	0	0	0	0	0	20	4	0	5000	0	0

Notes:
T = Treatment
D = Disposal
** Ten sites use existing facilities for Volume Reduction
-- = Disposal is not considered for this Alternative.

Table II-5.2-11. Hanford—LLW—Socioeconomic Impacts for Treatment and Disposal

LLW Alternatives	Number of Sites		Effect of Implementation of Alternatives					
				Jobs		Income		
	T	D	Cost (Millions) (1)	Jobs	% Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action	10**	6	1081	880	0.41	9.4	0.14	0.25
Decentralized		16	756	769	0.36	8.2	0.13	0.16
Regionalized-1		12	756	769	0.36	8.2	0.13	0.16
Regionalized-2	11	12	1186	1206	0.56	12.9	0.20	0.28
Regionalized-3		6	756	769	0.36	8.2	0.13	0.16
Regionalized-4	7	6	1219	1240	0.58	13.2	0.20	0.29
Regionalized-5		6	1219	1240	0.58	13.2	0.20	0.29
Regionalized-6		2	1823	1854	0.87	19.8	0.30	0.38
Regionalized-7		2	210	214	0.10	2.3	0.04	0.04
Centralized-1		1	3591	3653	1.70	39.0	0.60	0.75
Centralized-2		1	210	214	0.10	2.3	0.04	0.04
Centralized-3	7	1	3153	3207	1.50	34.2	0.53	0.69
Centralized-4	7	1	884	899	0.42	9.6	0.15	0.21
Centralized-5	1	1	7036	7157	3.34	76.4	1.17	1.50

Notes:
T = Treatment
D = Disposal
(1) In constant 1990 dollars.
(2) Compared to 1990 baseline.
** Ten sites use existing facilities for Volume Reduction.

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Table II-5.2–12. Hanford—LLW—Infrastructure Impacts for Treatment and Disposal

LLW Alternatives	Number of Sites		Effect of Implementation of Alternatives									
			Land Use		Water		Waste Water		Power		Employment (FTE)	
	T	D	Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	% Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Peak Construction Employment	% of Current Employment (1)
No Action	10**	6	22.2	0.00	13096	0.02	13096	6.55	2.00	0.37	295	2
Decentralized		16	10.3	0.00	17930	0.02	8772	4.39	2.70	0.49	287	2
Regionalized-1		12	10.3	0.00	17930	0.02	8772	4.39	2.70	0.49	287	2
Regionalized-2	11	12	11.6	0.00	22349	0.03	10996	5.50	3.40	0.62	564	4
Regionalized-3		6	10.3	0.00	17930	0.02	8772	4.39	2.70	0.49	287	2
Regionalized-4	7	6	12.7	0.00	22172	0.03	11331	5.67	3.50	0.64	591	4
Regionalized-5	4	6	12.7	0.00	22172	0.03	11331	5.67	3.50	0.64	591	4
Regionalized-6		2	15.5	0.00	32371	0.04	12256	6.30	10.98	2.00	663	5
Regionalized-7		2	3.7	0.00	6887	0.01	1615	0.81	0.83	0.15	84	1
Centralized-1		1	37.5	0.00	82007	0.10	16522	8.26	33.02	6.00	1238	9
Centralized-2		1	3.7	0.00	6887	0.01	1615	0.81	0.83	0.15	84	1
Centralized-3	7	1	32.7	0.00	86265	0.11	31870	15.94	34.62	6.29	1215	9
Centralized-4	7	1	8.3	0.00	16326	0.02	7153	3.58	1.90	0.35	468	3
Centralized-5	1	1	86.4	0.01	199473	0.25	101650	50.83	19.80	3.60	2891	20

Notes:
T = Treatment
D = Disposal
GPD = Gallons per Day
MW = Megawatts Electric
FTE = Full Time Equivalent
(1) Based on 1991 Site Employment.
** Ten sites use existing facilities for Volume Reduction.

Table II-5.2-13. Hanford—LLW—Cost

LLW Alternatives	Number of Sites		Total Cost (Millions) (1)	Cost by Life-Cycle Component (1)				Cost by Functional Area (1)		
	T	D		Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Treatment (Millions)	Storage (Millions)	Disposal (Millions)
No Action	10**	6	1223	11	37	1066	109	376	0	847
Decentralized		16	856	59	117	599	80	238	0	618
Regionalized-1		12	856	59	117	599	80	238	0	618
Regionalized-2	11	12	1342	124	224	861	112	962	0	380
Regionalized-3		6	856	59	117	599	80	238	0	618
Regionalized-4	7	6	1379	135	228	901	115	1000	0	380
Regionalized-5	4	6	1379	135	228	901	115	1000	0	380
Regionalized-6		2	2062	155	242	1275	391	238	0	1824
Regionalized-7		2	238	18	57	138	24	238	0	0
Centralized-1		1	4063	301	433	2556	774	238	0	3825
Centralized-2		1	238	18	57	138	24	238	0	0
Centralized-3	7	1	3568	307	420	5475	365	1000	0	2568
Centralized-4	7	1	1000	100	192	653	54	1000	0	0
Centralized-5	1	1	7961	674	1372	5246	669	5393	0	2568

Notes:
T = Treatment
D = Disposal
The Life Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum may not reflect the true total cost.
(1) In current 1994 dollars.
Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

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5.3 Hanford TRUW

Twelve of the 14 impact categories apply to TRUW at Hanford. These impacts are presented in the following tables.

Impact Category

No.	Description	Table No.	Page No.
1.	Hanford—TRUW—Treatment: Estimated Number of Fatalities	II-5.3-1	5-35
2.	Hanford—TRUW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects	II-5.3-2	5-36
4.	Hanford—TRUW—Treatment: MEI Probability of Cancer Fatality	II-5.3-3	5-37
5.	Hanford—TRUW—Treatment: MEI Probability of Cancer Incidences and Genetic Effects	II-5.3-4	5-38
6.	Hanford—TRUW—Treatment: Noncancer Health Risk From Chemical Exposure	II-5.3-5	5-39
7.	Hanford—TRUW—Emissions in Tons per Year of Criteria Air Pollutants	II-5.3-6	5-40
8.	Hanford—TRUW—Percent of Standard/Guideline for Criteria Air Pollutants	II-5.3-7	5-41
9.	Hanford—TRUW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-5.3-8	5-42
10.	Hanford—TRUW—Impacts on Water Resources Due to Increased Water Use	II-5.3-9	5-43
12.	Hanford—TRUW—Socioeconomic Impacts for Treatment	II-5.3-10	5-44
13.	Hanford—TRUW—Infrastructure Impacts for Treatment	II-5.3-11	5-45
14.	Hanford—TRUW—Cost	II-5.3-12	5-46

Table II-5.3-1. Hanford—TRUW—Treatment: Estimated Number of Fatalities

TRUW Alternatives	Treatment						
	Number of Sites		Treat STD	WM Worker		Offsite Population Radiation Exposure	Noninvolved Workers Radiation Exposure
	CH Treat	RH Treat		Radiation Exposure	Physical Hazards		
No Action **	16	5	WIPP WAC	7.2E-03	1.4E-01	1.1E-06	5.1E-08
Decentralized ***	16	5	WIPP WAC	1.0E-01	4.5E-01	5.7E-06	2.6E-07
Regionalized-1	5	2	Reduce Gas	1.3E-01	6.6E-01	6.8E-06	3.1E-07
Regionalized-2	5	2	LDR	1.4E-01	1.3E+00	1.1E-02	4.6E-04
Regionalized-3	3	2	LDR	1.4E-01	1.3E+00	1.1E-02	4.6E-04
Centralized	WIPP	2	LDR	9.7E-02	7.4E-01	6.3E-03	2.3E-04

Notes:
** For No Action Alternative, storage is indefinite; no disposal at WIPP is assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at 16 sites, then transfered to interim storage at 10 sites, then to WIPP.

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Table II-5.3-2. Hanford—TRUW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

TRUW Alternatives	Number of Sites		Treat STD	Offsite Population				Noninvolved Workers				WM Workers			
	CH Treat	RH Treat		Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects
No Action**	16	5	WIPP WAC	2.2E-03	3.7E-06	1.8E-11	2.2E-07	1.0E-04	1.7E-07	1.1E-11	1.0E-08	1.8E+01	2.5E-02	2.0E-08	1.1E-03
Decentralized***	16	5	WIPP WAC	1.1E-02	1.9E-05	1.4E-10	1.1E-06	5.3E-04	8.9E-07	8.5E-11	5.3E-08	2.6E+02	3.6E-01	4.6E-08	1.6E-02
Regionalized-1	5	2	Reduce Gas	1.4E-02	2.3E-05	3.5E-09	1.4E-06	6.3E-04	1.1E-06	2.1E-09	6.3E-08	3.3E+02	4.6E-01	1.4E-06	2.0E-02
Regionalized-2	5	2	LDR	2.2E+01	3.7E-02	1.5E-09	2.2E-03	9.1E-01	1.6E-03	8.9E-10	9.1E-05	3.5E+02	4.9E-01	8.2E-07	2.1E-02
Regionalized-3	3	2	LDR	2.2E+01	3.7E-02	1.5E-09	2.2E-03	9.1E-01	1.6E-03	8.9E-10	9.1E-05	3.5E+02	4.9E-01	8.2E-07	2.1E-02
Centralized	WIPP	2	LDR	1.3E+01	2.2E-02	2.7E-10	1.3E-03	4.7E-01	7.9E-04	1.6E-10	4.7E-05	2.6E+01	3.6E-02	1.2E-07	1.4E-02

Notes:
** For No Action Alternative, storage is indefinite; no disposal at WIPP is assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
T = Treatment
D = Disposal

Table II-5.3-3. Hanford—TRUW—Treatment: MEI Probability of Cancer Fatality

TRUW Alternatives	Number of Sites		Treat STD	Treatment	
	CH Treat	RH Treat		Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability
No Action**	16	5	WIPP WAC	2.2E-11	8.7E-11
Decentralized***	16	5	WIPP WAC	1.2E-10	4.5E-10
Regionalized-1	5	2	Reduce Gas	1.4E-10	5.4E-10
Regionalized-2	5	2	LDR	2.3E-07	7.9E-07
Regionalized-3	3	2	LDR	2.3E-07	7.9E-07
Centralized	WIPP	2	LDR	1.3E-07	4.1E-07

Notes:
MEI = Maximally Exposed Individual
** For No Action Alternative, storage is indefinite; no disposal of WIPP is assumed, for all other alternatives disposal at WIPP is assumed.
***In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then transferred to interim storage at 10 sites, then to WIPP.

Table II-5.3-4. Hanford—TRUW—Treatment: MEI Probability of Cancer Incidences and Genetic Effects

TRUW Alternatives	Number of Sites		Treat STD	Treatment							
				Offsite MEI				Noninvolved Worker MEI			
	CH Treat	RH Treat		Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability
No Action **	16	5	WIPP WAC	4.5E-08	7.6E-11	0.0E+00	4.5E-12	1.7E-07	3.0E-10	1.5E-14	1.7E-11
Decentralized ***	16	5	WIPP WAC	2.4E-07	4.0E-10	0.0E+00	2.4E-11	9.1E-07	1.5E-09	1.7E-13	9.1E-11
Regionalized-1	5	2	Reduce Gas	2.8E-07	4.8E-10	1.2E-13	2.8E-11	1.1E-06	1.8E-09	4.1E-12	1.1E-10
Regionalized-2	5	2	LDR	4.5E-04	7.7E-07	4.8E-14	4.5E-08	1.6E-03	2.7E-06	1.7E-12	1.6E-07
Regionalized-3	3	2	LDR	4.5E-04	7.7E-07	4.8E-14	4.5E-08	1.6E-03	2.7E-06	1.7E-12	1.6E-07
Centralized	WIPP	2	LDR	2.6E-04	4.5E-07	8.0E-15	2.6E-08	8.1E-04	1.4E-06	3.2E-13	8.1E-08

Notes:
** For No Action Alternative, storage is indefinite; no disposal at WIPP is assumed for all other alternatives, disposal of WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites then to WIPP.
MEI = Maximally Exposed Individual

Table II-5.3-5. Hanford—TRUW—Treatment: Noncancer Health Risk From Chemical Exposure

TRUW Alternatives	Number of Sites		Treat STD	Treatment		
	CH Treat	RH Treat		Offsite MEI Hazard Index	Noninvolved Worker MEI Hazard Index	WM Worker Exposure Index
No Action**	16	5	WIPP WAC	7.3E-13	2.6E-11	1.7E-07
Decentralized***	16	5	WIPP WAC	7.0E-12	2.5E-10	4.5E-07
Regionalized-1	5	2	Reduce Gas	2.3E-11	8.2E-10	6.3E-06
Regionalized-2	5	2	LDR	2.2E-10	7.6E-09	1.9E-05
Regionalized-3	3	2	LDR	2.2E-10	7.6E-09	1.9E-05
Centralized	WIPP	2	LDR	8.9E-11	3.1E-09	9.0E-06

Notes:
MEI = Maximally Exposed Individual
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
Hazard Index = Sum of hazard quotient values for all noncarcinogenic chemicals. The Hazard Quotient is the chemical-specific ratio of media exposure concentrations to concentrations exposure concentrations to concentrations believed to have no appreciable adverse effects.
Exposure Index = Ratio of exposure concentration to chemical-specific occupational threshold limits.

Table II-5.3-6. Hanford—TRUW—Emissions in Tons per Year of Criteria Air Pollutants

TRUW Alternatives	Number of Sites		Treat STD	Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
	CH Treat	RH Treat		CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action**	16	5	WIPP WAC	- -	- -	- -	- -	- -	- -	36 (0/36)	7 (0/7)	0	0	0	4 (0/4)
Decentralized***	16	5	WIPP WAC	103 (32/71)	97 (82/14)	0	7 (7/0)	8 (8/0)	16 (8/9)	71 (0/71)	15 (1/14)	0	0	0	9 (0/9)
Regionalized-1	5	2	Reduce Gas	118 (33/85)	103 (86/17)	0	7 (7/0)	8 (8/0)	18 (8/10)	82 (0/82)	17 (1/16)	0	0	0	10 (0/10)
Regionalized-2	5	2	LDR	155 (36/119)	117 (94/24)	0	8 (7/0)	9 (9/0)	23 (9/14)	92 (0/92)	19 (1/18)	0	0	0	11 (0/11)
Regionalized-3	3	2	LDR	155 (36/119)	117 (94/24)	0	8 (7/0)	9 (9/0)	23 (9/14)	92 (0/92)	19 (1/18)	0	0	0	11 (0/11)
Centralized	WIPP	2	LDR	109 (31/78)]	96 (80/16)	0	7 (6/0)	8 (8/0)	17 (8/9)	82 (0/82)	17 (1/16)	0	0	0	10 (0/10)

Notes:
Emissions <1 ton per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions / worker vehicles emission)
(2) Values = total emissions (stationary-source emissions / mobile-source emission)
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

Table II-5.3-7. Hanford—TRUW—Percent of Standard/Guideline for Criteria Air Pollutants

TRUW Alternatives	Number of Sites		Treat STD	Construction					
				Percent of Tons/Year General Conformity Rule (1)					
	CH Treat	RH Treat		CO	NO2	Pb	PM10	SO2	VOC
No Action**	16	5	WIPP WAC	--	--	--	--	--	--
Decentralized***	16	5	WIPP WAC	--	--	--	--	--	--
Regionalized-1	5	2	Reduce Gas	--	--	--	--	--	--
Regionalized-2	5	2	LDR	--	--	--	--	--	--
Regionalized-3	3	2	LDR	--	--	--	--	--	--
Centralized	WIPP	2	LDR	--	--	--	--	--	--

TRUW Alternatives	Number of Sites		Treat STD	Operations & Maintenance											
				Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
	CH Treat	RH Treat		CO (4)	NO2 (4)	Pb (4)	PM10 (4)	SO2 (4)	VOC (4)	CO	NO2	Pb	PM10	SO2	VOC
No Action**	16	5	WIPP WAC	0	1	0	0	0	0	--	--	--	--	--	--
Decentralized***	16	5	WIPP WAC	0	2	0	1	0	0	--	--	--	--	--	--
Regionalized-1	5	2	Reduce Gas	0	2	0	1	0	0	--	--	--	--	--	--
Regionalized-2	5	2	LDR	0	2	0	2	0	0	0	0	0	0	0	0
Regionalized-3	3	2	LDR	0	2	0	2	0	0	0	0	0	0	0	0
Centralized	WIPP	2	LDR	0	1	0	1	0	0	0	0	0	0	0	0

Notes:
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) Hanford is in an attainment area for all criteria pollutants, therefore the GCR does not apply.
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions for alternatives that do not involve treatment to LDR (incineration) are assumed to be negligible.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

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Table II-5.3-8. Hanford—TRUW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

TRUW Alternatives	Number of Sites		Treat STD	Operations & Maintenance											
	CH Treat	RH Treat		Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action**	16	5	WIPP - WAC	0	- -	- -	- -	0	0	- -	- -	- -	- -	- -	- -
Decentralized***	16	5	WIPP - WAC	0	- -	- -	- -	0	0	- -	- -	- -	- -	- -	- -
Regionalized-1	5	2	Reduce Gas	0	- -	- -	- -	0	0	- -	- -	- -	- -	- -	- -
Regionalized-2	5	2	LDR	0	- -	- -	- -	0	0	- -	- -	- -	- -	- -	- -
Regionalized-3	3	2	LDR	0	- -	- -	- -	0	0	- -	- -	- -	- -	- -	- -
Centralized	WIPP	2	LDR	0	- -	- -	- -	0	0	- -	- -	- -	- -	- -	- -

TRUW Alternatives	Number of Sites		Treat STD	Operations & Maintenance									
	CH Treat	RH Treat		Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action**	16	5	WIPP - WAC	0	0	- -	- -	- -	0	0	- -	- -	- -
Decentralized***	16	5	WIPP - WAC	0	0	- -	- -	- -	0	0	- -	- -	- -
Regionalized-1	5	2	Reduce Gas	0	0	- -	- -	- -	0	0	- -	- -	- -
Regionalized-2	5	2	LDR	0	0	- -	- -	- -	0	0	- -	- -	- -
Regionalized-3	3	2	LDR	0	0	- -	- -	- -	0	0	- -	- -	- -
Centralized	WIPP	2	LDR	0	0	- -	- -	- -	0	0	- -	- -	- -

Notes:

** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.

*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

- - = Emissions of this hazardous or toxic air pollutant are assumed to be negligible.

Percentages <1% are shown as zeros. CH = contact handled. RH = remote handled.

Table II-5.3-9. Hanford—TRUW—Impacts on Water Resources Due to Increased Water Use

TRUW Alternatives	Number of Sites		Treat STD	Construction			Operations			
	CH Treat	RH Treat		Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action**	16	5	WIPP WAC	- -	- -	- -	2069	<0.1	<0.1	- -
Decentralized***	16	5	WIPP WAC	52728	0.6	<0.1	11744	0.1	<0.1	- -
Regionalized-1	5	2	Reduce Gas	56413	0.6	<0.1	13956	0.1	<0.1	- -
Regionalized-2	5	2	LDR	64729	0.7	<0.1	15519	0.2	<0.1	- -
Regionalized-3	3	2	LDR	64729	0.7	<0.1	15519	0.2	<0.1	- -
Centralized	WIPP	2	LDR	52910	0.6	<0.1	6020	0.1	<0.1	- -

Notes:
Water supplied by surface water in the Columbia River. Current water use = 9,567,000 gallons/day.
Average flow rate of the Columbia River = 77,560,000,000 gallons/day.
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
- - = Wastewater discharged to evaporation ponds.
<0.1 indicates that the percentage is less than 0.1%.

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Table II-5.3-10. Hanford—TRUW—Socioeconomic Impacts for Treatment

TRUW Alternatives	Number of Sites		Effect of Implementation of Alternatives						
					Jobs		Income		
	CH Treat	RH Treat	Treat STD	Cost (Millions) (1)	Annual Jobs	% Annual Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action**	16	5	WIPP WAC	254	207	0.10	2.2	0.03	0.14
Decentralized***	16	5	WIPP WAC	1600	1628	0.76	17.4	0.27	0.28
Regionalized-1	5	2	Reduce Gas	1875	1908	0.89	20.4	0.31	0.33
Regionalized-2	5	2	LDR	2202	2240	1.05	23.9	0.37	0.39
Regionalized-3	3	2	LDR	2202	2240	1.05	23.9	0.37	0.39
Centralized	WIPP	2	LDR	1602	1630	0.76	17.4	0.27	0.28

Notes:
(1) In current 1990 dollars.
(2) Compared to 1990 baseline.
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

Table II-5.3-11. Hanford—TRUW—Infrastructure Impacts for Treatment

TRUW Alternatives	Number of Sites		Treat STD	Effect of Implementation of Alternatives									
				Land Use		Water		Waste Water		Power		Employment (FTE)	
	CH Treat	RH Treat		Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Peak Construction Employment	% of Current Employment (1)
No Action**	16	5	WIPP WAC	0.0	0.00	2796	0.00	2796	1.40	0.3	0.05	0	0.00
Decentralized***	16	5	WIPP WAC	21.8	0.15	52728	0.07	11744	5.87	2.6	0.47	788	5.50
Regionalized-1	5	2	Reduce Gas	23.5	0.16	56413	0.07	13956	6.98	2.6	0.48	986	6.80
Regionalized-2	5	2	LDR	24.7	0.17	64729	0.08	15519	7.76	3.6	0.66	1317	9.10
Regionalized-3	3	2	LDR	24.7	0.17	64729	0.08	15519	7.76	3.6	0.66	1317	9.10
Centralized	WIPP	2	LDR	21.0	0.25	52910	0.07	6020	3.01	4.9	0.88	874	6.10

Notes:
GPD = Gallons per Day
MW = Megawatts Electric
FTE = Full Time Equivalent
(1) Based on 1991 Site Employment.
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

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Table II-5.3-12. Hanford—TRUW—Cost

TRUW Alternatives	Number of Sites		Treat STD (2)	Total Cost (Millions) (1)	Life-Cycle Component				Functional Area		
	CH Treat	RH Treat			Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Retrieval Characterization (Millions)	Treatment (Millions)	Storage (Millions)
No Action**	11	5	WIPP - WAC	287	0	0	252	35	0	235	52
Decentralized***	16	5	WIPP - WAC	1810	110	403	960	338	584	1188	39
Regionalized-1	5	2	Reduce Gas	2122	156	480	1116	371	584	1446	93
Regionalized-2	5	2	LDR	2491	187	679	1241	384	584	1813	95
Regionalized-3	3	2	LDR	2491	187	679	1241	384	584	1813	95
Centralized	WIPP	2	LDR	1813	128	445	917	323	584	1180	49

Notes:
** For No Action Alternative, storage is indefinite; no disposal at WIPP to be assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
The Life Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum may not reflect the true total cost.
(1) In Current 1994 Dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.
(2) Treatment standard (STD) applied: treat to WIPP Waste Acceptance Criteria (WIPP WAC), treat for reduced gas generation (Reduce Gas), treat to Land Disposal Restrictions (LDR).

5.4 Hanford HLW

Nine of the 14 impact categories apply to HLW at Hanford. These impacts are presented in the following tables.

Impact Category

No.	Description	Table No.	Page No.
1.	Hanford—HLW—Storage: Estimated Number of Fatalities	II-5.4-1	5-48
2.	Hanford—HLW—Storage: Estimated Number of Cancer Incidences and Genetic Effects	II-5.4-2	5-49
7.	Hanford—HLW—Emissions in Tons per Year of Criteria Air Pollutants	II-5.4-3	5-50
8.	Hanford—HLW—Percent of Standard/Guideline for Criteria Air Pollutants	II-5.4-4	5-51
9.	Hanford—HLW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-5.4-5	5-52
10.	Hanford—HLW—Impacts on Water Resources Due to Increased Water Use	II-5.4-6	5-53
12.	Hanford—HLW—Socioeconomics Impacts for Storage	II-5.4-7	5-54
13.	Hanford—HLW—Infrastructure Impacts for Storage	II-5.4-8	5-55
14.	Hanford—HLW—Cost	II-5.4-9	5-56

Table II-5.4–1. Hanford—HLW—Storage: Estimated Number of Fatalities

HLW Alternatives	Number of Sites	WM Worker	
	S	Radiation Exposure	Physical Hazards
No Action	4	2.1E-01	1.3E-01
Decentralized	4	1.3E+00	4.8E-01
Regionalized-1	3	1.3E+00	4.8E-01
Regionalized-2	3	1.4E+00	4.9E-01
Centralized	3	1.7E+00	5.8E-01

Note:
S = Storage

Table II-5.4–2. Hanford—HLW—Storage: Estimated Number of Cancer Incidences and Genetic Effects

HLW Alternatives	Number of Sites	WM Worker		
	S	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	4	2.0E+03	2.8E+00	1.2E-01
Decentralized	4	3.3E+03	4.7E+00	2.0E-01
Regionalized-1	3	3.3E+03	4.7E+00	2.0E-01
Regionalized-2	3	3.4E+03	4.8E+00	2.1E-01
Centralized	3	4.3E+03	6.1E+00	2.6E-01

Notes:
S = Storage

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Table II-5.4-3. Hanford—HLW—Emissions in Tons per Year of Criteria Air Pollutants

HLW Alternatives	Number of Sites S	Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
		CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action	4	3 (2/1)	6 (6/0)	0	0	1 (1/0)	1 (1/0)	6 (0/6)	1 (0/1)	0	0	0	1 (0/1)
Decentralized	4	7 (6/1)	17 (17/0)	0	1 (1/0)	2 (2/0)	2 (2/0)	14 (0/14)	3 (0/3)	0	0	0	2 (0/2)
Regionalized-1	3	7 (6/1)	17 (17/0)	0	1 (1/0)	2 (2/0)	2 (2/0)	14 (0/14)	3 (0/3)	0	0	0	2 (0/2)
Regionalized-2	3	8 (6/1)	17 (17/0)	0	1 (1/0)	2 (2/0)	2 (2/0)	14 (0/14)	3 (0/3)	0	0	0	2 (0/2)
Centralized	3	10 (7/3)	19 (19/0)	0	1 (1/0)	2 (2/0)	2 (2/0)	14 (0/14)	3 (0/3)	0	0	0	2 (0/2)

Notes:
S = Storage
Data is based on repository beginning to accept HLW canisters in 2015.
Emissions <1 ton per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions / worker vehicles emission)
(2) Values = total emissions (stationary-source emissions / mobile-source emission)

Table II-5.4–4. Hanford—HLW—Percent of Standard/Guideline for Criteria Air Pollutants

HLW Alternatives	Number of Sites	Construction					
		Percent of Tons/Year General Conformity Rule (1)					
	S	CO	NO2	Pb	PM10	SO2	VOC
No Action	4	--	--	--	--	--	--
Decentralized	4	--	--	--	--	--	--
Regionalized-1	3	--	--	--	--	--	--
Regionalized-2	3	--	--	--	--	--	--
Centralized	1	--	--	--	--	--	--

HLW Alternatives	Number of Sites	Operations & Maintenance										
		Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)				
	S	CO (4)	NO2 (4)	Pb (4)	PM10 (4)	SO2 (4)	VOC (4)	CO	NO2	Pb	PM10	SO2
No Action	4	--	--	--	--	--	--	--	--	--	--	--
Decentralized	4	--	--	--	--	--	--	--	--	--	--	--
Regionalized-1	3	--	--	--	--	--	--	--	--	--	--	--
Regionalized-2	3	--	--	--	--	--	--	--	--	--	--	--
Centralized	1	--	--	--	--	--	--	--	--	--	--	--

Notes:
S = Storage
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) Hanford is in an attainment area for all criteria pollutants, therfore the GCR does not apply.
(2) Stationary-source emissions from HLW storage facilities are assumed to be negligible.
(3) Stationary-source emissions from HLW storage facilities are assumed to be negligible.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.

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Table II-5.4–5. Hanford—HLW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

HLW Alternatives	Number of Sites	Operations & Maintenance											
	S	Total Radio-nuclides	Other Hazardous and Toxic Air Pollutants	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action	4	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized	4	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-1	3	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-2	3	--	--	--	--	--	--	--	--	--	--	--	--
Centralized	1	--	--	--	--	--	--	--	--	--	--	--	--

HLW Alternatives	Number of Sites	Operations & Maintenance									
	S	Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action	4	--	--	--	--	--	--	--	--	--	--
Decentralized	4	--	--	--	--	--	--	--	--	--	--
Regionalized-1	3	--	--	--	--	--	--	--	--	--	--
Regionalized-2	3	--	--	--	--	--	--	--	--	--	--
Centralized	1	--	--	--	--	--	--	--	--	--	--

Notes:
S = Storage
-- = Emissions of hazardous and toxic air pollutants, including radionuclides, from HLW storage facilities are assumed to be negligible.

Table II-5.4–6. Hanford—HLW—Impacts on Water Resources Due to Increased Water Use

HLW Alternatives	Number of Sites S	Construction Water Use GPD	Construction % Current Use	Construction % Stream Flow	Operations Water Use GPD	Operations % Current Use	Operations % Stream Flow	Operations Waste Water % Stream Flow
No Action	4	25	<0.1	<0.1	2200	<0.1	<0.1	- -
Decentralized	4	27	<0.1	<0.1	11000	0.1	<0.1	- -
Regionalized-1	3	27	<0.1	<0.1	11000	0.1	<0.1	- -
Regionalized-2	3	27	<0.1	<0.1	11000	0.1	<0.1	- -
Centralized	3	28	<0.1	<0.1	11000	0.1	<0.1	- -

Notes:
S = Storage
Water supplied by surface water in the Columbia River. Current water use = 9,567,000 gallons/day.
Average flow rate of the Columbia River = 77,560,000,000 gallons/day.
Data is based on repository beginning to accept HLW canisters in 2015.
- - = Wastewater discharged to evaporation ponds.
<0.1 indicates that the percentage is less than 0.1%.

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Table II-5.4–5. Hanford—HLW—Socioeconomics Impacts for Storage

HLW Alternatives	Number of Sites S	Effect of Implementation of Alternatives					
		Cost (Millions) (1)	Jobs		Income		% ROI Population Increase (2)
			Annual Jobs	% Annual Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	
No Action	4	20	19	0.01	0.2	0.00	0.02
Decentralized	4	283	277	0.13	3.0	0.05	0.04
Regionalized-1	3	283	277	0.13	3.0	0.05	0.04
Regionalized-2	3	303	296	0.14	3.2	0.05	0.04
Centralized	3	485	474	0.22	5.1	0.08	0.05

Notes:
S = Storage
(1) In current 1990 dollars. The economic multiplier analysis only was applied to costs through 2015.
(2) Compared to 1990 baseline.

Table II-5.4–8. Hanford—HLW—Infrastructure Impacts for Storage

HLW Alternatives	Number of Sites	Effect of Implementation of Alternatives									
		Land Use		Water		Waste Water		Power		Employment (FTE)	
	S	Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Construction Employment	% of Current Employment (1)
No Action	4	1	0.01	2200	0	2200	1.1	0.07	0.01	8	0
Decentralized	4	14	0.10	11000	0.01	11000	5.3	0.07	0.01	29	0
Regionalized-1	3	14	0.10	11000	0.01	11000	5.3	0.07	0.01	29	0
Regionalized-2	3	14	0.10	11000	0.01	11000	5.3	0.07	0.01	30	0
Centralized	3	16	0.11	11000	0.01	11000	5.3	0.10	0.02	32	0

Notes:
S = Storage
GPD = Gallons per Day
MW = Megawatts Electric
FTE = Full Time Equivalent
(1) Based on 1991 Site Employment.

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Table II-5.4–9. Hanford—HLW—Cost

HLW Alternatives	Number of Sites	Total Cost (Millions) (1)	Cost by Life-Cycle Component (1)		Cost by Functional Area (1)	
	S		Construction (Millions) (2)	Operations & Maintenance (3) (Millions)	Storage (Millions)	Handling (Millions)
No Action	4	826	22	804	37	789
Decentralized	4	1426	280	1146	486	940
Regionalized-1	3	1426	280	1146	486	940
Regionalized-2	3	1463	280	1183	497	966
Centralized	3	1734	360	1374	688	1046
Centralized Delayed Acceptance	3	2331	520	1811	999	1332

Notes:
S = Storage
The Life Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum may not reflect the true total cost.
(1) In current 1994 Dollars; Total Cost = Sum of Life Cycle Components = Sum of Functional Areas.
(2) Construction costs are for the interim storage facilities.
(3) Operations and maintenance costs include operation and maintenance of the interim storage facilities, and the handling of canisters (unloading/loading of canisters into or out of the interim storage facilities).

5.5 Hanford HW

Eleven of the 14 impact categories apply to HW at Hanford. These impacts are presented in the following tables.

Impact Category

No.	Description	Table No.	Page No.
1.	Hanford—HW—Treatment: Estimated Number of Fatalities	II-5.5-1	5-58
2.	Hanford—HW—Treatment: Estimated Number of Cancer Incidences	II-5.5-2	5-59
3.	Hanford—HW—Treatment: MEI Probability of Cancer Incidences	II-5.5-3	5-60
6.	Hanford—HW—Treatment: Noncancer Health Risk From Chemical Exposure	II-5.5-4	5-61
7.	Hanford—HW—Emissions in Tons per Year of Criteria Air Pollutants	II-5.5-5	5-62
8.	Hanford—HW—Percent of Standard/Guideline for Criteria Air Pollutants	II-5.5-6	5-63
9.	Hanford—HW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-5.5-7	5-64
10.	Hanford—HW—Impacts on Water Resources Due to Increased Water Use	II-5.5-8	5-65
12.	Hanford—HW—Socioeconomics Impacts for Treatment	II-5.5-9	5-66
13.	Hanford—HW—Infrastructure Impacts for Treatment	II-5.5-10	5-67
14.	Hanford—HW—Cost	II-5.5-11	5-68

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Table II-5.5-1. Hanford—HW—Treatment: Estimated Number of Fatalities

HW Alternatives	Number of Sites T	WM Worker Physical Hazards
No Action	2	- -
Decentralized	3	- -
Regionalized-1	5	1.8E-02
Regionalized-2	2	- -

Notes:
- - = Treatment is not considered for this alternative
T = Treatment

Table II-5.5-2. Hanford—HW—Treatment: Estimated Number of Cancer Incidences

HW Alternatives	Number of Sites	Treatment		
	T	Offsite MEI Hazard Index	Noninvolved Worker MEI Hazard Index	WM Worker Exposure Index
No Action	2	- -	- -	- -
Decentralized	3	- -	- -	- -
Regionalized-1	5	1.9E-03	6.7E-02	5.9E+00
Regionalized-2	2	- -	- -	- -

Notes:
T = Treatment
MEI = Maximally Exposed Individual
- - = Treatment is not considered for this alternative.
Hazard Index = Sum of hazard quotient values for all noncarcinogenic chemicals. The Hazard Quotient is the chemical-specific ratio of media exposure concentrations to concentrations believed to have no appreciable adverse effects.
Exposure Index = Ratio of exposure concentration to chemical-specific occupational threshold limits.

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Table II-5.5-3. Hanford—HW—Treatment: MEI Probability of Cancer Incidences

HW Alternatives	Number of Sites	Treatment	
	T	Offsite MEI Cancer Incidence Probability	Noninvolved MEI Cancer Incidence Probability
No Action	2	- -	- -
Decentralized	3	- -	- -
Regionalized-1	5	1.4E-07	5.0E-06
Regionalized-2	2	- -	- -

Notes:
T = Treatment
MEI = Maximally Exposed Individual
- - = Treatment is not considered for this alternative.

Table II-5.5–4. Hanford—HW—Treatment: Noncancer Health Risk From Chemical Exposure

HW Alternatives	Number of Sites	Treatment		
	T	Offsite Population Chemical Cancer Incidence	Noninvolved Worker Chemical Cancer Incidence	WM Worker Chemical Cancer Incidence
No Action	2	- -	- -	- -
Decentralized	3	- -	- -	- -
Regionalized-1	5	4.3E-03	2.6E-03	2.9E-01
Regionalized-2	2	- -	- -	- -

Notes:
T = Treatment
- - = Treatment is not considered for this alternative.

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Table II-5.5-5. Hanford—HW—Emissions in Tons per Year of Criteria Air Pollutants

HW Alternatives	Number of Sites T	Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
		CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action	2	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized	3	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-1	5	6 (4/2)	10 (10/0)	0	1 (1/0)	1 (1/0)	1 (1/0)	0	0	0	1 (1/0)	2 (2/0)	0
Regionalized-2	2	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
T = Treatment
Emissions <1 ton per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions / worker vehicles emission)
(2) Values = total emissions (stationary-source emissions / mobile-source emission)

Table II-5.5-6. Hanford—HW—Percent of Standard/Guideline for Criteria Air Pollutants

HW Alternatives	Number of Sites T	Construction					
		Percent of Tons/Year General Conformity Rule (1)					
		CO	NO2	Pb	PM10	SO2	VOC
No Action	2	--	--	--	--	--	--
Decentralized	3	--	--	--	--	--	--
Regionalized-1	5	--	--	--	--	--	--
Regionalized-2	2	--	--	--	--	--	--

HW Alternatives	Number of Sites T	Operations & Maintenance											
		Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
		CO (4)	NO2 (4)	Pb (4)	PM10 (4)	SO2 (4)	VOC (4)	CO	NO2	Pb	PM10	SO2	VOC
No Action	2	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized	3	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-1	5	0	1 (1/0)	0	8 (8/0)	4 (4/0)	0	0	0	0	0	0	0
Regionalized-2	2	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
T = Treatment
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) Hanford is in an attainment area for all criteria pollutants, therefore the GCR does not apply.
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions for the Regionalized-2 Alternative are assumed to be negligible since no waste is treated at Hanford under this alternative.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.

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Table II-5.5-7. Hanford—HW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

HW Alternatives	Number of Sites T	Operations & Maintenance											
		Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action	2	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized	3	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-1	5	--	--	--	0	--	--	0	0	--	--	--	--
Regionalized-2	2	--	--	--	--	--	--	--	--	--	--	--	--

HW Alternatives	Number of Sites T	Operations & Maintenance									
		Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action	2	--	--	--	--	--	--	--	--	--	--
Decentralized	3	--	--	--	--	--	--	--	--	--	--
Regionalized-1	5	--	0	--	--	0	--	0	0	0	9
Regionalized-2	2	--	--	--	--	--	--	--	--	--	--

Notes:
T = Treatment
Percentages <1% are shown as zeros.
-- = Emissions of certain hazardous or toxic air pollutants, including radionuclides, from HW treatment facilities are assumed to be negligible.

Table II-5.5-8. Hanford—HW—Impacts on Water Resources Due to Increased Water Use

HW Alternatives	Number of Sites T	Construction Water Use GPD	Construction % Current Use	Construction % Stream Flow	Operations Water Use GPD	Operations % Current Use	Operations % Stream Flow	Operations Waste Water % Stream Flow
No Action	2	- -	- -	- -	- -	- -	- -	- -
Decentralized	3	- -	- -	- -	- -	- -	- -	- -
Regionalized-1	5	1366	<0.1	<0.1	933	<0.1	<0.1	- -
Regionalized-2	2	- -	- -	- -	- -	- -	- -	- -

Notes:
T = Treatment
Water supplied by surface water in the Columbia River. Current water use = 9,567,000 gallons/day.
Average flow rate of the Columbia River = 77,560,000,000 gallons/day.
- - = Treatment is not considered for this alternative, and where treatment is considered wastewater is dischaged to evaporation ponds.
<0.1 indicates that the percentage is less than 0.1%.

Table II-5.5-9. Hanford—HW—Socioeconomics Impacts for Treatment

HW Alternatives	Number of Sites	Effect of Implementation of Alternatives					
			Jobs		Income		
	T	Cost (Millions) (1)	Annual Jobs	% Annual Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action	2	- -	- -	- -	- -	- -	- -
Decentralized	3	- -	- -	- -	- -	- -	- -
Regionalized 1	5	54	63	0.03	0.7	0.01	0.01
Regionalized 2	2	- -	- -	- -	- -	- -	- -

Notes:
T = Treatment
- - = Treatment is not considered for this alternative.
(1) In current 1990 dollars.
(2) Compared to 1990 baseline.

Table II-5.5-10. Hanford—HW—Infrastructure Impacts for Treatment

HW Alternatives	Number of Sites	Effect of Implementation of Alternatives									
		Land Use		Water		Waste Water		Power		Employment (FTE)	
	T	Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	% Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Construction Employment	% of Current Employment (1)
No Action	2	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Decentralized	3	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-1	5	1	0.001	1366	0.00	933	0.47	0.28	0.05	22	0
Regionalized-2	2	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

Notes:
T = Treatment
GPD = Gallons per Day
MW = Megawatts Electric
- - = Treatment is not considered for this alternative.
(1) Based on 1991 Site Employment.

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Table II-5.5-11. Hanford—HW—Cost

HW Alternatives	Number of Sites	Total Cost (Millions) (1)	Government Cost by Life-Cycle Component (1)				Cost by Functional Area (1)	
							Treatment & Disposal	
	T		Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Government (2) (Millions)	Commercial (Millions)
No Action	2	6	--	--	--	--	--	6
Decentralized	3	6	--	--	--	--	--	6
Regionalized-1	5	70	5	21	35	1	61	8
Regionalized-2	2	--	--	--	--	--	--	--

Notes:
T = Treatment
-- = Not considered for this site.
The Life Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum may not reflect the true total cost.
(1) In current 1994 Dollars; Total Cost = Sum of the Functional Areas.
(2) Government costs equal to the sum of the life-cycle components.

6.0 INEL

INEL currently is custodian of significant volumes of LLMW, LLW, TRUW, HLW, and HW. Each of the waste types is treated independently in the following sections.

6.1 INEL LLMW

Seventeen tables immediately following portray impacts of LLMW at INEL. These tables are presented as follows:

Impact Category

No.	Description	Table No.	Page No.
1.	INEL—LLMW—Treatment and Disposal: Estimated Number of Fatalities	II-6.1-1	6-3
2.	INEL—LLMW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects	II-6.1-2	6-4
3.	INEL—LLMW—Disposal: Estimated Number of Cancer Incidences	II-6.1-3	6-5
4.	INEL—LLMW—Treatment and Disposal: MEI Probability of Cancer Fatality	II-6.1-4	6-6
5.	INEL—LLMW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects	II-6.1-5	6-7
6.	INEL—LLMW—Treatment and Disposal: Noncancer Health Risk from Chemical Exposure	II-6.1-6	6-8
7.	INEL—LLMW—Emissions in Tons per Year of Criteria Air Pollutants	II-6.1-7	6-9
8.	INEL—LLMW—Percent of Standard/Guideline for Criteria Air Pollutants	II-6.1-8	6-10
9.	INEL—LLMW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-6.1-9	6-11
10.	INEL—LLMW—Impacts on Water Resources Due to Increased Water Use	II-6.1-10	6-12
11.	INEL—LLMW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal (Contact-Handled)	II-6.1-11	6-13
12.	INEL—LLMW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria for Disposal (Remote-Handled)	II-6.1-12	6-14
13.	INEL—LLMW—Percent of Drinking Water Standards for Hazardous Constituents in Groundwater from Disposal (Contact-Handled)	II-6.1-13	6-15
14.	INEL—LLMW—Percent of Drinking Water Standards for Hazardous Constituents in Groundwater from Disposal (Remote-Handled)	II-6.1-14	6-16

15.	INEL—LLMW—Socioeconomics Impacts for Treatment and Disposal	II-6.1-15	6-17
16.	INEL—LLMW—Infrastructure Impacts for Treatment and Disposal	II-6.1-16	6-18
17.	INEL—LLMW—Cost	II-6.1-17	6-19

Table II-6.1-1. INEL—LLMW—Treatment and Disposal: Estimated Number of Fatalities

LLMW Alternatives	Number of Sites		Treatment				Disposal	
			WM Worker		Offsite Population	Noninvolved Workers	WM Worker	
	T	D	Radiation Exposure	Physical Hazards	Radiation Exposure	Radiation Exposure	Radiation Exposure	Physical Hazards
No Action	3	-	1.9E-01	2.2E-01	1.2E-03	3.1E-04	- -	- -
Decentralized	37	16	1.0E-01	4.3E-01	5.2E-05	7.0E-06	1.4E-01	4.6E-02
Regionalized-1	11	12	1.0E-01	4.3E-01	5.2E-05	7.0E-06	1.4E-01	4.6E-02
Regionalized-2	7	6	1.1E-01	5.5E-01	6.3E-04	4.5E-05	1.7E-01	5.5E-02
Regionalized-3	7	1	1.1E-01	5.5E-01	6.3E-04	4.5E-05	- -	- -
Regionalized-4	4	6	1.2E-01	8.8E-01	6.7E-04	4.8E-05	2.9E-01	1.0E-01
Centralized	1	1	7.1E-02	7.5E-02	4.9E-06	3.5E-07	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this Alternative.

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Table II-6.1-2. INEL—LLMW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

LLMW Alternatives	Number of Sites		Offsite Population				Noninvolved Workers				WM Worker			
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-re	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects
No Action	4	-	2.3E+00	3.8E-03	3.9E-06	2.3E-04	6.1E-01	1.0E-03	5.1E-06	6.1E-05	4.7E+02	6.5E-01	3.0E-05	2.8E-02
Decentralized	3	16	1.1E-01	1.8E-04	1.8E-07	1.1E-05	1.4E-02	2.4E-05	2.4E-07	1.4E-06	2.6E+02	3.6E-01	4.0E-04	1.6E-02
Regionalized -1	37	12	1.1E-01	1.8E-04	1.8E-07	1.1E-05	1.4E-02	2.4E-05	2.4E-07	1.4E-06	2.6E+02	3.6E-01	4.0E-04	1.6E-02
Regionalized-2	7	6	1.3E+00	2.1E-03	2.0E-07	1.3E-04	9.0E-02	1.5E-04	2.7E-07	9.0E-06	2.8E+02	3.9E-01	5.1E-04	1.7E-02
Regionalized-3	7	1	1.3E+00	2.1E-03	1.6E-07	1.3E-04	9.0E-02	1.5E-04	2.2E-07	9.0E-06	2.8E+02	3.9E-01	5.1E-04	1.7E-02
Regionalized-4	4	6	1.3E+00	2.3E-03	4.7E-07	1.3E-04	9.7E-02	1.6E-04	6.1E-07	9.7E-06	3.0E+02	4.2E-01	1.2E-03	1.8E-02
Centralized	1	1	9.9E-03	1.7E-05	4.9E-09	9.9E-07	6.9E-04	1.2E-06	6.4E-09	6.9E-08	1.8E+02	2.5E-01	7.0E-06	1.1E-02

Notes:
T = Treatment
D = Disposal

Table II-6.1-6. INEL—LLMW—Disposal: Estimated Number of Cancer Incidences

LLMW Alternatives	Number of Sites		WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	3	-	- -	- -	- -
Decentralized	37	16	3.5E+02	4.9E-01	2.1E-02
Regionalized-1	11	12	3.5E+02	4.9E-01	2.1E-02
Regionalized-2	7	6	4.1E+02	5.8E-01	2.5E-02
Regionalized-3	7	1	- -	- -	- -
Regionalized-4	4	6	7.2E+02	1.0E+00	4.4E-02
Centralized	1	1	- -	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this Alternative.

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Table II-6.1-4. INEL—LLMW—Treatment and Disposal: MEI Probability of Cancer Fatality

LLMW Alternatives	Number of Sites		Treatment		Disposal
	T	D	Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability	Hypothetical Farm Family Most Exposed Lifetime MEI Cancer Fatality Probability
No Action	3	-	1.4E-07	2.6E-07	- -
Decentralized	37	16	6.5E-09	6.0E-09	0.0E+00
Regionalized-1	11	12	6.5E-09	6.0E-09	0.0E+00
Regionalized-2	7	6	7.8E-08	3.9E-08	0.0E+00
Regionalized-3	7	1	7.8E-08	3.9E-08	- -
Regionalized-4	4	6	8.4E-08	4.2E-08	0.0E+00
Centralized	1	1	6.1E-10	3.0E-10	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered under the Alternative

Table II-6.1-5. INEL—LLMW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects

LLMW Alternatives	Number of Sites		Treatment								Disposal			
			Offsite Population MEI				Noninvolved Worker MEI				Most Exposed Farm Family Lifetime MEI			
	T	D	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability
No Action	3	-	2.9E-04	4.9E-07	5.4E-10	2.9E-08	5.3E-04	9.0E-07	4.3E-09	5.3E-08	--	--	--	--
Decentralized	37	16	1.3E-05	2.2E-08	2.5E-11	1.3E-09	1.2E-05	2.0E-08	2.0E-10	1.2E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Regionalized-1	11	12	1.3E-05	2.2E-08	2.5E-11	1.3E-09	1.2E-05	2.0E-08	2.0E-10	1.2E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Regionalized-2	7	6	1.6E-04	2.7E-07	2.6E-07	1.6E-08	7.8E-05	1.3E-07	2.2E-10	7.8E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Regionalized-3	7	1	1.6E-04	2.7E-07	2.2E-11	1.6E-08	7.8E-05	1.3E-07	1.8E-10	7.8E-09	--	--	--	--
Regionalized-4	4	6	1.7E-04	2.8E-07	6.4E-11	1.7E-08	1.2E-05	1.4E-07	5.1E-10	8.3E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Centralized	1	1	1.2E-06	2.1E-09	6.7E-13	1.2E-10	6.0E-07	1.0E-09	5.3E-12	5.9E-11	--	--	--	--

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
-- = Disposal is not considered for this alternative.

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Table II-6.1-6. INEL—LLMW—Treatment and Disposal: Noncancer Health Risk from Chemical Exposure

LLMW Alternatives	Number of Sites		Treatment			Disposal
	T	D	Offsite MEI Hazard Index	Noninvolved Worker MEI Hazard Index	WM Worker Exposure Index	Hypothetical Farm Family Most Exposed Lifetime Hazard Index
No Action	3	-	5.2E-07	4.1E-06	2.0E-04	- -
Decentralized	37	16	4.1E-08	3.2E-07	1.1E-03	8.1E-02
Regionalized-1	11	12	4.1E-08	3.2E-07	1.1E-03	8.1E-02
Regionalized-2	7	6	4.3E-08	3.5E-07	1.3E-03	8.4E-02
Regionalized-3	7	1	3.4E-08	2.7E-07	1.3E-03	- -
Regionalized-4	4	6	5.3E-08	4.2E-07	1.6E-03	4.5E-02
Centralized	1	1	7.7E-10	6.2E-09	4.3E-05	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for No Action Alternative for LLMW.
MEI = Maximally Exposed Individual
Hazard Index = Sum of hazard quotient values for all noncarcinogenic chemicals. The hazard quotient is the chemical-specific ratio of media exposure concentrations to concentrations believed to have no appreciable adverse effects.
Exposure Index = Ratio of Exposure concentration to chemical-specific occupational threshold limits.

Table II-6.1-7. INEL—LLMW—Emissions in Tons per Year of Criteria Air Pollutants

LLMW Alternatives	Number of Sites		Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	122 (45/77)	132 (117/15)	0	9 (9/0)	11 (11/0)	21 (12/9)	20 (2/18)	8 (4/4)	0	1 (1/0)	0	2 (0/2)
Decentralized	37	16	187 (83/104)	236 (215/21)	0	17 (17/0)	21 (21/0)	33 (21/12)	53 (2/51)	16 (6/10)	0	2 (2/0)	0	6 (0/6)
Regionalized-1	11	12	187 (83/104)	236 (215/21)	0	17 (17/0)	21 (21/0)	33 (21/12)	53 (2/51)	16 (6/10)	0	2 (2/0)	0	6 (0/6)
Regionalized-2	7	6	114 (20/93)	72 (53/19)	0	4 (4/0)	5 (5/0)	16 (5/11)	55 (1/54)	15 (4/11)	0	2 (2/0)	0	7 (0/7)
Regionalized-3	7	1	104 (19/85)	66 (49/17)	0	4 (4/0)	5 (5/0)	15 (5/10)	43 (1/42)	12 (4/8)	0	2 (2/0)	0	5 (0/5)
Regionalized-4	4	6	160 (23/137)	82 (61/27)	0	5 (5/0)	6 (6/0)	22 (6/16)	87 (1/86)	27 (10/17)	0	7 (7/0)	1 (1/0)	10 (0/10)
Centralized	1	1	34 (16/18)	45 (41/4)	0	3 (3/0)	4 (4/0)	6 (4/2)	8 (0/8)	3 (1/2)	0	0	0	1 (0/1)

Notes:
T = Treatment
D = Disposal
Emissions <1 tons per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions / worker vehicles emission).
(2) Values = total emissions (stationary-source emissions / mobile-source emission).

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Table II-6.1-8. INEL—LLMW—Percent of Standard/Guideline for Criteria Air Pollutants

LLMW Alternatives	Number of Sites		Construction					
			Percent of Tons/Year General Conformity Rule (1)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	- -	- -	- -	- -	- -	- -
Decentralized	37	16	- -	- -	- -	- -	- -	- -
Regionalized-1	11	12	- -	- -	- -	- -	- -	- -
Regionalized-2	7	6	- -	- -	- -	- -	- -	- -
Regionalized-3	7	1	- -	- -	- -	- -	- -	- -
Regionalized-4	4	6	- -	- -	- -	- -	- -	- -
Centralized	1	1	- -	- -	- -	- -	- -	- -

LLMW Alternatives	Number of Sites		Operations & Maintenance											
			Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
	T	D	CO (4)	NO2 (4)	Pb (4)	PM10 (4)	SO2 (4)	VOC (4)	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	1	10	0	7	0	1	0	0	0	0	0	0
Decentralized	37	16	2	15	0	13	0	1	0	0	0	0	0	0
Regionalized-1	11	12	2	15	0	13	0	1	0	0	0	0	0	0
Regionalized-2	7	6	1	9	0	14	0	0	0	0	0	0	0	0
Regionalized-3	7	1	1	9	0	14	0	0	0	0	0	0	0	0
Regionalized-4	4	6	1	25	0	45	1	0	0	0	0	0	0	0
Centralized	1	1	0	3	0	2	0	0	0	0	0	0	0	0

Notes:
T = Treatment
D = Disposal
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide. VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) INEL is in an attainment area for all criteria pollutants, therfore the GCR does not apply.
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.

Table II-6.1-9. INEL—LLMW—Percent of Standards/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

LLMW Alternatives	Number of Sites		Operations & Maintenance											
	T	D	Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action	3	-	0	0	0	--	--	0	--	--	0	0	0	0
Decentralized	37	16	0	0	0	--	--	0	--	--	0	0	0	0
Regionalized-1	11	12	0	0	0	--	--	0	--	--	0	0	0	0
Regionalized-2	7	6	0	0	0	--	--	0	--	--	0	0	0	0
Regionalized-3	7	1	0	0	0	--	--	0	--	--	0	0	0	0
Regionalized-4	4	6	0	0	0	--	--	0	--	--	0	0	0	0
Centralized	1	1	0	0	0	--	--	0	--	--	0	0	0	0

LLMW Alternatives	Number of Sites		Operations & Maintenance									
	T	D	Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2 Trichloro,1,1	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action	3	-	--	0	0	0	--	0	0	--	--	--
Decentralized	37	16	--	0	0	0	--	0	0	--	--	--
Regionalized-1	11	12	--	0	0	0	--	0	0	--	--	--
Regionalized-2	7	6	--	0	0	0	--	0	0	--	--	--
Regionalized-3	7	1	--	0	0	0	--	0	0	--	--	--
Regionalized-4	4	6	--	0	0	0	--	0	0	--	--	--
Centralized	1	1	--	0	0	0	--	0	0	--	--	--

Notes:
T = Treatment
D = Disposal
-- = Emissions of this hazardous or toxic air pollutant are assumed to be negligible.
Percentages <1% are shown as zeros.

Table II-6.1-10. INEL—LLMW—Impacts on Water Resources Due to Increased Water Use

LLMW Alternatives	Number of Sites		Construction			Operations			
	T	D	Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action	3	-	73350	1.3	- -	4304	0.1	- -	- -
Decentralized	37	16	110206	1.9	- -	7907	0.1	- -	- -
Regionalized-1	11	12	110206	1.9	- -	7907	0.1	- -	- -
Regionalized-2	7	6	41313	0.7	- -	8352	0.1	- -	- -
Regionalized-3	7	1	38333	0.7	- -	7309	0.1	- -	- -
Regionalized-4	4	6	52175	0.9	- -	13239	0.2	- -	- -
Centralized	1	1	21517	0.4	- -	1258	<0.1	- -	- -

Notes:
T = Treatment
D = Disposal
Water supplied by groundwater in the Snake River Plain Aquifer. Current water use = 5,700,000 gallons/day.
Wastewater discharged to onsite evaporation ponds.
- - = Stream Flow and Waste Water Stream Flow is not considered for this site.
<0.1 indicates that the percentage is less than 0.1%.

Table II-6.1-11. INEL—LLMW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal (Contact-Handled)

LLMW Alternatives	Number of Sites T	Number of Sites D	Ac 225	Ac 227	Am 241	Am 242	Am 243	C 14	Cs 135	Cs 137	Cm 242	Cm 244	Cm 245	I 129	Pb 210	Np 237	Ni 59	Ni 63	Pd 107	Pu 238	Pu 239	Pu 240	Pu 241
No Action	3	-	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-2	7	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centralized	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

LLMW Alternatives	Number of Sites T	Number of Sites D	Po 210	K 40	Pa 231	Ra 223	Ra 226	Sm 151	Se 79	Sr 90	Tc 99	Th 227	Th 228	Th 229	Th 230	Th 232	Sn 126	U 233	U 234	U 235	U 236	U 238	Y 90	Zr 93
No Action	3	-	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-2	7	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centralized	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Notes:
T = Treatment
D = Disposal
-- = No disposal of CH-LLMW at this site for this alternative.

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Table II-6.1-12. INEL—LLMW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria for Disposal (Remote-Handled)

LLMW Alternatives	T	D *	Ac 225	Ac 227	Am 241	Am 242	Am 243	C 14	Cs 135	Cs 137	Cm 242	Cm 244	Cm 245	I 129	Pb 210	Np 237	Ni 59	Ni 63	Pd 107	Pu 238	Pu 239	Pu 240	Pu 241
No Action	3	-	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-2	7	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-3	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-4	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centralized	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

LLMW Alternatives	T	D *	Po 210	K 40	Pa 231	Ra 223	Ra 226	Sm 151	Se 79	Sr 90	Tc 99	Th 227	Th 228	Th 229	Th 230	Th 232	Sn 126	U 233	U 234	U 235	U 236	U 238	Y 90	Zr 93
No Action	3	-	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-2	7	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-3	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-4	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centralized	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Notes:
T = Treatment
D = Disposal
* = In addition to the CH-LLMW disposal sites indicated below, disposal of RH-LLMW occurs at four sites (Hanford, INEL, ORR and SRS) for all alternatives except No Action
- - = No disposal at this site for this alternative.

Table II-6.1-13. INEL—LLMW—Percent of Drinking Water Standards for Hazardous Constituents in Groundwater from Disposal (Contact-Handled)

LLMW Alternatives	T	D	Acetone	Arsenic	Barium	Benzene	Cadmium	Carbon Tetrachloride	Chromium	Cyanide
No Action	3	-	--	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	8	0	80	0	0
Regionalized-1	11	12	0	0	0	8	0	80	0	0
Regionalized-2	7	6	0	0	0	8	0	80	0	0
Regionalized-3	7	1	--	--	--	--	--	--	--	--
Regionalized-4	4	6	0	0	0	3	0	40	0	0
Centralized	1	1	--	--	--	--	--	--	--	--

LLMW Alternatives	T	D	1,2-dichloro-ethane	Lead	Mercury	Methylene Chloride	Selenium	Silver	1,2,2-trichloro-1,1-trifluoroethane
No Action	3	-	--	--	--	--	--	--	--
Decentralized	37	16	40	0	0	100	0	0	0
Regionalized-1	11	12	40	0	0	100	0	0	0
Regionalized-2	7	6	40	0	0	100	0	0	0
Regionalized-3	7	1	--	--	--	--	--	--	--
Regionalized-4	4	6	20	0	0	50	0	0	0
Centralized	1	1	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
"--" = No disposal at this site for this alternative.

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Table II-6.1-14. INEL—LLMW—Percent of Drinking Water Standards for Hazardous Constituents in Groundwater from Disposal (Remote-Handled)

LLMW Alternatives	T	D *	Acetone	Arsenic	Barium	Benzene	Cadmium	Carbon Tetrachloride	Chromium
No Action	3	-	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	0	0	2	0
Regionalized-1	11	12	0	0	0	0	0	2	0
Regionalized-2	7	6	0	0	0	0	0	2	0
Regionalized-3	7	1	0	0	0	0	0	2	0
Regionalized-4	4	6	0	0	0	0	0	2	0
Centralized	1	1	0	0	0	0	0	2	0

LLMW Alternatives	T	D *	1,2-dichloro-ethane	Lead	Mercury	Methylene Chloride	Selenium	Silver	1,2,2-trichloro-1,1-trifluoroethane
No Action	3	-	--	--	--	--	--	--	--
Decentralized	37	16	2	0	0	2	0	0	0
Regionalized-1	11	12	2	0	0	2	0	0	0
Regionalized-2	7	6	2	0	0	2	0	0	0
Regionalized-3	7	1	2	0	0	2	0	0	0
Regionalized-4	4	6	2	0	0	2	0	0	0
Centralized	1	1	2	0	0	2	0	0	0

Notes:
T = Treatment
D = Disposal
* = In addition to the CH-LLMW disposal sites indicated below, disposal of RH-LLMW occurs at four sites (Hanford, INEL, ORR and SRS) for all alternatives except No Action.
"--" = No disposal at this site for this alternative.

Table II-6.1-15. INEL—LLMW—Socioeconomics Impacts for Treatment and Disposal

LLMW Alternatives	Number of Sites		Effect of Implementation of Alternatives					
				Jobs		Income		
	T	D	Cost (Millions) (1)	Annual Jobs	% Annual Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action	3	-	748	618	0.62	6.7	0.23	0.35
Decentralized	37	16	1623	1572	1.58	16.9	0.58	0.18
Regionalized-1	11	12	1628	1576	1.58	17.0	0.59	0.48
Regionalized-2	7	6	1573	1525	1.53	16.4	0.57	0.48
Regionalized-3	7	1	1396	1352	1.36	14.5	0.51	0.39
Regionalized-4	4	6	2100	2034	2.04	21.9	0.76	0.24
Centralized	1	1	739	715	0.72	7.7	0.27	0.07

Notes:
T = Treatment
D = Disposal
(1) In current 1990 dollars.
(2) Compared to 1990 baseline

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Table II-6.1-16. INEL—LLMW—Infrastructure Impacts for Treatment and Disposal

LLMW Alternatives	Number of Sites		Effect of Implementation of Alternatives									
			Land Use		Water		Waste Water		Power		Employment (FTE)	
	T	D	Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	% Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Peak Construction Employment	% of Current Employment (1)
No Action	3	-	33.3	0.03	73350	0.24	4304	0.43	10.34	24.73	588	5
Decentralized	37	16	55.6	0.05	110206	0.36	7907	0.74	5.25	12.56	798	7
Regionalized-1	11	12	55.6	0.05	110206	0.36	7907	0.74	5.25	12.56	798	7
Regionalized-2	7	6	23.5	0.02	41313	0.13	8352	0.84	1.70	4.06	716	6
Regionalized-3	7	1	21.6	0.02	38333	0.12	7309	0.73	1.70	4.06	646	5
Regionalized-4	4	6	30.6	0.03	52175	0.17	13239	1.32	2.59	6.20	1055	9
Centralized	1	1	12.2	0.01	21517	0.07	1258	0.13	0.32	0.77	137	1

Notes:
T = Treatment
D = Disposal
GPD = Gallons per Day
MW = Megawatts
(1) Based on 1991 Site Employment

Table II-6.1-17. INEL—LLMW—Cost

LLMW Alternatives	Number of Sites		Total Cost (Millions) (1)	Cost by Life-Cycle Component (1)				Cost by Functional Area (1)		
	T	D		Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Treatment (Millions)	Storage (Millions)	Disposal (Millions)
No Action	3	-	903	75	319	364	145	404	499	0
Decentralized	37	16	1837	180	668	918	70	1382	0	455
Regionalized-1	11	12	1842	181	668	923	70	1383	0	460
Regionalized-2	7	6	1780	176	621	887	96	1455	0	325
Regionalized-3	7	1	1580	157	602	760	61	1462	0	118
Regionalized-4	4	6	2377	217	807	1214	138	1868	0	508
Centralized	1	1	836	79	333	382	41	1718	0	118

Notes:
T = Treatment
D = Disposal
The Life-Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum of these may not reflect the true total cost.
(1) In current 1994 dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

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6.2 INEL LLW

Thirteen tables immediately following portray the impacts of LLW at INEL. These tables are presented as follows:

Impact Category

No.	Description	Table No.	Page No.
1.	INEL—LLW—Treatment and Disposal: Estimated Number of Fatalities	II-6.2-1	6-21
2.	INEL—LLW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects	II-6.2-2	6-22
3.	INEL—LLW—Disposal: Estimated Number of Cancer Incidences and Genetic Effects	II-6.2-3	6-23
4.	INEL—LLW—Treatment and Disposal: MEI Probability of Cancer Fatality	II-6.2-4	6-24
5.	INEL—LLW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects	II-6.2-5	6-25
7.	INEL—LLW—Emissions in Tons per Year of Criteria Air Pollutants	II-6.2-6	6-26
8.	INEL—LLW—Percent of Standard/Guideline for Criteria Air Pollutants	II-6.2-7	6-27
9.	INEL—LLW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-6.2-8	6-28
10.	INEL—LLW—Impacts on Water Resources Due to Increased Water Use	II-6.2-9	6-29
11.	INEL—LLW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal	II-6.2-10	6-30
12.	INEL—LLW—Socioeconomic Impacts for Treatment and Disposal	II-6.2-11	6-31
13.	INEL—LLW—Infrastructure Impacts for Treatment and Disposal	II-6.2-12	6-32
14.	INEL—LLW—Cost	II-6.2-13	6-33

Table II-6.2-1. INEL—LLW—Treatment and Disposal: Estimated Number of Fatalities

LLW Alternatives	Number of Sites		Treatment				Disposal	
			WM Worker		Offsite Population	Noninvolved Workers	WM Worker	
	T	D	Radiation Exposure	Physical Hazards	Radiation Exposure	Radiation Exposure	Radiation Exposure	Physical Hazards
No Action	10**	6	2.5E-01	3.7E-01	1.4E-06	3.0E-06	6.4E-01	2.1E-01
Decentralized		16	1.7E-01	1.5E-01	8.0E-07	2.4E-07	4.2E-01	2.5E-01
Regionalized-1		12	1.7E-01	1.5E-01	8.0E-07	2.4E-07	4.2E-01	2.5E-01
Regionalized-2	11	12	1.7E-01	3.7E-01	1.4E-06	4.0E-07	3.4E-01	1.5E-01
Regionalized-3		6	1.7E-01	1.5E-01	8.0E-07	2.4E-07	4.2E-01	1.5E-01
Regionalized-4	7	6	1.7E-01	3.7E-01	1.4E-06	4.0E-07	3.4E-01	1.5E-01
Regionalized-5	4	6	5.3E-01	8.1E-01	4.1E-04	1.2E-04	3.6E-01	1.6E-01
Regionalized-6		2	2.1E-01	2.3E-01	1.3E-06	3.9E-07	- -	- -
Regionalized-7		2	2.1E-01	2.3E-01	1.3E-06	3.9E-07	- -	- -
Centralized-1		1	2.1E-01	2.3E-01	1.3E-06	3.9E-07	- -	- -
Centralized-2		1	2.1E-01	2.3E-01	1.3E-06	3.9E-07	- -	- -
Centralized-3	7	1	1.7E-01	3.7E-01	1.4E-06	4.0E-07	- -	- -
Centralized-4	7	1	1.7E-01	3.7E-01	1.4E-06	4.0E-07	- -	- -
Centralized-5	1	1	1.7E-01	1.5E-01	8.0E-07	2.4E-07	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered under the alternative
** Ten sites use existing facilities for Volume Reduction

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Table II-6.2-2. INEL—LLW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

LLW Alternatives	Number of Sites		Offsite Population			Noninvolved Worker			WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	10**	6	2.7E-03	4.7E-06	2.7E-07	8.1E-04	1.4E-06	8.1E-08	6.2E+02	8.7E-01	3.7E-02
Decentralized		16	1.6E-03	2.7E-06	1.6E-07	4.8E-04	8.1E-07	4.8E-08	4.1E+02	5.8E-01	2.5E-02
Regionalized-1		12	1.6E-03	2.7E-06	1.6E-07	4.8E-04	8.1E-07	4.8E-08	4.1E+02	5.8E-01	2.5E-02
Regionalized-2	11	12	2.7E-03	4.6E-06	2.7E-07	8.1E-04	1.4E-06	8.1E-08	4.2E+02	5.8E-01	2.5E-02
Regionalized-3		6	1.6E-03	2.7E-06	1.6E-07	4.8E-04	8.1E-07	4.8E-08	4.1E+02	5.8E-01	2.5E-02
Regionalized-4	7	6	2.7E-03	4.6E-06	2.7E-07	8.1E-04	1.4E-06	8.1E-08	4.2E+02	5.8E-01	2.5E-02
Regionalized-5	4	6	8.2E-01	1.4E-03	8.2E-05	2.3E-01	4.0E-04	2.3E-05	1.3E+03	1.9E+00	8.0E-02
Regionalized-6		2	2.6E-03	4.4E-06	2.6E-07	7.7E-04	1.3E-06	7.7E-08	5.2E+02	7.2E-01	3.1E-01
Regionalized-7		2	2.6E-03	4.4E-06	2.6E-07	7.7E-04	1.3E-06	7.7E-08	5.2E+02	7.2E-01	3.1E-01
Centralized-1		1	2.6E-03	4.4E-06	2.6E-07	7.7E-04	1.3E-06	7.7E-08	5.2E+02	7.2E-01	3.1E-01
Centralized-2		1	2.6E-03	4.4E-06	2.6E-07	7.7E-04	1.3E-06	7.7E-08	5.2E+02	7.2E-01	3.1E-01
Centralized-3	7	1	2.7E-03	4.6E-06	2.7E-07	8.1E-04	1.4E-06	8.1E-08	4.2E+02	5.8E-01	2.5E-02
Centralized-4	7	1	2.7E-03	4.6E-06	2.7E-07	8.1E-04	1.4E-06	8.1E-08	4.2E+02	5.8E-01	2.5E-02
Centralized-5	1	1	1.6E-03	2.7E-06	1.6E-07	4.8E-04	8.1E-07	4.8E-08	4.1E+02	5.8E-01	2.5E-02

Notes:
T = Treatment
D = Disposal
** Ten sites use existing facilities for Volume Reduction.

Table II-6.2-3. INEL—LLW—Disposal: Estimated Number of Cancer Incidences and Genetic Effects

LLW Alternatives	Number of Sites		WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	10**	6	1.6E+03	2.2E+00	9.6E-02
Decentralized		16	1.0E+03	1.5E+00	6.3E-02
Regionalized-1		12	1.0E+03	1.5E+00	6.3E-02
Regionalized-2	11	12	8.6E+02	1.2E+00	5.2E-02
Regionalized-3		6	1.0E+03	1.5E+00	6.3E-02
Regionalized-4	7	6	8.6E+02	1.2E+00	5.2E-02
Regionalized-5	4	6	9.0E+02	1.3E+00	5.4E-02
Regionalized-6		2	- -	- -	- -
Regionalized-7		2	- -	- -	- -
Centralized-1		1	- -	- -	- -
Centralized-2		1	- -	- -	- -
Centralized-3	7	1	- -	- -	- -
Centralized-4	7	1	- -	- -	- -
Centralized-5	1	1	- -	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered under the alternative.
** Ten sites use existing facilities for Volume Reduction.

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Table II-6.2–4. INEL—LLW—Treatment and Disposal: MEI Probability of Cancer Fatality

LLW Alternatives	Number of Sites		Treatment		Disposal
	T	D	Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability	Hypothetical Farm Family - Most Exposed Lifetime MEI Cancer Fatality Probability
No Action	10**	6	1.7E-10	3.4E-10	0.0E+00
Decentralized		16	9.9E-11	2.0E-10	0.0E+00
Regionalized-1		12	9.9E-11	2.0E-10	0.0E+00
Regionalized-2	11	12	1.7E-10	3.4E-10	0.0E+00
Regionalized-3		6	9.9E-11	2.0E-10	0.0E+00
Regionalized-4	7	6	1.7E-10	3.4E-10	0.0E+00
Regionalized-5	4	6	5.1E-08	1.0E-07	0.0E+00
Regionalized-6		2	1.6E-10	3.2E-10	- -
Regionalized-7		2	1.6E-10	3.2E-10	- -
Centralized-1		1	1.6E-10	3.2E-10	- -
Centralized-2		1	1.6E-10	3.2E-10	- -
Centralized-3	7	1	1.7E-10	3.4E-10	- -
Centralized-4	7	1	1.7E-10	3.4E-10	- -
Centralized-5	1	1	9.9E-11	2.0E-10	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered under the Alternative.
** Ten sites use existing facilities for Volume Reduction.

Table II-6.2-5. INEL—LLW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects

LLW Alternatives	Number of Sites		Treatment						Disposal		
			Offsite MEI			Noninvolved Worker MEI			Most Exposed Lifetime MEI		
	T	D	Dose (rem)	Radiation Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Radiation Genetic Effects Probability
No Action	10**	6	3.4E-07	5.8E-10	3.4E-11	6.7E-07	1.1E-09	6.7E-11	0.0E+00	0.0E+00	0.0E+00
Decentralized		16	2.0E-07	3.4E-10	2.0E-11	4.0E-07	6.8E-10	4.0E-11	0.0E+00	0.0E+00	0.0E+00
Regionalized-1		12	2.0E-07	3.4E-10	2.0E-11	4.0E-07	6.8E-10	4.0E-11	0.0E+00	0.0E+00	0.0E+00
Regionalized-2	11	12	3.3E-07	5.7E-10	3.3E-11	6.7E-07	1.1E-09	6.7E-11	0.0E+00	0.0E+00	0.0E+00
Regionalized-3		6	2.0E-07	3.4E-10	2.0E-11	4.0E-07	6.8E-10	4.0E-11	0.0E+00	0.0E+00	0.0E+00
Regionalized-4	7	6	3.3E-07	5.7E-10	3.3E-11	6.7E-07	1.1E-09	6.7E-11	0.0E+00	0.0E+00	0.0E+00
Regionalized-5	4	6	1.0E-04	1.7E-07	1.0E-08	2.0E-04	3.4E-07	2.0E-08	0.0E+00	0.0E+00	0.0E+00
Regionalized-6		2	3.2E-07	5.4E-10	3.2E-11	6.4E-07	1.1E-09	6.4E-11	--	--	--
Regionalized-7		2	3.2E-07	5.4E-10	3.2E-11	6.4E-07	1.1E-09	6.4E-11	--	--	--
Centralized-1		1	3.2E-07	5.4E-10	3.2E-11	6.4E-07	1.1E-09	6.4E-11	--	--	--
Centralized-2		1	3.2E-07	5.4E-10	3.2E-11	6.4E-07	1.1E-09	6.4E-11	--	--	--
Centralized-3	7	1	3.3E-07	5.7E-10	3.3E-11	6.7E-07	1.1E-09	6.7E-11	--	--	--
Centralized-4	7	1	3.3E-07	5.7E-10	3.3E-11	6.7E-07	1.1E-09	6.7E-11	--	--	--
Centralized-5	1	1	2.0E-07	3.4E-10	2.0E-11	4.0E-07	6.8E-10	4.0E-11	--	--	--

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
-- = Disposal is not considered under the alternative.
** Ten sites use existing facilities for Volume Reduction.

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Table II-6.2-6. INEL—LLW—Emissions in Tons per Year of Criteria Air Pollutants

LLW Alternatives	Number of Sites		Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action	10**	6	26 (5/21)	16 (12/4)	0	1 (1/0)	1 (1/0)	4 (1/3)	59 (0/59)	12 (0/12)	0	0	0	7 (0/7)
Decentralized		16	48 (8/40)	28 (20/8)	0	2 (2/0)	2 (2/0)	7 (2/5)	65 (0/65)	13 (0/13)	0	0	0	8 (0/8)
Regionalized-1		12	48 (8/40)	28 (20/8)	0	2 (2/0)	2 (2/0)	7 (2/5)	65 (0/65)	13 (0/13)	0	0	0	8 (0/8)
Regionalized-2	11	12	67 (9/59)	34 (23/12)	0	2 (2/0)	2 (2/0)	9 (2/7)	91 (0/91)	19 (1/18)	0	1 (1/0)	0	11 (0/11)
Regionalized-3		6	48 (8/40)	28 (20/8)	0	2 (2/0)	2 (2/0)	7 (2/5)	63 (0/63)	13 (0/13)	0	0	0	8 (0/8)
Regionalized-4	7	6	67 (9/59)	34 (23/12)	0	2 (2/0)	2 (2/0)	9 (2/7)	91 (0/91)	19 (1/18)	0	1 (1/0)	0	11 (0/11)
Regionalized-5	4	6	148 (21/127)	79 (54/25)	0	5 (4/0)	5 (5/0)	20 (5/15)	182 (1/181)	40 (2/38)	0	4 (3/0)	0	22 (0/22)
Regionalized-6		2	44 (4/40)	18 (10/8)	0	1 (1/0)	1 (1/0)	6 (1/5)	33 (0/33)	8 (0/8)	0	0	0	4 (4/0)
Regionalzied-7		2	44 (4/40)	18 (10/8)	0	1 (1/0)	1 (1/0)	6 (1/5)	33 (0/33)	8 (0/8)	0	0	0	4 (4/0)
Centralized-1		1	44 (4/40)	18 (10/8)	0	1 (1/0)	1 (1/0)	6 (1/5)	33 (0/33)	8 (0/8)	0	0	0	4 (4/0)
Centralized-2		1	44 (4/40)	18 (10/8)	0	1 (1/0)	1 (1/0)	6 (1/5)	33 (0/33)	8 (0/8)	0	0	0	4 (4/0)
Centralized-3	7	1	65 (6/59)	28 (16/12)	0	1 (1/0)	2 (2/0)	9 (2/7)	65 (0/65)	15 (1/14)	0	1 (1/0)	0	8 (0/8)
Centralized-4	7	1	65 (6/59)	28 (16/12)	0	1 (1/0)	2 (2/0)	9 (2/7)	65 (0/65)	15 (1/14)	0	1 (1/0)	0	8 (0/8)
Centralized-5	1	1	44 (4/40)	18 (10/8)	0	1 (1/0)	1 (1/0)	6 (1/5)	33 (0/33)	8 (0/8)	0	0	0	4 (4/0)

Notes:
T = Treatment
D = Disposal
Emissions <1 ton per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions/worker vehicles emission)
(2) Values = total emissions (stationary-source emissions/mobile-source emission)
** Ten sites use existing facilities for Volume Reduction.

Table II-6.2-7. INEL—LLW—Percent of Standard/Guideline for Criteria Air Pollutants

LLW Alternatives	Number of Sites		Construction					
			Percent of Tons/Year General Conformity Rule (1)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC
No Action	10**	6	--	--	--	--	--	--
Decentralized		16	--	--	--	--	--	--
Regionalized-1		12	--	--	--	--	--	--
Regionalized-2	11	12	--	--	--	--	--	--
Regionalized-3		6	--	--	--	--	--	--
Regionalized-4	7	6	--	--	--	--	--	--
Regionalized-5	4	6	--	--	--	--	--	--
Regionalized-6		2	--	--	--	--	--	--
Regionalzied-7		2	--	--	--	--	--	--
Centralized-1		1	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--
Centralized-4	7	1	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--

LLW Alternatives	Number of Sites		Operations & Maintenance											
			Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
	T	D	CO (4)	NO2	Pb (4)	PM10	SO2 (4)	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action	10**	6	0	2	0	2	0	0	0	0	0	0	0	0
Decentralized		16	0	1	0	1	0	0	--	--	--	--	--	--
Regionalized-1		12	0	1	0	1	0	0	--	--	--	--	--	--
Regionalized-2	11	12	0	4	0	4	0	0	0	0	0	0	0	0
Regionalized-3		6	0	1	0	1	0	0	--	--	--	--	--	--
Regionalized-4	7	6	0	4	0	4	0	0	0	0	0	0	0	0
Regionalized-5	4	6	1	5	0	22	1	0	0	0	0	0	0	0
Regionalized-6		2	0	1	0	0	0	0	--	--	--	--	--	--
Regionalzied-7		2	0	1	0	0	0	0	--	--	--	--	--	--
Centralized-1		1	0	1	0	0	0	0	--	--	--	--	--	--
Centralized-2		1	0	1	0	0	0	0	--	--	--	--	--	--
Centralized-3	7	1	0	3	0	4	0	0	0	0	0	0	0	0
Centralized-4	7	1	0	3	0	4	0	0	0	0	0	0	0	0
Centralized-5	1	1	0	1	0	0	0	0	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide. VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) INEL is in an attainment area for all criteria pollutants, therefore the GCR do not apply.
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions for the No Action and minimum treatment (no incineration) alternatives, and the Centralized - 5 Alternative, are assumed to be negligible.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied.
Values are for stationary-source emissions only.
** Ten sites use existing facilities for Volume Reduction.

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Table II-6.2–8. INEL—LLW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

LLW Alternatives	Number of Sites		Operations & Maintenance											
	T	D	Total Radio-nuclides	Other Hazardous and Toxic Air Pollutants	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action	10**	6	0	--	--	--	--	--	--	--	--	--	--	--
Decentralized		16	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-1		12	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-2	11	12	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-3		6	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	7	6	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-5	4	6	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-6		2	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-1		1	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-4	7	1	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	0	--	--	--	--	--	--	--	--	--	--	--

LLW Alternatives	Number of Sites		Operations & Maintenance									
	T	D	Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action	10**	6	--	--	--	--	--	--	--	--	--	--
Decentralized		16	--	--	--	--	--	--	--	--	--	--
Regionalized-1		12	--	--	--	--	--	--	--	--	--	--
Regionalized-2	11	12	--	--	--	--	--	--	--	--	--	--
Regionalized-3		6	--	--	--	--	--	--	--	--	--	--
Regionalized-4	7	6	--	--	--	--	--	--	--	--	--	--
Regionalized-5	4	6	--	--	--	--	--	--	--	--	--	--
Regionalized-6		2	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	--	--	--	--	--	--	--	--	--	--
Centralized-1		1	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--	--	--	--	--
Centralized-4	7	1	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--	--	--	--	--

Notes:
T= Treatment
D = Disposal
- - = Emissions of this hazardous or toxic air pollutant are assumed to be negligible.
Percentages <1% are shown as zeros.
** Ten sites use existing facilities for Volume Reduction.

Table II-6.2-9. INEL—LLW—Impacts on Water Resources Due to Increased Water Use

LLW Alternatives	Number of Sites		Construction			Operations			
	T	D	Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action	10**	6	3434	0.1	- -	4458	0.1	- -	- -
Decentralized		16	21632	0.4	- -	8483	0.1	- -	- -
Regionalized-1		12	21632	0.4	- -	8483	0.1	- -	- -
Regionalized-2	11	12	25442	0.4	- -	12725	0.2	- -	- -
Regionalized-3		6	21632	0.4	- -	8483	0.1	- -	- -
Regionalized-4	7	6	25442	0.4	- -	12725	0.2	- -	- -
Regionalized-5	4	6	63961	1.1	- -	28247	0.5	- -	- -
Regionalized-6		2	12191	0.2	- -	4514	0.1	- -	- -
Regionalized-7		2	12191	0.2	- -	4514	0.1	- -	- -
Centralized-1		1	12191	0.2	- -	4514	0.1	- -	- -
Centralized-2		1	12191	0.2	- -	4514	0.1	- -	- -
Centralized-3	7	1	19535	0.3	- -	10059	0.2	- -	- -
Centralized-4	7	1	19535	0.3	- -	10059	0.2	- -	- -
Centralized-5	1	1	12191	0.2	- -	4514	0.1	- -	- -

Notes:
T = Treatment
D = Disposal
Water supplied by groundwater in the Snake River Plain Aquifer. Current water use = 5,700,000 gallons/day.
Wastewater discharged to onsite evaporation ponds.
** Ten sites use existing facilities for Volume Reduction.
- - = Stream Flow is not considered for this site.
<0.1 indicates that the percentage is less than 0.1%.

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Table II-6.2–10. INEL—LLW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal

LLW Alternatives	Number of Sites T	Number of Sites D	Ac 225	Ac 227	Am 241	Am 242	Am 243	C 14	Cs 135	Cs 137	Cm 242	Cm 244	Cm 245	I 129	Pb 210	Np 237	Ni 59	Ni 63	Pd 107	Pu 238	Pu 239	Pu 240	Pu 241
No Action	10**	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Decentralized		16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1		12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-2	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-3		6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-4	7	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-5	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-6		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-1		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-4	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

LLW Alternatives	Number of Sites T	Number of Sites D	Po 210	K 40	Pa 231	Ra 223	Ra 226	Sm 151	Se 79	Sr 90	Tc 99	Th 227	Th 228	Th 229	Th 230	Th 232	Sn 126	U 233	U 234	U 235	U 236	U 238	Y 90	Zr 93
No Action	10**	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Decentralized		16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1		12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-2	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-3		6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-4	7	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-5	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-6		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-1		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-4	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
** Ten sites use existing facilities for Volume Reduction
- - = Disposal is not considered for this Alternative.

Table II-6.2-11. INEL—LLW—Socioeconomic Impacts for Treatment and Disposal

LLW Alternatives	Number of Sites		Effect of Implementation of Alternatives					
				Jobs		Income		
	T	D	Cost (Millions) (1)	Jobs	% Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action	10**	6	1418	1098	1.10	11.8	0.41	0.32
Decentralized		16	1120	1085	1.09	11.7	0.41	0.50
Regionalized-1		12	1120	1085	1.09	11.7	0.41	0.50
Regionalized-2	11	12	1355	1312	1.32	14.1	0.49	0.66
Regionalized-3		6	1120	1085	1.09	11.7	0.41	0.50
Regionalized-4	7	6	1530	1481	1.49	15.9	0.55	0.66
Regionalized-5		6	3079	2981	2.99	32.1	1.11	3.20
Regionalized-6		2	613	593	0.60	6.4	0.22	0.26
Regionalized-7		2	613	593	0.60	6.4	0.22	0.26
Centralized-1		1	613	593	0.60	6.4	0.22	0.26
Centralized-2		1	613	593	0.60	6.4	0.22	0.26
Centralized-3	7	1	984	952	0.96	10.3	0.36	0.44
Centralized-4	7	1	984	952	0.96	10.3	0.36	0.44
Centralized-5	1	1	613	593	0.60	6.4	0.22	0.26

Note:
T = Treatment
D = Disposal
(1) In constant 1990 dollars.
(2) Compared to 1990 baseline.
** Ten sites use existing facilities for Volume Reduction

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Table II-6.2-12. INEL—LLW—Infrastructure Impacts for Treatment and Disposal

LLW Alternatives	Number of Sites		Effect of Implementation of Alternatives									
			Land Use		Water		Waste Water		Power		Employment (FTE)	
	T	D	Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	% Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Peak Construction Employment	% of Current Employment (1)
No Action	10**	6	7.5	0.01	4458	6.51	4458	0	1.42	3.4	164	1
Decentralized		16	12.5	0.01	21632	0.07	8483	0	2.41	5.78	488	4
Regionalized-1		12	12.5	0.01	21632	0.07	8483	0	2.41	5.78	488	4
Regionalized-2	11	12	13.9	0.01	25442	0.08	12725	0	2.98	7.14	555	5
Regionalized-3		6	12.5	0.01	21632	0.07	8483	0	2.41	5.78	488	4
Regionalized-4	7	6	13.9	0.01	21520	0.08	12725	0	3.00	7.17	555	5
Regionalized-5	4	6	26.5	0.03	63961	0.21	28247	0	7.30	17.47	2702	23
Regionalized-6		2	7.9	0.01	12191	0.04	4514	0	1.26	3.02	330	3
Regionalized-7		2	7.9	0.01	12191	0.04	4514	0	1.26	3.02	330	3
Centralized-1		1	7.9	0.01	12191	0.04	4514	0	1.26	3.02	330	3
Centralized-2		1	7.9	0.01	12191	0.04	4514	0	1.26	3.02	330	3
Centralized-3	7	1	11.9	0.01	15530	0.06	10059	0	3.00	7.18	454	4
Centralized-4	7	1	11.9	0.01	15530	0.06	10059	0	3.00	7.18	454	4
Centralized-5	1	1	7.9	0.01	12191	0.04	4514	0	1.26	3.02	281	2

Notes:
T = Treatment
D = Disposal
GPD = Gallons per Day
MW = Megawatts Electric
FTE = Full Time Equivalent
(1) Based on 1991 Site Employment.
** Ten sites use existing facilities for Volume Reduction.

Table II-6.2-13. INEL—LLW—Cost

LLW Alternatives	Number of Sites		Total Cost (Millions) (1)	Cost by Life-Cycle Component (1)				Cost by Functional Area (1)		
	T	D		Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Treatment (Millions)	Storage (Millions)	Disposal (Millions)
No Action	10**	6	1604	27	80	1399	98	1010	0	594
Decentralized		16	1267	100	205	819	144	655	0	612
Regionalized-1		12	1267	100	205	819	144	655	0	612
Regionalized-2	11	12	1533	112	236	1044	141	1113	0	420
Regionalized-3		6	1267	100	205	819	144	655	0	612
Regionalized-4	7	6	1731	135	257	1163	177	1113	0	619
Regionalized-5	4	6	3484	288	641	2332	222	2865	0	618
Regionalized-6		2	693	57	157	439	40	693	0	0
Regionalized-7		2	693	57	157	439	40	693	0	0
Centralized-1		1	693	57	157	439	40	693	0	0
Centralized-2		1	693	57	157	439	40	693	0	0
Centralized-3	7	1	1113	88	200	753	72	1113	0	0
Centralized-4	7	1	1113	88	200	753	72	1113	0	0
Centralized-5	1	1	693	57	157	439	40	693	0	0

Notes:
** Ten sites use existing facilities for Volume Reduction
T = Treatment
D = Disposal
The Life Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum may not reflect the true total cost.
(1) In Current 1994 Dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

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6.3 INEL TRUW

Twelve tables immediately following portray the impacts of TRUW at INEL. These tables are presented as follows:

Impact Category

No.	Description	Table No.	Page No.
1.	INEL—TRUW—Treatment: Estimated Number of Fatalities	II-6.3-1	6-35
2.	INEL—TRUW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects	II-6.3-2	6-36
4.	INEL—TRUW—Treatment: MEI Probability of Cancer Fatality	II-6.3-3	6-37
5.	INEL—TRUW—Treatment: MEI Probability of Cancer Incidences and Genetic Effects	II-6.3-4	6-38
6.	INEL—TRUW—Treatment: Noncancer Health Risk From Chemical Exposure	II-6.3-5	6-39
7.	INEL—TRUW—Emissions in Tons per Year of Criteria Air Pollutants	II-6.3-6	6-40
8.	INEL—TRUW—Percent of Standard/Guideline for Criteria Air Pollutants	II-6.3-7	6-41
9.	INEL—TRUW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-6.3-8	6-42
10.	INEL—TRUW—Impacts on Water Resources Due to Increased Water Use	II-6.3-9	6-43
12.	INEL—TRUW—Socioeconomic Impacts for Treatment	II-6.3-10	6-44
13.	INEL—TRUW—Infrastructure Impacts for Treatment	II-6.3-11	6-45
14.	INEL—TRUW—Cost	II-6.3-12	6-46

Table II-6.3-1. INEL—TRUW—Treatment: Estimated Number of Fatalities

TRUW Alternatives	Treatment						
	Number of Sites		Treat STD	WM Worker		Offsite Population Radiation Exposure	Noninvolved Workers Radiation Exposure
	CH Treat	RH Treat		Radiation Exposure	Physical Hazards		
No Action **	16	5	WIPP WAC	4.0E-06	2.7E-02	6.7E-09	1.7E-09
Decentralized ***	16	5	WIPP WAC	2.5E-01	8.2E-01	1.1E-06	3.4E-07
Regionalized-1	5	2	Reduce Gas	2.5E-01	1.0E+00	1.4E-06	4.3E-07
Regionalized-2	5	2	LDR	2.4E-01	1.6E+00	7.3E-03	2.2E-03
Regionalized-3	3	2	LDR	2.5E-01	1.8E+00	4.1E-02	1.2E-02
Centralized	WIPP	2	LDR	2.4E-01	5.5E-01	1.6E-06	4.7E-07

Notes:
** For No Action Alternative, storage is indefinite; no disposal at WIPP is assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at 16 sites, then transfered to interim storage at 10 sites, then to WIPP.

Table II-6.3-2. INEL—TRUW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

TRUW Alternatives	Number of Sites		Treat STD	Offsite Population				Noninvolved Workers				WM Workers			
	CH Treat	RH Treat		Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects
No Action**	16	5	WIPP WAC	1.3E-05	2.3E-08	1.7E-12	1.3E-09	3.4E-06	5.7E-09	2.3E-12	3.4E-10	9.9E-03	1.4E-05	3.7E-09	6.0E-07
Decentralized***	16	5	WIPP WAC	2.3E-03	3.9E-06	2.3E-09	2.3E-07	6.8E-04	1.2E-06	3.0E-09	6.8E-08	6.3E+02	8.8E-01	9.2E-06	3.8E-02
Regionalized-1	5	2	Reduce Gas	2.9E-03	4.9E-06	2.3E-09	2.9E-07	8.6E-04	1.5E-06	3.1E-09	8.6E-08	6.3E+02	8.8E-01	1.5E-05	3.8E-02
Regionalized-2	5	2	LDR	1.5E+01	2.5E-02	1.7E-09	1.5E-03	4.4E+00	7.5E-03	2.2E-09	4.4E-04	5.9E+02	8.3E-01	2.2E-05	3.6E-02
Regionalized-3	3	2	LDR	8.2E+01	1.4E-01	1.7E-09	8.2E-03	2.5E+01	4.2E-02	2.3E-09	2.5E-03	6.2E+02	8.7E-01	3.3E-05	3.7E-02
Centralized	WIPP	2	LDR	3.2E-03	5.4E-06	6.6E-09	3.2E-07	9.4E-04	1.6E-06	8.7E-09	9.4E-08	6.1E+02	8.5E-01	4.4E-05	3.6E-02

Notes:
** For No Action Alternative, storage is indefinite; no disposal at WIPP is assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
T = Treatment
D = Disposal

Table II-6.3-3. INEL—TRUW—Treatment: MEI Probability of Cancer Fatality

TRUW Alternatives	Number of Sites		Treat STD	Treatment	
	CH Treat	RH Treat		Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability
No Action**	16	5	WIPP WAC	8.4E-13	1.5E-12
Decentralized***	16	5	WIPP WAC	1.4E-10	2.9E-10
Regionalized-1	5	2	Reduce Gas	1.8E-10	3.7E-10
Regionalized-2	5	2	LDR	9.1E-07	1.9E-06
Regionalized-3	3	2	LDR	5.1E-06	1.1E-05
Centralized	WIPP	2	LDR	2.0E-10	4.0E-10

Notes:
MEI = Maximally Exposed Individual
** For No Action Alternative, storage is indefinite; no disposal of WIPP is assumed, for all other alternatives disposal at WIPP is assumed.
***In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then transferred to interim storage at 10 sites, then to WIPP.

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Table II-6.3-4. INEL—TRUW—Treatment: MEI Probability of Cancer Incidences and Genetic Effects

TRUW Alternatives	CH Treat	RH Treat	Treat STD	Treatment							
				Offsite MEI				Noninvolved Worker MEI			
				Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability
No Action **	16	5	WIPP WAC	1.7E-09	2.8E-12	0.0E+00	1.7E-13	2.9E-09	4.9E-12	0.0E+00	2.9E-13
Decentralized ***	16	5	WIPP WAC	2.8E-07	4.8E-10	3.2E-13	2.8E-11	5.8E-07	9.9E-10	2.5E-12	5.8E-11
Regionalized-1	5	2	Reduce Gas	3.6E-07	6.1E-10	3.2E-13	3.6E-11	7.4E-07	1.3E-09	2.6E-12	7.4E-11
Regionalized-2	5	2	LDR	1.8E-03	3.1E-06	2.3E-13	1.8E-07	3.7E-03	6.4E-06	1.9E-12	3.7E-07
Regionalized-3	3	2	LDR	1.0E-02	1.7E-05	2.4E-13	1.0E-06	2.1E-02	3.6E-05	1.9E-12	2.1E-06
Centralized	WIPP	2	LDR	3.9E-07	6.7E-10	9.1E-13	3.9E-11	8.1E-07	1.4E-09	7.3E-12	8.1E-11

Notes:
** For No Action Alternative, storage is indefinite; no disposal at WIPP is assumed for all other alternatives, disposal of WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites then to WIPP.
MEI = Maximally Exposed Individual

Table II-6.3-5. INEL—TRUW—Treatment: Noncancer Health Risk From Chemical Exposure

TRUW Alternatives	Number of Sites		Treat STD	Treatment		
	CH Treat	RH Treat		Offsite MEI Hazard Index	Noninvolved Worker MEI Hazard Index	WM Worker Exposure Index
No Action**	16	5	WIPP WAC	7.8E-14	6.2E-13	1.1E-07
Decentralized***	16	5	WIPP WAC	1.9E-11	1.5E-10	3.1E-05
Regionalized-1	5	2	Reduce Gas	2.6E-11	2.1E-10	3.1E-05
Regionalized-2	5	2	LDR	4.2E-10	3.3E-09	1.0E-04
Regionalized-3	3	2	LDR	7.9E-10	6.3E-09	2.0E-04
Centralized	WIPP	2	LDR	4.9E-11	4.0E-10	1.9E-04

Notes:
MEI = Maximally Exposed Individual
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
Hazard Index = Sum of hazard quotient values for all noncarcinogenic chemicals. The Hazard Quotient is the chemical-specific ratio of media exposure concentrations to concentrations exposure concentrations to concentrations believed to have no appreciable adverse effects.
Exposure Index = Ratio of exposure concentration to chemical-specific occupational threshold limits.

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Table II-6.3-6. INEL—TRUW—Emissions in Tons per Year of Criteria Air Pollutants

TRUW Alternatives	Number of Sites		Treat STD	Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
	CH Treat	RH Treat		CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action**	16	5	WIPP WAC	- -	- -	- -	- -	- -	- -	57 (0/57)	11 (0/11)	0	0	0	7 (0/7)
Decentralized***	16	5	WIPP WAC	116 (41/75)	121 (106/15)	0	8 (8/0)	10 (10/0)	19 (10/9)	72 (0/72)	15 (1/14)	0	0	0	9 (0/9)
Regionalized-1	5	2	Reduce Gas	121 (41/80)	124 (108/16)	0	9 (9/0)	10 (10/0)	20 (10/10)	82 (0/82)	17 (1/16)	0	0	0	10 (0/10)
Regionalized-2	5	2	LDR	140 (43/97)	131 (112/19)	0	9 (9/0)	11 (11/0)	23 (11/12)	87 (0/87)	18 (1/17)	0	0	0	11 (11/0)
Regionalized-3	3	2	LDR	165 (45/120)	142 (118/24)	0	9 (9/0)	11 (11/0)	25 (11/14)	107 (1/107)	22 (1/21)	0	0	0	13 (0/13)
Centralized	WIPP	2	LDR	79 (36/43)	103 (94/9)	0	8 (8/0)	9 (9/0)	14 (9/5)	48 (0/48)	10 (0/10)	0	0	0	6 (0/6)

Notes:
Emissions <1 ton per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions / worker vehicles emission)
(2) Values = total emissions (stationary-source emissions / mobile-source emission)
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

Table II-6.3-7. INEL—TRUW—Percent of Standard/Guideline for Criteria Air Pollutants

TRUW Alternatives	Number of Sites		Treat STD	Construction					
				Percent of Tons/Year General Conformity Rule (1)					
	CH Treat	RH Treat		CO	NO2	Pb	PM10	SO2	VOC
No Action	16	5	WIPP WAC	--	--	--	--	--	--
Decentralized	16	5	WIPP WAC	--	--	--	--	--	--
Regionalized-1	5	2	Reduce Gas	--	--	--	--	--	--
Regionalized-2	5	2	LDR	--	--	--	--	--	--
Regionalized-3	3	2	LDR	--	--	--	--	--	--
Centralized	WIPP	2	LDR	--	--	--	--	--	--

TRUW Alternatives	Number of Sites		Treat STD	Operations & Maintenance											
				Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
	CH Treat	RH Treat		CO (4)	NO2 (4)	Pb (4)	PM10 (4)	SO2 (4)	VOC (4)	CO	NO2	Pb	PM10	SO2	VOC
No Action	16	5	WIPP WAC	0	1	0	0	0	0	--	--	--	--	--	--
Decentralized	16	5	WIPP WAC	0	1	0	1	0	0	--	--	--	--	--	--
Regionalized-1	5	2	Reduce Gas	0	2	0	1	0	0	--	--	--	--	--	--
Regionalized-2	5	2	LDR	0	2	0	10	4	0	0	0	0	0	0	0
Regionalized-3	3	2	LDR	1	4	0	17	8	0	0	0	0	0	0	0
Centralized	WIPP	2	LDR	0	0	0	0	0	0	--	--	--	--	--	--

Notes:
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide. VOC = volatile organic compounds.
NAAQS = National Ambient Air Quality Standard.
(1) INEL is in an attainment area for all criteria pollutants, therefore the GCR does not apply.
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions for alternatives that do not involve treatment to LDR (incineration) are assumed to be negligible.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

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Table II-6.3-8. INEL—TRUW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

TRUW Alternatives	Number of Sites		Treat STD	Operations & Maintenance											
	CH Treat	RH Treat		Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action**	16	5	WIPP - WAC	0	--	--	--	0	0	--	--	--	--	--	--
Decentralized***	16	5	WIPP - WAC	0	--	--	--	0	0	--	--	--	--	--	--
Regionalized-1	5	2	Reduce Gas	0	--	--	--	0	0	--	--	--	--	--	--
Regionalized-2	5	2	LDR	2	--	--	--	0	0	--	--	--	--	--	--
Regionalized-3	3	2	LDR	10	--	--	--	0	0	--	--	--	--	--	--
Centralized	WIPP	2	LDR	0	--	--	--	0	0	--	--	--	--	--	--

TRUW Alternatives	Number of Sites		Treat STD	Operations & Maintenance									
	CH Treat	RH Treat		Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action**	16	5	WIPP - WAC	0	0	--	--	--	0	0	--	--	--
Decentralized***	16	5	WIPP - WAC	0	0	--	--	--	0	0	--	--	--
Regionalized-1	5	2	Reduce Gas	0	0	--	--	--	0	0	--	--	--
Regionalized-2	5	2	LDR	0	0	--	--	--	0	0	--	--	--
Regionalized-3	3	2	LDR	0	0	--	--	--	0	0	--	--	--
Centralized	WIPP	2	LDR	0	0	--	--	--	0	0	--	--	--

Notes:
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
-- = Emissions of this hazardous or toxic air pollutant are assumed to be negligible.
Percentages <1% are shown as zeros. CH = contact handled. RH = remote handled.

Table II-6.3-9. INEL—TRUW—Impacts on Water Resources Due to Increased Water Use

TRUW Alternatives	Number of Sites		Treat STD	Construction			Operations			
	CH Treat	RH Treat		Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action**	16	5	WIPP WAC	- -	- -	- -	3206	0.1	- -	- -
Decentralized***	16	5	WIPP WAC	65914	1.2	- -	9723	0.2	- -	- -
Regionalized-1	5	2	Reduce Gas	67519	1.2	- -	11126	0.2	- -	- -
Regionalized-2	5	2	LDR	71723	1.3	- -	12400	0.2	- -	- -
Regionalized-3	3	2	LDR	77743	1.4	- -	16872	0.3	- -	- -
Centralized	WIPP	2	LDR	56308	1.0	- -	4425	0.1	- -	- -

Notes:
Water supplied by groundwater in the Snake River Plain Aquifer. Current water use = 5,700,000 gallons/day.
Wastewater discharged to onsite evaporation ponds.
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
- - = Stream Flow and Waste Water Stream Flow are not considered for this site.

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Table II-6.3-10. INEL—TRUW—Socioeconomic Impacts for Treatment

TRUW Alternatives	Number of Sites		Effect of Implementation of Alternatives						
					Jobs		Income		
	CH Treat	RH Treat	Treat STD	Cost (Millions) (1)	Annual Jobs	% Annual Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action**	16	5	WIPP WAC	217	168	0.17	1.8	0.06	0.22
Decentralized***	16	5	WIPP WAC	1492	1445	1.45	15.6	0.54	0.60
Regionalized-1	5	2	Reduce Gas	1610	1559	1.56	16.8	0.58	0.66
Regionalized-2	5	2	LDR	1805	1748	1.75	18.8	0.65	0.74
Regionalized-3	3	2	LDR	2196	2126	2.13	22.9	0.80	0.91
Centralized	WIPP	2	LDR	875	847	0.85	9.1	0.32	0.37

Notes:
(1) In current 1990 dollars.
(2) Compared to 1990 baseline.
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

Table II-6.3-11. INEL—TRUW—Infrastructure Impacts for Treatment

TRUW Alternatives	Number of Sites		Treat STD	Effect of Implementation of Alternatives									
				Land Use		Water		Waste Water		Power		Employment (FTE)	
	CH Treat	RH Treat		Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Peak Construction Employment	% of Current Employment (1)
No Action	16	5	WIPP WAC	0	0.00	3206	0.01	3206	0.32	0.53	1.28	0	0.00
Decentralized	16	5	WIPP WAC	28.1	0.03	65914	0.22	9723	0.97	1.96	4.69	754	6.40
Regionalized-1	5	2	Reduce Gas	27.8	0.03	67519	0.22	11126	1.11	2.66	6.36	842	7.10
Regionalized-2	5	2	LDR	28.2	0.03	71723	0.23	12400	1.24	2.78	6.64	1015	8.60
Regionalized-3	3	2	LDR	28.2	0.03	77743	0.25	16872	1.69	2.78	6.64	1257	10.60
Centralized	WIPP	2	LDR	28.2	0.02	56308	0.18	4425	0.44	2.78	6.64	403	3.40

Notes:
GPD = Gallons per Day
MW = Megawatts Electric
FTE = Full Time Equivalent
(1) Based on 1991 Site Employment.
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

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Table II-6.3-12. INEL—TRUW—Cost

TRUW Alternatives	Number of Sites		Treat STD (2)	Total Cost (Millions) (1)	Life-Cycle Component				Functional Area		
	CH Treat	RH Treat			Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Retrieval Characterization (Millions)	Treatment (Millions)	Storage (Millions)
No Action**	11	5	WIPP - WAC	246	0	0	206	40	0	199	47
Decentralized***	16	5	WIPP - WAC	1688	83	419	725	461	930	705	54
Regionalized-1	5	2	Reduce Gas	1822	105	450	777	489	930	801	91
Regionalized-2	5	2	LDR	2042	125	549	875	493	930	1023	90
Regionalized-3	3	2	LDR	2485	157	680	1140	508	930	1456	100
Centralized	WIPP	2	LDR	990	33	237	323	397	930	61	0

Notes:
** For No Action Alternative, storage is indefinite; no disposal at WIPP to be assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
The Life Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum may not reflect the true total cost.
(1) In Current 1994 Dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.
(2) Treatment standard (STD) applied: treat to WIPP Waste Acceptance Criteria (WIPP WAC), treat for reduced gas generation (Reduce Gas), treat to Land Disposal Restrictions (LDR).

6.4 INEL HLW

Nine tables immediately following portray the impacts of HLW at INEL. These tables are presented as follows:

Impact Category

No.	Description	Table No.	Page No.
1.	INEL—HLW—Storage: Estimated Number of Fatalities	II-6.4-1	6-48
2.	INEL—HLW—Storage: Estimated Number of Cancer Incidences and Genetic Effects	II-6.4-2	6-49
7.	INEL—HLW—Emissions in Tons per Year of Criteria Air Pollutants	II-6.4-3	6-50
8.	INEL—HLW—Percent of Standard/Guideline for Criteria Air Pollutants	II-6.4-4	6-51
9.	INEL—HLW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-6.4-5	6-52
10.	INEL—HLW—Impacts on Water Resources Due to Increased Water Use	II-6.4-6	6-53
12.	INEL—HLW—Socioeconomics Impacts for Storage	II-6.4-7	6-54
13.	INEL—HLW—Infrastructure Impacts for Storage	II-6.4-8	6-55
14.	INEL—HLW—Cost	II-6.4-9	6-56

Table II-6.4–1. INEL—HLW—Storage: Estimated Number of Fatalities

HLW Alternatives	Number of Sites	WM Worker	
	S	Radiation Exposure	Physical Hazards
No Action	4	- -	- -
Decentralized	4	4.4E-01	1.3E-01
Regionalized-1	3	4.4E-01	1.3E-01
Regionalized-2	3	4.4E-01	1.3E-01
Centralized	3	4.3E-01	1.3E-01

Notes:
S = Storage
- - = The INEL is not considered for storage of vitrified HLW canisters under the No Action Alternative.

Table II-6.4–2. INEL—HLW—Storage: Estimated Number of Cancer Incidences and Genetic Effects

HLW Alternatives	Number of Sites	WM Worker		
	S	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	4	- -	- -	- -
Decentralized	4	1.1E+03	1.5E+00	6.6E-02
Regionalized-1	3	1.1E+03	1.5E+00	6.6E-02
Regionalized-2	3	1.1E+03	1.5E+00	6.6E-02
Centralized	3	1.1E+03	1.5E+00	6.5E-02

Notes:
S = Storage

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Table II-6.4–3. INEL—HLW—Emissions in Tons per Year of Criteria Air Pollutants

HLW Alternatives	Number of Sites	Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
	S	CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action	4	0	0	0	0	0	0	0	0	0	0	0	0
Decentralized	4	3 (2/1)	4 (4/0)	0	0	0	0	7 (0/7)	1 (0/1)	0	0	0	1 (0/1)
Regionalized-1	3	3 (2/1)	4 (4/0)	0	0	0	0	7 (0/7)	1 (0/1)	0	0	0	1 (0/1)
Regionalized-2	3	3 (2/1)	4 (4/0)	0	0	0	0	7 (0/7)	1 (0/1)	0	0	0	1 (0/1)
Centralized	3	3 (2/1)	4 (4/0)	0	0	0	0	7 (0/7)	1 (0/1)	0	0	0	1 (0/1)

Notes:
S = Storage
Data is based on repository beginning to accept HLW canisters in 2015.
Emissions <1 ton per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions/worker vehicles emission)
(2) Values = total emissions (stationary-source emissions/mobile-source emission)

Table II-6.4-4. INEL—HLW—Percent of Standard/Guideline for Criteria Air Pollutants

HLW Alternatives	Number of Sites S	Construction: Percent of Tons/Year General Conformity Rule (1)					
		CO	NO2	Pb	PM10	SO2	VOC
No Action	4	--	--	--	--	--	--
Decentralized	4	--	--	--	--	--	--
Regionalized-1	3	--	--	--	--	--	--
Regionalized-2	3	--	--	--	--	--	--
Centralized	1	--	--	--	--	--	--

HLW Alternatives	Number of Sites S	Operations & Maintenance: Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)				
		CO (4)	NO2 (4)	Pb (4)	PM10 (4)	SO2 (4)	VOC (6)	CO	NO2	Pb	PM10	SO2
No Action	4	--	--	--	--	--	--	--	--	--	--	--
Decentralized	4	--	--	--	--	--	--	--	--	--	--	--
Regionalized-1	3	--	--	--	--	--	--	--	--	--	--	--
Regionalized-2	3	--	--	--	--	--	--	--	--	--	--	--
Centralized	1	--	--	--	--	--	--	--	--	--	--	--

Notes:
S = Storage
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) Hanford is in an attainment area for all criteria pollutants, therfore the GCR does not apply.
(2) Stationary-source emissions from HLW storage facilities are assumed to be negligible.
(3) Stationary-source emissions from HLW storage facilities are assumed to be negligible.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.

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Table II-6.4–5. INEL—HLW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

HLW Alternatives	Number of Sites	Operations & Maintenance											
	S	Total Radio-nuclides	Other Hazardous and Toxic Air Pollutants	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action	4	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized	4	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized - 1	3	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized - 2	3	--	--	--	--	--	--	--	--	--	--	--	--
Centralized	1	--	--	--	--	--	--	--	--	--	--	--	--

HLW Alternatives	Number of Sites	Operations & Maintenance									
	S	Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action	4	--	--	--	--	--	--	--	--	--	--
Decentralized	4	--	--	--	--	--	--	--	--	--	--
Regionalized - 1	3	--	--	--	--	--	--	--	--	--	--
Regionalized - 2	3	--	--	--	--	--	--	--	--	--	--
Centralized	1	--	--	--	--	--	--	--	--	--	--

Notes:
S = Storage
-- = Emissions of hazardous and toxic air pollutants, including radionuclides, from HLW storage facilities are assumed to be negligible.

Table II-6.4-6. INEL—HLW—Impacts on Water Resources Due to Increased Water Use

HLW Alternatives	Number of Sites S	Construction Water Use GPD	Construction % Current Use	Construction % Stream Flow	Operations Water Use GPD	Operations % Current Use	Operations % Stream Flow	Operations Waste Water % Stream Flow
No Action	4	- -	- -	- -	- -	- -	- -	- -
Decentralized	4	24	<0.1	- -	1900	<0.1	- -	- -
Regionalized-1	3	24	<0.1	- -	1900	<0.1	- -	- -
Regionalized-2	3	24	<0.1	- -	1900	<0.1	- -	- -
Centralized	3	24	<0.1	- -	1900	<0.1	- -	- -

Notes:
S = Storage
Water supplied by groundwater in the Snake River Plain Aquifer. Current water use = 5,700,000 gallons/day.
Wastewater discharged to onsite evaporation ponds.
Data is based on repository beginning to accept HLW canisters in 2015.
<0.1 indicates that the percentage is less than 0.1%.
- - = The INEL is not considered for storage of vitrified HLW canisters under the No Action Alternative, Stream Flow and Waste Water Stream Flow are not considered for this site.

Table II-6.4–7. INEL—HLW—Socioeconomics Impacts for Storage

HLW Alternatives	Number of Sites	Effect of Implementation of Alternatives					
			Jobs		Income		
	S	Cost (Millions) (1)	Annual Jobs	% Annual Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action	4	- -	- -	- -	- -	- -	- -
Decentralized	4	54	50	0.05	0.5	0.02	0.04
Regionalized-1	3	54	50	0.05	0.5	0.02	0.04
Regionalized-2	3	54	50	0.05	0.5	0.02	0.04
Centralized	3	63	58	0.06	0.6	0.02	0.04

Notes:
S = Storage
(1) In current 1990 dollars. The economic multiplier analysis only was applied to costs through 2015.
(2) Compared to 1990 baseline.
- - = The INEL is not considered as a storage for vitrified HLW canisters under the No Action Alternative.

Table II-6.4-8. INEL—HLW—Infrastructure Impacts for Storage

HLW Alternatives	Number of Sites	Effect of Implementation of Alternatives									
		Land Use		Water		Waste Water		Power		Employment (FTE)	
	S	Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Construction Employment	% of Current Employment (1)
No Action	4	--	--	--	--	--	--	--	--	--	--
Decentralized	4	8	0.01	1900	0.00	1900	0.0	0.07	0.16	8	0
Regionalized-1	3	8	0.01	1900	0.00	1900	0.0	0.07	0.16	8	0
Regionalized-2	3	8	0.01	1900	0.00	1900	0.0	0.07	0.16	8	0
Centralized	3	8	0.01	1900	0.00	1900	0.0	0.07	0.16	8	0

Notes:
S = Storage
GPD = Gallons per Day
MW = Megawatts Electric
FTE = Full Time Equivalent
(1) Based on 1991 Site Employment.
-- = The INEL is not considered for storage of vitrified HLW canisters under the No Action Alternative.

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Table II-6.4-9. INEL—HLW—Cost

HLW Alternatives	Number of Sites	Total Cost (Millions) (1)	Cost by Life-Cycle Component (1)		Cost by Functional Area (1)	
	S		Construction (Millions) (2)	Operations & Maintenance (3) (Millions)	Storage (Millions)	Handling (Millions)
No Action	4	--	--	--	--	--
Decentralized	4	984	120	864	214	770
Regionalized-1	3	984	120	864	214	770
Regionalized-2	3	984	120	864	214	770
Centralized	3	1000	120	880	214	786
Centralized Delayed Acceptance	3	537	14	523	17	520

Notes:
S = Storage
The Life Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum may not reflect the true total cost.
(1) In current 1994 Dollars; Total Cost = Sum of Life Cycle Components = Sum of Functional Areas.
(2) Construction costs are for the interim storage facilities.
(3) Operations and maintenance costs include operation and maintenance of the interim storage facilities, and the handling of canisters (unloading/loading of canisters into or out of the interim storage facilities).

6.5 INEL HW

Eleven tables immediately following portray the impacts of HW at INEL. These tables are presented as follows:

Impact Category

No.	Description	Table No.	Page No.
1.	INEL—HW—Treatment: Estimated Number of Fatalities	II-6.5-1	6-58
2.	INEL—HW—Treatment: Estimated Number of Cancer Incidences	II-6.5-2	6-59
3.	INEL—HW—Treatment: MEI Probability of Cancer Incidences	II-6.5-3	6-60
6.	INEL—HW—Treatment: Noncancer Health Risk From Chemical Exposure	II-6.5-4	6-61
7.	INEL—HW—Emissions in Tons per Year of Criteria Air Pollutants	II-6.5-5	6-62
8.	INEL—HW—Percent of Standard/Guideline for Criteria Air Pollutants	II-6.5-6	6-63
9.	INEL—HW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-6.5-7	6-64
10.	INEL—HW—Impacts on Water Resources Due to Increased Water Use	II-6.5-8	6-65
12.	INEL—HW—Socioeconomics Impacts for Treatment	II-6.5-9	6-66
13.	INEL—HW—Infrastructure Impacts for Treatment	II-6.5-10	6-67
14.	INEL—HW—Cost	II-6.5-11	6-68

Table II-6.5-1. INEL—HW—Treatment: Estimated Number of Fatalities

HW Alternatives	Number of Sites T	WM Worker Physical Hazards
No Action	2	2.6E-03
Decentralized	3	- -
Regionalized 1	5	6.8E-03
Regionalized 2	2	3.1E-02

Notes:
T = Treatment

Table II-6.5-2. INEL—HW—Treatment: Estimated Number of Cancer Incidences

HW Alternatives	Number of Sites	Treatment		
	T	Offsite MEI Hazard Index	Noninvolved Worker MEI Hazard Index	WM Worker Exposure Index
No Action	2	3.2E-05	2.5E-04	2.1E+00
Decentralized	3	- -	- -	- -
Regionalized-1	5	1.9E-04	1.5E-03	4.8E+00
Regionalized-2	2	1.8E-03	1.4E-02	6.2E+00

Notes:
T = Treatment
MEI = Maximally Exposed Individual
- - = Treatment is not considered for this alternative.
Hazard Index = Sum of hazard quotient values for all noncarcinogenic chemicals. The Hazard Quotient is the chemical-specific ratio of media exposure concentrations to concentrations believed to have no appreciable adverse effects.
Exposure Index = Ratio of exposure concentration to chemical-specific occupational threshold limits.

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Table II-6.5-3. INEL—HW—Treatment: MEI Probability of Cancer Incidences

HW Alternatives	Number of Sites T	Treatment: Offsite MEI Cancer Incidence Probability	Treatment: Noninvolved MEI Cancer Incidence Probability
No Action	2	4.6E-09	3.7E-08
Decentralized	3	- -	- -
Regionalized-1	5	1.4E-08	1.1E-07
Regionalized-2	2	1.3E-07	1.1E-06

Notes:
T = Treatment
MEI = Maximally Exposed Individual
- - = Treatment is not considered for this alternative.

Table II-6.5-4. INEL—HW—Treatment: Noncancer Health Risk From Chemical Exposure

HW Alternatives	Number of Sites	Treatment		
	T	Offsite Population Chemical Cancer Incidence	Noninvolved Worker Chemical Cancer Incidence	WM Worker Chemical Cancer Incidence
No Action	2	3.4E-05	4.4E-05	1.8E-02
Decentralized	3	- -	- -	- -
Regionalized-1	5	1.0E-04	1.4E-04	7.6E-02
Regionalized-2	2	9.7E-04	1.3E-03	7.4E-01

Notes:
T = Treatment
- - = Treatment is not considered for this alternative.

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Table II-6.5-5. INEL—HW—Emissions in Tons per Year of Criteria Air Pollutants

HW Alternatives	Number of Sites T	Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
		CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action	2	--	--	--	--	--	--	0	0	0	0	0	0
Decentralized	3	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-1	5	3 (2/1)	4 (4/0)	0	0	0	0	0	0	0	0	0	0
Regionalized-2	2	5 (3/2)	9 (9/0)	0	1 (1/0)	1 (1/0)	1 (1/0)	0	1 (0/0)	0	3 (3/0)	3 (3/0)	0

Notes:
T = Treatment
Emissions <1 ton per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions/worker vehicles emission)
(2) Values = total emissions (stationary-source emissions/mobile-source emission)

Table II-6.5-6. INEL—HW—Percent of Standard/Guideline for Criteria Air Pollutants

HW Alternatives	Number of Sites T	Construction					
		Percent of Tons/Year General Conformity Rule (1)					
		CO	NO2	Pb	PM10	SO2	VOC
No Action	2	--	--	--	--	--	--
Decentralized	3	--	--	--	--	--	--
Regionalized-1	5	--	--	--	--	--	--
Regionalized-2	2	--	--	--	--	--	--

HW Alternatives	Number of Sites T	Operations & Maintenance											
		Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
		CO (4)	NO2 (4)	Pb (4)	PM10 (4)	SO2 (4)	VOC (4)	CO	NO2	Pb	PM10	SO2	VOC
No Action	2	0	0	0	2 (2/0)	1 (1/0)	0	0	0	0	0	0	0
Decentralized	3	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-1	5	0	0	0	2 (2/0)	1 (1/0)	0	0	0	0	0	0	0
Regionalized-2	2	0	1 (1/0)	0	17 (17/0)	9 (9/0)	0	0	0	0	0	0	0

Notes:
T = Treatment
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide. VOC = volatile organi
NAAQS = National Ambient Air Quality Standard.
(1) INEL is in an attainment area for all criteria pollutants, therfore the GCR does not apply.
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions for the Decentralized Alternative are assume no waste is treated at INEL under this alternative.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.

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Table II-6.5-7. INEL—HW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

HW Alternatives	Number of Sites T	Operations & Maintenance											
		Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action	2	--	--	--	0	--	--	0	0	--	--	--	--
Decentralized	3	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized - 1	5	--	--	--	0	--	--	0	0	--	--	--	--
Regionalized - 2	2	--	--	--	0	--	--	0	0	--	--	--	--

HW Alternatives	Number of Sites T	Operations & Maintenance									
		Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action	2	--	0	--	--	0	--	0	0	0	0
Decentralized	3	--	--	--	--	--	--	--	--	--	--
Regionalized - 1	5	--	0	--	--	0	--	0	0	0	1
Regionalized - 2	2	--	0	--	--	0	--	0	0	0	9

Notes:
T = Treatment
Percentages <1% are shown as zeros.
-- = Emissions of certain hazardous or toxic air pollutants, including radionuclides, from HW treatment facilities are assumed to be negligible.

Table II-6.5-8. INEL—HW—Impacts on Water Resources Due to Increased Water Use

HW Alternatives	Number of Sites T	Construction Water Use GPD	Construction % Current Use	Construction % Stream Flow	Operations Water Use GPD	Operations % Current Use	Operations % Stream Flow	Operations Waste Water % Stream Flow
No Action	2	- -	- -	- -	56	<0.1	- -	- -
Decentralized	3	- -	- -	- -	- -	- -	- -	- -
Regionalized-1	5	516	<0.1	- -	313	<0.1	- -	- -
Regionalized-2	2	1823	<0.1	- -	1108	<0.1	- -	- -

Notes:
T = Treatment
Water supplied by groundwater in the Snake River Plain Aquifer. Current water use = 5,700,000 gallons/day.
Wastewater discharged to onsite evaporation ponds.
- - = Not considered for this site.
<0.1 indicates that the percentage is less than 0.1%.

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Table II-6.5-9. INEL—HW—Socioeconomics Impacts for Treatment

HW Alternatives	Number of Sites	Effect of Implementation of Alternatives					
			Jobs		Income		
	T	Cost (Millions) (1)	Annual Jobs	% Annual Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action	2	6	6	0.01	0.1	0.00	0.00
Decentralized	3	0	0	0.00	0.0	0.00	0.00
Regionalized 1	5	21	23	0.02	0.2	0.01	0.01
Regionalized 2	2	116	128	0.13	1.4	0.05	0.02

Notes:
T = Treatment
(1) In current 1990 dollars.
(2) Compared to 1990 baseline.

Table II-6.5-10. INEL—HW—Infrastructure Impacts for Treatment

HW Alternatives	Number of Sites	Effect of Implementation of Alternatives									
		Land Use		Water		Waste Water		Power		Employment (FTE)	
	T	Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	% Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Construction Employment	% of Current Employment (1)
No Action	2	0	0.000	56	0.00	56	0.00	0.30	0.10	0	0
Decentralized	3	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-1	5	1	0.001	516	0.00	313	0.00	0.13	0.30	9	0
Regionalized-2	2	3	0.002	1823	0.01	1108	0.00	0.42	1.00	18	0

Notes:
T = Treatment
GPD = Gallons per Day
MW = Megawatts Electric
- - = Treatment is not considered for this alternative.
(1) Based on 1991 Site Employment.

Table II-6.5-11. INEL—HW—Cost

HW Alternatives	Number of Sites	Total Cost (Millions) (1)	Government Cost by Life-Cycle Component (1)				Cost by Functional Area (1)	
							Treatment & Disposal	
	T		Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Government (2) (Millions)	Commercial (Millions)
No Action	2	10	- -	- -	6	0	6	4
Decentralized	3	4	- -	- -	- -	- -	- -	4
Regionalized-1	5	25	2	9	12	1	23	2
Regionalized-2	2	137	10	39	79	3	131	6

Notes:
T = Treatment
- - = Not considered for this site.
The Life Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum may not reflect the true total cost.
(1) In current 1994 Dollars; Total Cost = Sum of the Functional Areas.
(2) Government costs equal to the sum of the life-cycle components.

7.0 LANL

LANL currently is custodian of significant volumes of LLMW, LLW, TRUW, and HW. Each of the waste types is treated independently in the following sections:

7.1 LANL LLMW

Fifteen tables immediately following portray the impacts of LLMW at LANL. These tables are presented as follows:

Impact Category

No.	Description	Table No.	Page No.
1.	LANL—LLMW—Treatment and Disposal: Estimated Number of Fatalities	II-7.1-1	7-2
2.	LANL—LLMW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects	II-7.1-2	7-3
3.	LANL—LLMW—Disposal: Estimated Number of Cancer Incidences and Genetic Effects	II-7.1-3	7-4
4.	LANL—LLMW—Treatment and Disposal: MEI Probability of Cancer Fatality	II-7.1-4	7-5
5.	LANL—LLMW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects	II-7.1-5	7-6
6.	LANL—LLMW—Treatment and Disposal: Noncancer Health Risk from Chemical Exposure	II-7.1-6	7-7
7.	LANL—LLMW—Emissions in Tons per Year of Criteria Air Pollutants	II-7.1-7	7-8
8.	LANL—LLMW—Percent of Standard/Guideline for Criteria Air Pollutants	II-7.1-8	7-9
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10.	LANL—LLMW—Impacts on Water Resources due to Increased Water Use	II-7.1-10	7-11
11.	LANL—LLMW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal	II-7.1-11	7-12
12.	LANL—LLMW—Percent of Drinking Water Standards for Hazardous Constituents in Groundwater from Disposal (Contact-Handled)	II-7.1-12	7-13
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14.	LANL—LLMW—Infrastructure Impacts for Treatment and Disposal	II-7.1-14	7-15
15.	LANL—LLMW—Cost	II-7.1-15	7-16

Table II-7.1-1. LANL—LLMW—Treatment and Disposal: Estimated Number of Fatalities

LLMW Alternatives	Number of Sites		Treatment				Disposal	
			WM Worker		Offsite Population	Noninvolved Workers	WM Worker	
	T	D	Radiation Exposure	Physical Hazards	Radiation Exposure	Radiation Exposure	Radiation Exposure	Physical Hazards
No Action	3	-	2.2E-03	4.2E-02	1.5E-04	1.3E-05	- -	- -
Decentralized	37	16	1.6E-03	2.0E-01	5.9E-04	1.2E-05	1.6E-03	1.1E-02
Regionalized-1	11	12	1.8E-03	2.0E-01	6.1E-04	1.2E-05	1.9E-03	1.1E-02
Regionalized-2	7	6	2.3E-03	2.2E-01	8.6E-04	1.7E-05	1.2E-02	1.3E-01
Regionalized-3	7	1	2.3E-03	2.2E-01	8.6E-04	1.7E-05	- -	- -
Regionalized-4	4	6	6.9E-04	4.4E-02	3.8E-05	7.5E-07	- -	- -
Centralized	1	1	6.9E-04	4.4E-02	3.8E-05	7.5E-07	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this Alternative.

Table II-7.1-2. LANL—LLMW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

LLMW Alternatives	Number of Sites		Offsite Population				Noninvolved Workers				WM Worker			
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects
No Action	3	-	3.0E-01	5.1E-04	7.9E-06	3.0E-05	2.7E-02	4.6E-05	3.9E-06	2.7E-06	5.5E+00	7.7E-03	6.1E-07	3.3E-04
Decentralized	37	16	1.2E+00	2.0E-03	2.6E-07	1.2E-04	2.4E-02	4.0E-05	1.3E-07	2.4E-06	3.9E+00	5.5E-03	4.1E-06	2.3E-04
Regionalized -1	11	12	1.2E+00	2.1E-03	2.6E-07	1.2E-04	2.5E-02	4.2E-05	1.3E-07	2.5E-06	4.5E+00	6.4E-03	4.2E-06	2.7E-04
Regionalized-2	7	6	1.7E+00	2.9E-03	6.9E-06	1.7E-04	3.5E-02	5.9E-05	3.4E-06	3.5E-06	5.9E+00	8.2E-03	6.0E-06	3.5E-04
Regionalized-3	7	1	1.7E+00	2.9E-03	7.0E-07	1.7E-04	3.5E-02	5.9E-05	1.0E-07	3.5E-06	5.9E+00	8.2E-03	6.0E-06	3.5E-04
Regionalized-4	4	6	7.6E-02	1.3E-04	1.4E-06	7.6E-06	1.5E-03	2.6E-06	6.9E-07	1.5E-07	1.7E+00	2.4E-03	3.0E-07	1.0E-04
Centralized	1	1	7.6E-02	1.3E-04	1.6E-08	7.6E-06	1.5E-03	2.6E-06	8.1E-09	1.5E-07	1.7E+00	2.4E-03	3.0E-07	1.0E-04

Notes:
T = Treatment
D = Disposal

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Table II-7.1-3. LANL—LLMW—Disposal: Estimated Number of Cancer Incidences

LLMW Alternatives	Number of Sites		WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	3	-	- -	- -	- -
Decentralized	37	16	3.9E+00	5.5E-03	2.4E-04
Regionalized-1	11	12	4.8E+00	6.7E-03	2.9E-04
Regionalized-2	7	6	2.9E+01	4.0E-02	1.7E-03
Regionalized-3	7	1	- -	- -	- -
Regionalized-4	4	6	3.9E+00	5.5E-03	2.4E-04
Centralized	1	1	- -	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this Alternative.

Table II-7.1–4. LANL—LLMW—Treatment and Disposal: MEI Probability of Cancer Fatality

LLMW Alternatives	Number of Sites		Treatment		Disposal
	T	D	Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability	Hypothetical Farm Family Most Exposed Lifetime MEI Cancer Fatality Probability
No Action	3	-	1.6E-08	1.0E-08	- -
Decentralized	37	16	6.2E-08	8.7E-09	0.0E+00
Regionalized-1	11	12	6.4E-08	9.0E-09	0.0E+00
Regionalized-2	7	6	9.1E-08	1.3E-08	0.0E+00
Regionalized-3	7	1	9.1E-08	1.3E-08	- -
Regionalized-4	4	6	4.0E-09	5.5E-10	0.0E+00
Centralized	1	1	4.0E-09	5.5E-10	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered under the Alternative

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Table II-7.1-5. LANL—LLMW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects

LLMW Alternatives	Number of Sites		Treatment								Disposal			
			Offsite Population MEI				Noninvolved Worker MEI				Most Exposed Farm Family Lifetime MEI			
	T	D	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability
No Action	3	-	3.2E-05	5.4E-08	9.7E-10	3.2E-09	2.0E-05	3.5E-08	2.4E-09	2.0E-09	- -	- -	- -	- -
Decentralized	37	16	1.2E-04	2.1E-07	3.2E-11	1.2E-08	1.7E-05	3.0E-08	8.0E-11	1.7E-09	0.0E+00	0.0E+00	7.7E-05	0.0E+00
Regionalized-1	11	12	1.3E-04	2.2E-07	3.3E-11	1.3E-08	1.8E-05	3.1E-08	8.1E-11	1.8E-09	0.0E+00	0.0E+00	7.7E-05	0.0E+00
Regionalized-2	7	6	1.8E-04	3.1E-07	8.5E-10	1.8E-08	2.6E-05	4.3E-08	2.1E-09	2.6E-09	0.0E+00	0.0E+00	4.3E-05	0.0E+00
Regionalized-3	7	1	1.8E-04	3.1E-07	2.5E-11	1.8E-08	2.6E-05	4.3E-08	6.2E-11	2.6E-09	- -	- -	- -	- -
Regionalized-4	4	6	8.0E-06	1.4E-08	1.7E-10	8.0E-10	1.1E-06	1.9E-09	4.3E-10	1.1E-10	0.0E+00	0.0E+00	1.2E-07	0.0E+00
Centralized	1	1	8.0E-06	1.4E-08	2.0E-12	8.0E-10	1.1E-06	1.9E-09	5.0E-12	1.1E-10	- -	- -	- -	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered for this alternative.

Table II-7.1-6. LANL—LLMW—Treatment and Disposal: Noncancer Health Risk from Chemical Exposure

LLMW Alternatives	Number of Sites		Treatment			Disposal
	T	D	Offsite MEI Hazard Index	Noninvolved Worker MEI Hazard Index	WM Worker Exposure Index	Hypothetical Farm Family Most Exposed Lifetime Hazard Index
No Action	3	-	1.5E-06	3.9E-06	5.9E-06	- -
Decentralized	37	16	6.3E-08	1.6E-07	1.4E-05	3.7E-02
Regionalized-1	11	12	6.5E-08	1.6E-07	1.4E-05	3.7E-02
Regionalized-2	7	6	2.6E-07	6.5E-07	5.0E-05	1.8E-02
Regionalized-3	7	1	4.4E-08	1.1E-07	5.0E-05	- -
Regionalized-4	4	6	1.4E-07	3.6E-07	5.8E-06	2.2E-05
Centralized	1	1	3.0E-09	7.5E-09	5.8E-06	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this alternative.
MEI = Maximally Exposed Individual
Hazard Index = Sum of hazard quotient values for all noncarcinogenic chemicals. The hazard quotient is the chemical-specific ratio of media exposure concentrations to concentrations believed to have no appreciable adverse effects.
Exposure Index = Ratio of Exposure concentration to chemical-specific occupational threshold limits.

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Table II-7.1-7. LANL—LLMW—Emissions in Tons per Year of Criteria Air Pollutants

LLMW Alternatives	Number of Sites		Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	48 (29/19)	80 (76/4)	0	6 (6/0)	7 (7/0)	9 (7/2)	4 (1/3)	3 (2/1)	0	0	0	0
Decentralized	37	16	58 (12/46)	41 (32/9)	0	3 (3/0)	3 (3/0)	9 (3/6)	19 (0/19)	5 (1/4)	0	0	0	2 (0/2)
Regionalized-1	11	12	61 (12/49)	42 (32/10)	0	3 (3/0)	3 (3/0)	9 (3/6)	20 (0/20)	4 (0/4)	0	0	0	2 (0/2)
Regionalized-2	7	6	67 (5/62)	25 (13/12)	0	1 (1/0)	1 (1/0)	8 (1/7)	44 (0/44)	10 (1/9)	0	0	0	5 (0/5)
Regionalized-3	7	1	48 (2/46)	14 (5/9)	0	0	0	7 (1/6)	19 (0/19)	4 (0/4)	0	0	0	2 (0/2)
Regionalized-4	4	6	13 (1/12)	4 (2/2)	0	0	0	1 (0/1)	4 (0/4)	1 (0/1)	0	0	0	0
Centralized	1	1	13 (1/12)	4 (2/2)	0	0	0	1 (0/1)	4 (0/4)	1 (0/1)	0	0	0	0

Notes:
T = Treatment
D = Disposal
Emissions <1 tons per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions / worker vehicles emission).
(2) Values = total emissions (stationary-source emissions / mobile-source emission).

Table II-7.1-8. LANL—LLMW—Percent of Standard/Guideline for Criteria Air Pollutants

LLMW Alternatives	Number of Sites		Construction					
			Percent of Tons/Year General Conformity Rule (1)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	--	--	--	--	--	--
Decentralized	37	16	--	--	--	--	--	--
Regionalized-1	11	12	--	--	--	--	--	--
Regionalized-2	7	6	--	--	--	--	--	--
Regionalized-3	7	1	--	--	--	--	--	--
Regionalized-4	4	6	--	--	--	--	--	--
Centralized	1	1	--	--	--	--	--	--

LLMW Alternatives	Number of Sites		Operations & Maintenance											
			Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
	T	D	CO (4)	NO2 (4)	Pb (4)	PM10 (4)	SO2 (4)	VOC (4)	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	1	6	0	3	0	0	--	--	--	--	--	--
Decentralized	37	16	0	2	0	2	0	0	0	0	0	0	0	0
Regionalized-1	11	12	0	1	0	1	0	0	0	0	0	0	0	0
Regionalized-2	7	6	0	1	0	2	0	0	0	0	0	0	0	0
Regionalized-3	7	1	0	1	0	1	0	0	0	0	0	0	0	0
Regionalized-4	4	6	0	0	0	0	0	0	--	--	--	--	--	--
Centralized	1	1	0	0	0	0	0	0	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) LANL is in an attainment area for all criteria pollutants, therefore the GCR does not apply.
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions are assumed to be negligible for the No Action, Regionalized-4, and Centralized Alternatives.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.

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Table II-7.1-9. LANL—LLMW—Percent of Standards/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

LLMW Alternatives	Number of Sites		Operations & Maintenance											
	T	D	Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action	3	-	0	0	0	--	--	0	--	--	0	0	0	0
Decentralized	37	16	0	0	0	--	--	0	--	--	0	0	0	0
Regionalized-	11	12	0	0	0	--	--	0	--	--	0	0	0	0
Regionalized-	7	6	0	0	0	--	--	0	--	--	0	0	0	0
Regionalized-	7	1	0	0	0	--	--	0	--	--	0	0	0	0
Regionalized-	4	6	0	0	0	--	--	0	--	--	0	0	0	0
Centralized	1	1	0	0	0	--	--	0	--	--	0	0	0	0

LLMW Alternatives	Number of Sites		Operations & Maintenance									
	T	D	Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action	3	-	--	0	0	0	--	0	0	0	--	--
Decentralized	37	16	--	0	0	0	--	0	0	0	--	--
Regionalized-	11	12	--	0	0	0	--	0	0	0	--	--
Regionalized-	7	6	--	0	0	0	--	0	0	0	--	--
Regionalized-	7	1	--	0	0	0	--	0	0	0	--	--
Regionalized-	4	6	--	0	0	0	--	0	0	0	--	--
Centralized	1	1	--	0	0	0	--	0	0	0	--	--

Notes:
T = Treatment
D = Disposal
-- = Emissions of this hazardous or toxic air pollutant are assumed to be negligible.
Percentages <1% are shown as zeros.

Table II-7.1-10. LANL—LLMW—Impacts on Water Resources Due to Increased Water Use

LLMW Alternatives	Number of Sites		Construction			Operations			
	T	D	Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action	3	-	69589	1.7	- -	2128	0.1	- -	- -
Decentralized	37	16	21639	0.5	- -	2922	0.1	- -	- -
Regionalized-1	11	12	21320	0.5	- -	2920	0.1	- -	- -
Regionalized-2	7	6	16275	0.4	- -	5078	0.1	- -	- -
Regionalized-3	7	1	10113	0.2	- -	2966	0.1	- -	- -
Regionalized-4	4	6	2149	0.1	- -	597	<0.1	- -	- -
Centralized	1	1	2149	0.1	- -	597	<0.1	- -	- -

Notes:
T = Treatment
D = Disposal
Water supplied by groundwater in the Main Aquifer. Current water use = 4,100,000 gallons/day.
Wastewater discharged to onsite dry stream beds.
- - = Stream Flow and Waste Water Stream Flow is not considered for this site.
<0.1 indicates that the percentage is less than 0.1%.

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Table II-7.1-11. LANL—LLMW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal (Contact-Handled)

LLMW Alternatives	Number of Sites T	Number of Sites D	Ac 225	Ac 227	Am 241	Am 242	Am 243	C 14	Cs 135	Cs 137	Cm 242	Cm 244	Cm 245	I 129	Pb 210	Np 237	Ni 59	Ni 63	Pd 107	Pu 238	Pu 239	Pu 240	Pu 241
No Action	3	-	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-2	7	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centralized	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

LLMW Alternatives	Number of Sites T	Number of Sites D	Po 210	K 40	Pa 231	Ra 223	Ra 226	Sm 151	Se 79	Sr 90	Tc 99	Th 227	Th 228	Th 229	Th 230	Th 232	Sn 126	U 233	U 234	U 235	U 236	U 238	Y 90	Zr 93
No Action	3	-	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-2	7	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centralized	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
-- = No disposal at this site for this alternative.

Table II-7.1-12. LANL—LLMW—Percent of Drinking Water Standards for Hazardous Constituents in Groundwater from Disposal (Contact-Handled)

LLMW Alternatives	T	D	Acetone	Arsenic	Barium	Benzene	Cadmium	Carbon Tetrachloride	Chromium	Cyanide
No Action	3	-	--	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	2	0	0	0	0
Regionalized-1	11	12	0	0	0	2	0	0	0	0
Regionalized-2	7	6	0	0	0	20	0	0	0	0
Regionalized-3	7	1	--	--	--	--	--	--	--	--
Regionalized-4	4	6	0	0	0	0	0	0	0	0
Centralized	1	1	--	--	--	--	--	--	--	--

LLMW Alternatives	T	D	1,2-dichloro-ethane	Lead	Mercury	Methylene Chloride	Selenium	Silver	1,2,2-trichloro-1,1-trifluoroethane
No Action	3	-	--	--	--	--	--	--	--
Decentralized	37	16	500	0	0	2000	0	0	0
Regionalized-1	11	12	500	0	0	2000	0	0	0
Regionalized-2	7	6	300	0	0	700	0	0	0
Regionalized-3	7	1	--	--	--	--	--	--	--
Regionalized-4	4	6	1	0	0	1	0	0	0
Centralized	1	1	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
"--" = No disposal at this site for this alternative.

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Table II-7.1-13. LANL—LLMW—Socioeconomics Impacts for Treatment and Disposal

LLMW Alternatives	Number of Sites		Effect of Implementation of Alternatives					
				Jobs		Income		
	T	D	Cost (Millions) (1)	Annual Jobs	% Annual Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action	3	-	156	123	0.01	1.3	0.00	0.09
Decentralized	37	16	427	420	0.03	4.6	0.01	0.12
Regionalized-1	11	12	442	434	0.03	4.7	0.01	0.25
Regionalized-2	7	6	768	755	0.05	8.2	0.01	0.48
Regionalized-3	7	1	407	400	0.03	4.4	0.01	0.25
Regionalized-4	4	6	96	94	0.01	1.0	0.00	0.06
Centralized	1	1	96	94	0.01	1.0	0.00	0.05

Notes:
T = Treatment
D = Disposal
(1) In current 1990 dollars.
(2) Compared to 1990 baseline

Table II-7.1-14. LANL—LLMW—Infrastructure Impacts for Treatment and Disposal

LLMW Alternatives	Number of Sites		Effect of Implementation of Alternatives									
			Land Use		Water		Waste Water		Power		Employment (FTE)	
	T	D	Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	% Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Peak Construction Employment	% of Current Employment (1)
No Action	3	-	20.8	0.13	69589	0.70	2128	0.21	10	8.33	144	2
Decentralized	37	16	13.4	0.08	21639	0.22	2922	0.29	1.3	1.08	357	6
Regionalized-1	11	12	13.4	0.08	21320	0.21	2920	0.29	1.28	1.07	376	6
Regionalized-2	7	6	11.1	0.07	16275	0.16	5078	0.51	1.34	1.12	479	8
Regionalized-3	7	1	7.4	0.05	10113	0.10	2966	0.30	0.69	0.58	357	6
Regionalized-4	4	6	4.8	0.03	2149	0.02	597	0.06	0.61	0.51	90	1
Centralized	1	1	4.8	0.02	2149	0.02	597	0.06	0.61	0.51	90	1

Notes:
T = Treatment
D = Disposal
GPD = Gallons per Day
MW = Megawatts
(1) Based on 1991 Site Employment

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Table II-7.1-15. LANL—LLMW—Cost

LLMW Alternatives	Number of Sites		Total Cost (Millions) (1)	Cost by Life-Cycle Component (1)				Cost by Functional Area (1)		
	T	D		Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Treatment (Millions)	Storage (Millions)	Disposal (Millions)
No Action	3	-	176	19	204	230	134	46	131	0
Decentralized	37	16	484	46	179	228	20	405	0	79
Regionalized-1	11	12	500	66	180	235	20	421	0	79
Regionalized-2	7	6	869	94	212	480	84	452	0	417
Regionalized-3	7	1	461	57	178	206	19	461	0	0
Regionalized-4	4	6	343	35	74	287	46	108	0	235
Centralized	1	1	109	12	49	43	5	108	0	0

Notes:
T = Treatment
D = Disposal
The Life-Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum of these may not reflect the true total cost.
(1) In current 1994 dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

7.2 LANL LLW

Thirteen tables immediately following portray the impacts of LLW at LANL. These tables are presented as follows:

Impact Category

No.	Description	Table No.	Page No.
1.	LANL—LLW—Treatment and Disposal: Estimated Number of Fatalities	II-7.2-1	7-18
2.	LANL—LLW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects	II-7.2-2	7-19
3.	LANL—LLW—Disposal: Estimated Number of Cancer Incidences and Genetic Effects	II-7.2-3	7-20
4.	LANL—LLW—Treatment and Disposal: MEI Probability of Cancer Fatality	II-7.2-4	7-21
5.	LANL—LLW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects	II-7.2-5	7-22
7.	LANL—LLW—Emissions in Tons per Year of Criteria Air Pollutants	II-7.2-6	7-23
8.	LANL—LLW—Percent of Standard/Guideline for Criteria Air Pollutants	II-7.2-7	7-24
9.	LANL—LLW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-7.2-8	7-25
10.	LANL—LLW—Impacts on Water Resources due to Increased Water Use	II-7.2-9	7-26
11.	LANL—LLW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal	II-7.2-10	7-27
12.	LANL—LLW—Socioeconomics Impacts for Treatment and Disposal	II-7.2-11	7-28
13.	LANL—LLW—Infrastructure Impacts for Treatment and Disposal	II-7.2-12	7-29
14.	LANL—LLW—Cost	II-7.2-13	7-30

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Table II-7.2-1. LANL—LLW—Treatment and Disposal: Estimated Number of Fatalities

LLW Alternatives	Number of Sites		Treatment				Disposal	
			WM Worker		Offsite Population	Noninvolved Workers	WM Worker	
	T	D	Radiation Exposure	Physical Hazards	Radiation Exposure	Radiation Exposure	Radiation Exposure	Physical Hazards
No Action	10**	6	1.8E-01	1.6E-01	1.9E-04	1.3E-05	8.3E-01	3.8E-01
Decentralized		16	1.4E-01	1.4E-01	2.1E-04	1.4E-05	5.6E-01	3.2E-01
Regionalized-1		12	1.4E-01	1.4E-01	2.1E-04	1.4E-05	5.6E-01	3.2E-01
Regionalized-2	11	12	1.9E-01	3.0E-01	7.8E-03	7.0E-04	3.6E-01	1.7E-01
Regionalized-3		6	1.4E-01	1.4E-01	2.1E-04	1.4E-05	7.8E-01	4.1E-01
Regionalized-4	7	6	3.4E-01	5.9E-01	7.8E-03	7.0E-04	3.9E-01	1.8E-01
Regionalized-5	4	6	1.4E-01	1.9E-01	2.1E-04	1.4E-05	3.9E-01	1.8E-01
Regionalized-6		2	1.4E-01	1.9E-01	2.1E-04	1.4E-05	- -	- -
Regionalized-7		2	1.4E-01	1.9E-01	2.1E-04	1.4E-05	- -	- -
Centralized-1		1	1.4E-01	1.9E-01	2.1E-04	1.4E-05	- -	- -
Centralized-2		1	1.4E-01	1.9E-01	2.1E-04	1.4E-05	- -	- -
Centralized-3	7	1	3.4E-01	5.9E-01	7.8E-03	7.0E-04	- -	- -
Centralized-4	7	1	3.4E-01	5.9E-01	7.8E-03	7.0E-04	- -	- -
Centralized-5	1	1	1.4E-01	1.9E-01	2.1E-04	1.4E-05	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered under the alternative
** Ten sites use existing facilities for Volume Reduction

Table II-7.2-2. LANL—LLW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

LLW Alternatives	Number of Sites		Offsite Population			Noninvolved Worker			WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	10**	6	3.9E-01	6.6E-04	3.9E-05	2.6E-02	4.5E-05	2.6E-06	4.4E+02	6.2E-01	2.7E-02
Decentralized		16	4.2E-01	7.1E-04	4.2E-05	2.8E-02	4.8E-05	2.8E-06	3.5E+02	4.9E-01	2.1E-02
Regionalized-1		12	4.2E-01	7.1E-04	4.2E-05	2.8E-02	4.8E-05	2.8E-06	3.5E+02	4.9E-01	2.1E-02
Regionalized-2	11	12	1.6E+01	2.7E-02	1.6E-03	1.4E+00	2.4E-03	1.4E-04	4.6E+02	6.5E-01	2.8E-02
Regionalized-3		6	4.2E-01	7.1E-04	4.2E-05	2.8E-02	4.8E-05	2.8E-06	3.5E+02	4.9E-01	2.1E-02
Regionalized-4	7	6	1.6E+01	2.7E-02	1.6E-03	1.4E+00	2.4E-03	1.4E-04	8.6E+02	1.2E+00	5.1E-02
Regionalized-5	4	6	4.2E-01	7.1E-04	4.2E-05	2.8E-02	4.8E-05	2.8E-06	3.5E+02	4.9E-01	2.1E-02
Regionalized-6		2	4.2E-01	7.1E-04	4.2E-05	2.8E-02	4.8E-05	2.8E-06	3.5E+02	4.9E-01	2.1E-02
Regionalized-7		2	4.2E-01	7.1E-04	4.2E-05	2.8E-02	4.8E-05	2.8E-06	3.5E+02	4.9E-01	2.1E-02
Centralized-1		1	4.2E-01	7.1E-04	4.2E-05	2.8E-02	4.8E-05	2.8E-06	3.5E+02	4.9E-01	2.1E-02
Centralized-2		1	4.2E-01	7.1E-04	4.2E-05	2.8E-02	4.8E-05	2.8E-06	3.5E+02	4.9E-01	2.1E-02
Centralized-3	7	1	1.6E+01	2.7E-02	1.6E-03	1.4E+00	2.4E-03	1.4E-04	8.6E+02	1.2E+00	5.1E-02
Centralized-4	7	1	1.6E+01	2.7E-02	1.6E-03	1.4E+00	2.4E-03	1.4E-04	8.6E+02	1.2E+00	5.1E-02
Centralized-5	1	1	4.2E-01	7.1E-04	4.2E-05	2.8E-02	4.8E-05	2.8E-06	3.5E+02	4.9E-01	2.1E-02

Notes:
T = Treatment
D = Disposal
** Ten sites use existing facilities for Volume Reduction.

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Table II-7.2-3. LANL—LLW—Disposal: Estimated Number of Cancer Incidences and Genetic Effects

LLW Alternatives	Number of Sites		WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	10**	6	2.1E+03	2.9E+00	1.2E-01
Decentralized		16	1.4E+03	2.0E+00	8.4E-02
Regionalized-1		12	1.4E+03	2.0E+00	8.5E-02
Regionalized-2	11	12	9.1E+02	1.3E+00	5.4E-02
Regionalized-3		6	1.9E+03	2.7E+00	1.2E-01
Regionalized-4	7	6	1.0E+03	1.4E+00	6.0E-02
Regionalized-5	4	6	9.6E+02	1.4E+00	5.8E-02
Regionalized-6		2	- -	- -	- -
Regionalized-7		2	- -	- -	- -
Centralized-1		1	- -	- -	- -
Centralized-2		1	- -	- -	- -
Centralized-3	7	1	- -	- -	- -
Centralized-4	7	1	- -	- -	- -
Centralized-5	1	1	- -	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered under the alternative.
** Ten sites use existing facilities for Volume Reduction.

Table II-7.2–4. LANL—LLW—Treatment and Disposal: MEI Probability of Cancer Fatality

LLW Alternatives	Number of Sites		Treatment		Disposal
	T	D	Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability	Hypothetical Farm Family - Most Exposed Lifetime MEI Cancer Fatality Probability
No Action	10**	6	2.0E-08	1.0E-08	0.0E+00
Decentralized		16	2.2E-08	1.1E-08	0.0E+00
Regionalized-1		12	2.2E-08	1.1E-08	0.0E+00
Regionalized-2	11	12	8.2E-07	5.3E-07	0.0E+00
Regionalized-3		6	2.2E-08	1.1E-08	0.0E+00
Regionalized-4	7	6	8.2E-07	5.3E-07	0.0E+00
Regionalized-5	4	6	2.2E-08	1.1E-08	0.0E+00
Regionalized-6		2	2.2E-08	1.1E-08	- -
Regionalized-7		2	2.2E-08	1.1E-08	- -
Centralized-1		1	2.2E-08	1.1E-08	- -
Centralized-2		1	2.2E-08	1.1E-08	- -
Centralized-3	7	1	8.2E-07	5.3E-07	- -
Centralized-4	7	1	8.2E-07	5.3E-07	- -
Centralized-5	1	1	2.2E-08	1.1E-08	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered under the Alternative.
** Ten sites use existing facilities for Volume Reduction.

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Table II-7.2-5. LANL—LLW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects

LLW Alternatives	Number of Sites		Treatment						Disposal		
			Offsite MEI			Noninvolved Worker MEI			Most Exposed Lifetime MEI		
	T	D	Dose (rem)	Radiation Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Radiation Genetic Effects Probability
No Action	10**	6	4.1E-05	6.9E-08	4.1E-09	2.0E-05	3.4E-08	2.0E-09	0.0E+00	0.0E+00	0.0E+00
Decentralized		16	4.4E-05	7.5E-08	4.4E-09	2.2E-05	3.7E-08	2.2E-09	0.0E+00	0.0E+00	0.0E+00
Regionalized-1		12	4.4E-05	7.5E-08	4.4E-09	2.2E-05	3.7E-08	2.2E-09	0.0E+00	0.0E+00	0.0E+00
Regionalized-2	11	12	1.6E-03	2.8E-06	1.6E-07	1.1E-03	1.8E-06	1.1E-07	0.0E+00	0.0E+00	0.0E+00
Regionalized-3		6	4.4E-05	7.5E-08	4.4E-09	2.2E-05	3.7E-08	2.2E-09	0.0E+00	0.0E+00	0.0E+00
Regionalized-4	7	6	1.6E-03	2.8E-06	1.6E-07	1.1E-03	1.8E-06	1.1E-07	0.0E+00	0.0E+00	0.0E+00
Regionalized-5	4	6	4.4E-05	7.5E-08	4.4E-09	2.2E-05	3.7E-08	2.2E-09	0.0E+00	0.0E+00	0.0E+00
Regionalized-6		2	4.4E-05	7.5E-08	4.4E-09	2.2E-05	3.7E-08	2.2E-09	- -	- -	- -
Regionalized-7		2	4.4E-05	7.5E-08	4.4E-09	2.2E-05	3.7E-08	2.2E-09	- -	- -	- -
Centralized-1		1	4.4E-05	7.5E-08	4.4E-09	2.2E-05	3.7E-08	2.2E-09	- -	- -	- -
Centralized-2		1	4.4E-05	7.5E-08	4.4E-09	2.2E-05	3.7E-08	2.2E-09	- -	- -	- -
Centralized-3	7	1	1.6E-03	2.8E-06	1.6E-07	1.1E-03	1.8E-06	1.1E-07	- -	- -	- -
Centralized-4	7	1	1.6E-03	2.8E-06	1.6E-07	1.1E-03	1.8E-06	1.1E-07	- -	- -	- -
Centralized-5	1	1	4.4E-05	7.5E-08	4.4E-09	2.2E-05	3.7E-08	2.2E-09	- -	- -	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered under the alternative.
** Ten sites use existing facilities for Volume Reduction.

Table II-7.2–6. LANL—LLW—Emissions in Tons per Year of Criteria Air Pollutants

LLW Alternatives	Number of Sites		Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action	10**	6	17 (6/11)	15 (13/2)	0	1 (1/0)	1 (1/0)	2 (1/1)	94 (1/93)	20 (1/19)	0	0	0	11 (0/11)
Decentralized		16	27 (10/18)	29 (25/4)	0	2 (2/0)	2 (2/0)	5 (2/2)	69 (0/68)	14 (0/14)	0	0	0	8 (0/8)
Regionalized-1		12	26 (10/16)	29 (26/3)	0	2 (2/0)	2 (2/0)	4 (3/2)	64 (0/64)	13 (0/13)	0	0	0	8 (0/8)
Regionalized-2	11	12	65 (9/57)	34 (23/11)	0	2 (2/0)	2 (2/0)	9 (2/7)	76 (0/76)	18 (3/15)	0	2 (2/0)	0	9 (0/9)
Regionalized-3		6	120 (14/106)	56 (35/21)	0	3 (3/0)	3 (3/0)	16 (3/13)	82 (0/82)	18 (1/18)	0	0	0	10 (0/10)
Regionalized-4	7	6	118 (12/106)	53 (31/21)	0	3 (3/0)	3 (3/0)	16 (3/13)	146 (1/145)	33 (3/30)	0	2 (2/0)	0	18 (0/18)
Regionalized-5	4	6	19 (2/17)	8 (5/3)	0	0	0	2 (0/2)	44 (0/43)	10 (0/9)	0	0	0	5 (0/5)
Regionalized-6		2	19 (2/17)	8 (5/3)	0	0	0	3 (0/2)	14 (0/14)	4 (0/4)	0	0	0	2 (0/2)
Regionalzied-7		2	19 (2/17)	8 (5/3)	0	0	0	3 (0/2)	14 (0/14)	4 (0/4)	0	0	0	2 (0/2)
Centralized-1		1	19 (2/17)	8 (5/3)	0	0	0	3 (0/2)	14 (0/14)	4 (0/4)	0	0	0	2 (0/2)
Centralized-2		1	19 (2/17)	8 (5/3)	0	0	0	3 (0/2)	14 (0/14)	4 (0/4)	0	0	0	2 (0/2)
Centralized-3	7	1	112 (6/106)	37 (16/21)	0	1 (1/0)	2 (2/0)	14 (2/13)	100 (0/100)	25 (3/22)	0	2 (2/0)	0	12 (0/12)
Centralized-4	7	1	112 (6/106)	37 (16/21)	0	1 (1/0)	2 (2/0)	14 (2/13)	100 (0/100)	25 (3/22)	0	2 (2/0)	0	12 (0/12)
Centralized-5	1	1	19 (2/17)	8 (5/3)	0	0	0	3 (0/2)	14 (0/14)	4 (0/4)	0	0	0	2 (0/2)

Notes:
T = Treatment
D = Disposal
Emissions <1 ton per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions/worker vehicles emission)
(2) Values = total emissions (stationary-source emissions/mobile-source emission)
** Ten sites use existing facilities for Volume Reduction.

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Table II-7.2-7. LANL—LLW—Percent of Standard/Guideline for Criteria Air Pollutants

LLW Alternatives	Number of Sites		Construction					
			Percent of Tons/Year General Conformity Rule (1)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC
No Action	10**	6	–	–	–	–	–	–
Decentralized		16	–	–	–	–	–	–
Regionalized-1		12	–	–	–	–	–	–
Regionalized-2	11	12	–	–	–	–	–	–
Regionalized-3		6	–	–	–	–	–	–
Regionalized-4	7	6	–	–	–	–	–	–
Regionalized-5	4	6	–	–	–	–	–	–
Regionalized-6		2	–	–	–	–	–	–
Regionalzied-7		2	–	–	–	–	–	–
Centralized-1		1	–	–	–	–	–	–
Centralized-2		1	–	–	–	–	–	–
Centralized-3	7	1	–	–	–	–	–	–
Centralized-4	7	1	–	–	–	–	–	–
Centralized-5	1	1	–	–	–	–	–	–

LLW Alternatives	Number of Sites		Operations & Maintenance											
			Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
	T	D	CO (4)	NO2 (4)	Pb (4)	PM10 (4)	SO2 (4)	VOC (4)	CO	NO2	Pb	PM10	SO2	VOC
No Action	10**	6	1	3	0	1	0	0	–	–	–	–	–	–
Decentralized		16	0	1	0	1	0	0	–	–	–	–	–	–
Regionalized-1		12	0	1	0	1	0	0	–	–	–	–	–	–
Regionalized-2	11	12	0	8	0	12	0	0	0	0	0	0	0	0
Regionalized-3		6	0	1	0	1	0	0	–	–	–	–	–	–
Regionalized-4	7	6	1	8	0	13	0	0	0	0	0	0	0	0
Regionalized-5	4	6	0	0	0	0	0	0	–	–	–	–	–	–
Regionalized-6		2	0	0	0	0	0	0	–	–	–	–	–	–
Regionalzied-7		2	0	0	0	0	0	0	–	–	–	–	–	–
Centralized-1		1	0	0	0	0	0	0	–	–	–	–	–	–
Centralized-2		1	0	0	0	0	0	0	–	–	–	–	–	–
Centralized-3	7	1	0	8	0	12	0	0	0	0	0	0	0	0
Centralized-4	7	1	0	8	0	12	0	0	0	0	0	0	0	0
Centralized-5	1	1	0	0	0	0	0	0	–	–	–	–	–	–

Notes:
T = Treatment
D = Disposal
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) LANL is in an attainment area for all criteria pollutants, therefore the GCR do not apply.
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions for all but the Regionalized-2 and -4, and Centralized-3 and -4 Alternatives are assumed to be negligible.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.
** Ten sites use existing facilities for Volume Reduction.

Table II-7.2–8. LANL—LLW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

LLW Alternatives	Number of Sites		Operations & Maintenance											
	T	D	Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action	10**	6	0	--	--	--	--	--	--	--	--	--	--	--
Decentralized		16	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-1		12	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-2	11	12	2	--	--	--	--	--	--	--	--	--	--	--
Regionalized-3		6	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	7	6	2	--	--	--	--	--	--	--	--	--	--	--
Regionalized-5	4	6	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-6		2	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-1		1	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	2	--	--	--	--	--	--	--	--	--	--	--
Centralized-4	7	1	2	--	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	0	--	--	--	--	--	--	--	--	--	--	--

LLW Alternatives	Number of Sites		Operations & Maintenance									
	T	D	Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action	10**	6	--	--	--	--	--	--	--	--	--	--
Decentralized		16	--	--	--	--	--	--	--	--	--	--
Regionalized-1		12	--	--	--	--	--	--	--	--	--	--
Regionalized-2	11	12	--	--	--	--	--	--	--	--	--	--
Regionalized-3		6	--	--	--	--	--	--	--	--	--	--
Regionalized-4	7	6	--	--	--	--	--	--	--	--	--	--
Regionalized-5	4	6	--	--	--	--	--	--	--	--	--	--
Regionalized-6		2	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	--	--	--	--	--	--	--	--	--	--
Centralized-1		1	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--	--	--	--	--
Centralized-4	7	1	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--	--	--	--	--

Notes:
T= Treatment
D = Disposal
- - = Emissions of this hazardous or toxic air pollutant are assumed to be negligible.
Percentages <1% are shown as zeros.
** Ten sites use existing facilities for Volume Reduction.

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Table II-7.2–9. LANL—LLW—Impacts on Water Resources Due to Increased Water Use

LLW Alternatives	Number of Sites		Construction			Operations			
	T	D	Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action	10**	6	3586	0.1	- -	9666	0.2	- -	- -
Decentralized		16	22273	0.5	- -	7743	0.2	- -	- -
Regionalized-1		12	22884	0.6	- -	7965	0.2	- -	- -
Regionalized-2	11	12	25707	0.6	- -	11429	0.3	- -	- -
Regionalized-3		6	30312	0.7	- -	10658	0.3	- -	- -
Regionalized-4	7	6	35601	0.9	- -	15828	0.4	- -	- -
Regionalized-5	4	6	14081	0.3	- -	5468	0.1	- -	- -
Regionalized-6		2	5714	0.1	- -	1739	<0.1	- -	- -
Regionalized-7		2	5714	0.1	- -	1739	<0.1	- -	- -
Centralized-1		1	5714	0.1	- -	1739	<0.1	- -	- -
Centralized-2		1	5714	0.1	- -	1739	<0.1	- -	- -
Centralized-3	7	1	20240	0.5	- -	10039	0.2	- -	- -
Centralized-4	7	1	20240	0.5	- -	10039	0.2	- -	- -
Centralized-5	1	1	5714	0.1	- -	1739	<0.1	- -	- -

Notes:
T = Treatment
D = Disposal
Water supplied by groundwater in the Main Aquifer. Current water use = 4,100,000 gallons/day.
Wastewater discharged to onsite dry stream beds.
** Ten sites use existing facilities for Volume Reduction.
- - = Stream Flow is not considered for this alternative.
<0.1 indicates that the percentage is less than 0.1%.

Table II-7.2-10. LANL—LLW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal

LLW Alternatives	Number of Sites T	Number of Sites D	Ac 225	Ac 227	Am 241	Am 242	Am 243	C 14	Cs 135	Cs 137	Cm 242	Cm 244	Cm 245	I 129	Pb 210	Np 237	Ni 59	Ni 63	Pd 107	Pu 238	Pu 239	Pu 240	Pu 241
No Action	10**	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Decentralized		16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1		12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-2	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-3		6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-4	7	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-5	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-6		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-1		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-4	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

LLW Alternatives	Number of Sites T	Number of Sites D	Po 210	K 40	Pa 231	Ra 223	Ra 226	Sm 151	Se 79	Sr 90	Tc 99	Th 227	Th 228	Th 229	Th 230	Th 232	Sn 126	U 233	U 234	U 235	U 236	U 238	Y 90	Zr 93
No Action	10**	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Decentralized		16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1		12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-2	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-3		6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-4	7	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-5	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-6		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-1		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-4	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
** Ten sites use existing facilities for Volume Reduction
- - = Disposal is not considered for this Alternative.

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Table II-7.2-11. LANL—LLW—Socioeconomic Impacts for Treatment and Disposal

LLW Alternatives	Number of Sites		Effect of Implementation of Alternatives					
				Jobs		Income		
	T	D	Cost (Millions) (1)	Jobs	% Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action	10**	6	1235	971	1.16	10.6	0.42	0.64
Decentralized		16	1072	1053	1.26	11.5	0.45	0.96
Regionalized-1		12	1322	1299	1.56	14.1	0.56	0.62
Regionalized-2	11	12	1249	1228	1.47	13.4	0.53	0.76
Regionalized-3		6	1776	1746	2.09	19.0	0.75	0.77
Regionalized-4	7	6	2007	1972	2.36	21.5	0.85	1.42
Regionalized-5		6	1874	1842	2.21	20.0	0.79	0.41
Regionalized-6		2	254	249	0.30	2.7	0.11	0.14
Regionalized-7		2	254	249	0.30	2.7	0.11	0.14
Centralized-1		1	254	249	0.30	2.7	0.11	0.14
Centralized-2		1	254	249	0.30	2.7	0.11	0.14
Centralized-3	7	1	1207	1187	1.42	12.9	0.51	0.99
Centralized-4	7	1	1207	1187	1.42	12.9	0.51	0.99
Centralized-5	1	1	254	249	0.30	2.7	0.11	0.14

Notes:
T = Treatment
D = Disposal
(1) In constant 1990 dollars.
(2) Compared to 1990 baseline.
** Ten sites use existing facilities for Volume Reduction.

Table II-7.2-12. LANL—LLW—Infrastructure Impacts for Treatment and Disposal

LLW Alternatives	Number of Sites		Effect of Implementation of Alternatives									
			Land Use		Water		Waste Water		Power		Employment (FTE)	
	T	D	Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	% Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Peak Construction Employment	% of Current Employment (1)
No Action	10**	6	11.5	0.07	9666	0.10	9666	0.97	1.76	1.46	89	1
Decentralized		16	11.3	0.07	22273	0.22	7743	0.77	2.42	2.01	1478	24
Regionalized-1		12	11.6	0.07	22884	0.23	7965	0.80	2.48	2.07	426	7
Regionalized-2	11	12	13.4	0.08	25707	0.26	11429	1.14	2.81	2.34	621	10
Regionalized-3		6	15.1	0.09	30312	0.30	10658	1.07	3.28	2.73	523	8
Regionalized-4	7	6	18.5	0.11	35601	0.36	15828	1.58	3.89	3.24	1074	17
Regionalized-5	4	6	11.3	0.02	14081	0.14	5468	0.55	1.49	2.08	288	5
Regionalized-6		2	3.3	0.02	5714	0.06	1739	0.17	1.49	2.08	136	2
Regionalized-7		2	3.3	0.02	5714	0.06	1739	0.17	1.49	2.08	136	2
Centralized-1		1	3.3	0.02	5714	0.06	1739	0.17	1.49	2.08	136	2
Centralized-2		1	3.3	0.02	5714	0.06	1739	0.17	1.49	2.08	136	2
Centralized-3	7	1	11.8	0.07	20240	0.20	10039	1.00	2.91	2.42	821	13
Centralized-4	7	1	11.8	0.07	20240	0.20	10039	1.00	2.91	2.42	821	13
Centralized-5	1	1	3.3	0.02	5714	0.06	1739	0.17	1.49	2.08	121	2

Notes:
T = Treatment
D = Disposal
GPD = Gallons per Day
MW = Megawatts Electric
FTE = Full Time Equivalent
(1) Based on 1994 Site Employment.
** Ten sites use existing facilities for Volume Reduction.

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Table II-7.2-13. LANL—LLW—Cost

LLW Alternatives	Number of Sites		Total Cost (Millions) (1)	Cost by Life-Cycle Component (1)				Cost by Functional Area (1)		
	T	D		Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Treatment (Millions)	Storage (Millions)	Disposal (Millions)
No Action	10**	6	1397	15	109	1147	125	292	0	1105
Decentralized		12	1213	95	162	766	190	287	0	925
Regionalized 1		6	1495	121	191	994	190	287	0	1208
Regionalized 2	11	12	1413	140	244	888	141	812	0	602
Regionalized 3		16	2010	127	817	875	191	287	0	1723
Regionalized 4	7	6	2270	199	412	1497	163	1366	0	904
Regionalized 5	4	6	2120	153	657	1126	185	287	0	1833
Regionalized 6		2	287	23	65	176	24	287	0	0
Regionalized 7		2	287	23	65	176	24	287	0	0
Centralized 1		1	287	23	65	176	24	287	0	0
Centralized 2		1	287	23	65	176	24	287	0	0
Centralized 3	7	1	1366	142	318	833	74	1366	0	0
Centralized 4	7	1	1366	142	318	833	74	1366	0	0
Centralized 5		2	287	23	65	176	24	287	0	0

Notes:
** Ten sites use existing facilities for Volume Reduction
T = Treatment
D = Disposal
The Life Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum may not reflect the true total cost.
(1) In Current 1994 Dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

7.3 LANL TRUW

Twelve tables immediately following portray the impacts of TRUW at LANL. These tables are presented as follows:

Impact Category

No.	Description	Table No.	Page No.
1.	LANL—TRUW—Treatment: Estimated Number of Fatalities	II-7.3-1	7-32
2.	LANL—TRUW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects	II-7.3-2	7-33
4.	LANL—TRUW—Treatment: MEI Probability of Cancer Fatality	II-7.3-3	7-34
5.	LANL—TRUW—Treatment: MEI Probability of Cancer Incidences and Genetic Effects	II-7.3-4	7-35
6.	LANL—TRUW—Treatment: Noncancer Health Risk from Chemical Exposure	II-7.3-5	7-36
7.	LANL—TRUW—Emissions in Tons per Year of Criteria Air Pollutants	II-7.3-6	7-37
8.	LANL—TRUW—Percent of Standard/Guideline for Criteria Air Pollutants	II-7.3-7	7-38
9.	LANL—TRUW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-7.3-8	7-39
10.	LANL—TRUW—Impacts on Water Resources due to Increase Water Use	II-7.3-9	7-40
12.	LANL—TRUW—Socioeconomics Impacts for Treatment and Disposal	II-7.3-10	7-41
13.	LANL—TRUW—Infrastructure Impacts for Treatment and Disposal	II-7.3-11	7-42
14.	LANL—TRUW—Cost	II-7.2-12	7-43

Table II-7.3-1. LANL—TRUW—Treatment: Estimated Number of Fatalities

TRUW Alternatives	Treatment						
	Number of Sites		Treat STD	WM Worker		Offsite Population Radiation Exposure	Noninvolved Workers Radiation Exposure
	CH Treat	RH Treat		Radiation Exposure	Physical Hazards		
No Action **	16	5	WIPP WAC	3.5E-04	5.4E-02	4.1E-06	3.8E-07
Decentralized ***	16	5	WIPP WAC	1.4E-01	3.8E-01	5.4E-05	4.9E-06
Regionalized-1	5	2	Reduce Gas	1.4E-01	5.1E-01	6.5E-05	6.0E-06
Regionalized-2	5	2	LDR	1.4E-01	8.4E-01	6.4E-01	5.8E-02
Regionalized-3	3	2	LDR	1.4E-01	2.5E-01	7.1E-05	6.4E-03
Centralized	WIPP	2	LDR	1.4E-01	2.5E-01	7.1E-05	6.4E-06

Notes:
** For No Action Alternative, storage is indefinite; no disposal at WIPP is assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at 16 sites, then transfered to interim storage at 10 sites, then to WIPP.

Table II-7.3-2. LANL—TRUW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

TRUW Alternatives	Number of Sites		Treat STD	Offsite Population				Noninvolved Workers				WM Workers			
	CH Treat	RH Treat		Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects
No Action**	16	5	WIPP WAC	8.3E-03	1.4E-05	2.3E-11	8.3E-07	7.6E-04	1.3E-06	1.1E-11	7.6E-08	8.6E-01	1.2E-03	4.9E-09	5.2E-05
Decentralized***	16	5	WIPP WAC	1.1E-01	1.8E-04	6.8E-10	1.1E-05	9.8E-03	1.7E-05	3.4E-10	9.8E-07	3.6E+02	5.0E-01	3.5E-08	2.1E-02
Regionalized-1	5	2	Reduce Gas	1.3E-01	2.2E-04	9.5E-10	1.3E-05	1.2E-02	2.0E-05	4.7E-10	1.2E-06	3.6E+02	5.0E-01	1.5E-07	2.1E-02
Regionalized-2	5	2	LDR	1.3E+03	2.2E+00	1.1E-09	1.3E-01	1.2E+02	2.0E-01	5.4E-10	1.2E-02	3.4E+02	4.8E-01	3.7E-07	2.0E-02
Regionalized-3	3	2	LDR	1.4E-01	2.4E-04	1.9E-09	1.4E-05	1.3E-02	2.2E-05	9.4E-10	1.3E-06	3.6E+02	5.0E-01	1.7E-07	2.2E-02
Centralized	WIPP	2	LDR	1.4E-01	2.4E-04	1.9E-09	1.4E-05	1.3E-02	2.2E-05	9.4E-10	1.3E-06	3.6E+02	5.0E-01	1.7E-07	2.2E-02

Notes:
** For No Action Alternative, storage is indefinite; no disposal at WIPP is assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
T = Treatment
D = Disposal

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Table II-7.3-3. LANL—TRUW—Treatment: MEI Probability of Cancer Fatality

TRUW Alternatives	Number of Sites		Treat STD	Treatment	
	CH Treat	RH Treat		Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability
No Action**	16	5	WIPP WAC	4.4E-10	2.8E-10
Decentralized***	16	5	WIPP WAC	5.7E-09	3.7E-09
Regionalized-1	5	2	Reduce Gas	6.9E-09	4.5E-09
Regionalized-2	5	2	LDR	6.7E-05	4.4E-05
Regionalized-3	3	2	LDR	7.4E-09	4.8E-09
Centralized	WIPP	2	LDR	7.4E-09	4.8E-09

Notes:
MEI = Maximally Exposed Individual
** For No Action Alternative, storage is indefinite; no disposal of WIPP is assumed, for all other alternatives disposal at WIPP is assumed.
***In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then transferred to interim storage at 10 sites, then to WIPP.

Table II-7.3-4. LANL—TRUW—Treatment: MEI Probability of Cancer Incidences and Genetic Effects

TRUW Alternatives	Number of Sites		Treat STD	Treatment							
				Offsite MEI				Noninvolved Worker MEI			
	CH Treat	RH Treat		Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability
No Action **	16	5	WIPP WAC	8.7E-07	1.5E-09	0.0E+00	8.7E-11	5.7E-07	9.7E-10	0.0E+00	5.7E-11
Decentralized ***	16	5	WIPP WAC	1.1E-05	1.9E-08	8.3E-14	1.1E-09	7.4E-06	1.2E-08	2.1E-13	7.4E-10
Regionalized-1	5	2	Reduce Gas	1.4E-05	2.3E-08	1.2E-13	1.4E-09	9.0E-06	1.5E-08	3.0E-13	9.0E-10
Regionalized-2	5	2	LDR	1.3E-01	2.3E-04	1.3E-13	1.3E-05	8.7E-02	1.5E-04	3.3E-13	8.7E-06
Regionalized-3	3	2	LDR	1.5E-05	2.5E-08	2.3E-13	1.5E-09	9.7E-06	1.6E-08	5.7E-13	9.7E-10
Centralized	WIPP	2	LDR	1.5E-05	2.5E-08	2.3E-13	1.5E-09	9.7E-06	1.6E-08	5.7E-13	9.7E-10

Notes:
** For No Action Alternative, storage is indefinite; no disposal at WIPP is assumed for all other alternatives, disposal of WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites then to WIPP.
MEI = Maximally Exposed Individual

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Table II-7.3-5. LANL—TRUW—Treatment: Noncancer Health Risk From Chemical Exposure

TRUW Alternatives	Number of Sites		Treat STD	Treatment		
	CH Treat	RH Treat		Offsite MEI Hazard Index	Noninvolved Worker MEI Hazard Index	WM Worker Exposure Index
No Action**	16	5	WIPP WAC	4.2E-12	1.1E-11	6.2E-08
Decentralized***	16	5	WIPP WAC	1.2E-10	3.0E-10	4.7E-07
Regionalized-1	5	2	Reduce Gas	1.7E-10	4.1E-10	4.8E-07
Regionalized-2	5	2	LDR	1.1E-08	2.8E-08	6.7E-05
Regionalized-3	3	2	LDR	3.1E-10	7.8E-10	2.3E-06
Centralized	WIPP	2	LDR	3.1E-10	7.8E-10	2.3E-06

Notes:
MEI = Maximally Exposed Individual
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
Hazard Index = Sum of hazard quotient values for all noncarcinogenic chemicals. The Hazard Quotient is the chemical-specific ratio of media exposure concentrations to concentrations exposure concentrations to concentrations believed to have no appreciable adverse effects.
Exposure Index Ratio of exposure concentration to chemical-specific occupational threshold limits.

Table II-7.3-6. LANL—TRUW—Emissions in Tons per Year of Criteria Air Pollutants

TRUW Alternatives	Number of Sites		Treat STD	Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
	CH Treat	RH Treat		CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action**	16	5	WIPP WAC	- -	- -	- -	- -	- -	- -	4 (0/4)	1 (0/1)	0	0	0	0
Decentralized***	16	5	WIPP WAC	54 (26/28)	74 (68/6)	0	6 (5/0)	6 (6/0)	10 (7/3)	39 (0/39)	8 (0/8)	0	0	0	5 (0/5)
Regionalized-1	5	2	Reduce Gas	67 (21/46)	64 955/9)	0	4 (4/0)	5 (5/0)	11 (5/6)	42 (0/42)	8 (0/8)	0	0	0	5 (0/5)
Regionalized-2	5	2	LDR	65 (21/44)	63 (54/9)	0	4 (4/0)	5 (5/0)	10 (5/5)	47 (0/47)	10 (1/9)	0	0	0	6 (0/6)
Regionalized-3	3	2	LDR	43 (18/25)	52 (47/5)	0	4 (4/0)	4 (4/0)	8 (5/3)	23 (0/23)	5 (0/5)	0	0	0	3 (0/3)
Centralized	WIPP	2	LDR	43 (18/25)	52 (47/5)	0	4 (4/0)	4 (4/0)	8 (5/3)	23 (0/23)	5 (0/5)	0	0	0	3 (0/3)

Notes:
Emissions <1 ton per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions / worker vehicles emission)
(2) Values = total emissions (stationary-source emissions / mobile-source emission)
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

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Table II-7.3-7. LANL—TRUW—Percent of Standard/Guideline for Criteria Air Pollutants

TRUW Alternatives	Number of Sites		Treat STD	Construction					
				Percent of Tons/Year General Conformity Rule (1)					
	CH Treat	RH Treat		CO	NO2	Pb	PM10	SO2	VOC
No Action	16	5	WIPP WAC	--	--	--	--	--	--
Decentralized	16	5	WIPP WAC	--	--	--	--	--	--
Regionalized-1	5	2	Reduce Gas	--	--	--	--	--	--
Regionalized-2	5	2	LDR	--	--	--	--	--	--
Regionalized-3	3	2	LDR	--	--	--	--	--	--
Centralized	WIPP	2	LDR	--	--	--	--	--	--

TRUW Alternatives	Number of Sites		Treat STD	Operations & Maintenance											
				Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
	CH Treat	RH Treat		CO (4)	NO2 (4)	Pb (4)	PM10 (4)	SO2 (4)	VOC (4)	CO	NO2	Pb	PM10	SO2	VOC
No Action	16	5	WIPP WAC	0	0	0	0	0	0	--	--	--	--	--	--
Decentralized	16	5	WIPP WAC	0	1	0	0	0	0	--	--	--	--	--	--
Regionalized-1	5	2	Reduce Gas	0	1	0	0	0	0	--	--	--	--	--	--
Regionalized-2	5	2	LDR	0	2	0	5	2	0	0	0	0	0	0	0
Regionalized-3	3	2	LDR	0	0	0	0	0	0	--	--	--	--	--	--
Centralized	WIPP	2	LDR	0	0	0	0	0	0	--	--	--	--	--	--

Notes:
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) LANL is in an attainment area for all criteria pollutants, therefore the GCR does not apply.
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions for alternatives that do not involve treatment to LDR (incineration) are assumed to be negligible.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

Table II-7.3-8. LANL—TRUW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

TRUW Alternatives	Number of Sites		Treat STD	Operations & Maintenance											
	CH Treat	RH Treat		Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action**	16	5	WIPP - WAC	0	--	--	--	0	0	--	--	--	--	--	--
Decentralized***	16	5	WIPP - WAC	0	--	--	--	0	0	--	--	--	--	--	--
Regionalized-1	5	2	Reduce Gas	0	--	--	--	0	0	--	--	--	--	--	--
Regionalized-2	5	2	LDR	134	--	--	--	0	0	--	--	--	--	--	--
Regionalized-3	3	2	LDR	0	--	--	--	0	0	--	--	--	--	--	--
Centralized	WIPP	2	LDR	0	--	--	--	0	0	--	--	--	--	--	--

TRUW Alternatives	Number of Sites		Treat STD	Operations & Maintenance									
	CH Treat	RH Treat		Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action**	16	5	WIPP - WAC	0	0	--	--	--	0	0	--	--	--
Decentralized***	16	5	WIPP - WAC	0	0	--	--	--	0	0	--	--	--
Regionalized-1	5	2	Reduce Gas	0	0	--	--	--	0	0	--	--	--
Regionalized-2	5	2	LDR	0	0	--	--	--	0	0	--	--	--
Regionalized-3	3	2	LDR	0	0	--	--	--	0	0	--	--	--
Centralized	WIPP	2	LDR	0	0	--	--	--	0	0	--	--	--

Notes:
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
-- = Emissions of this hazardous or toxic air pollutant are assumed to be negligible.
Percentages <1% are shown as zeros. CH = contact handled. RH = remote handled.

Table II-7.3-9. LANL—TRUW—Impacts on Water Resources Due to Increased Water Use

TRUW Alternatives	Number of Sites		Treat STD	Construction			Operations			
	CH Treat	RH Treat		Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action**	16	5	WIPP WAC	- -	- -	- -	1850	<0.1	- -	- -
Decentralized***	16	5	WIPP WAC	33849	0.8	- -	5214	0.1	- -	- -
Regionalized-1	5	2	Reduce Gas	34966	0.9	- -	5922	0.1	- -	- -
Regionalized-2	5	2	LDR	34362	0.8	- -	6974	0.2	- -	- -
Regionalized-3	3	2	LDR	28400	0.7	- -	2019	<0.1	- -	- -
Centralized	WIPP	2	LDR	28400	0.7	- -	2019	<0.1	- -	- -

Notes:
Water supplied by groundwater in the Main Aquifer. Current water use = 4,100,000 gallons/day.
Wastewater discharged to onsite dry stream beds.
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
- - = Stream Flow and Waste Water Stream Flow are not considered for this site.
<0.1 indicates that the percentage is less than 0.1%.

Table II-7.3-10. LANL—TRUW—Socioeconomic Impacts for Treatment

TRUW Alternatives	Number of Sites		Effect of Implementation of Alternatives						
					Jobs		Income		
	CH Treat	RH Treat	Treat STD	Cost (Millions) (1)	Annual Jobs	% Annual Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action**	16	5	WIPP WAC	97	76	0.09	0.8	0.03	0.14
Decentralized***	16	5	WIPP WAC	812	798	0.96	8.7	0.34	0.43
Regionalized-1	5	2	Reduce Gas	849	834	1.00	9.1	0.36	0.46
Regionalized-2	5	2	LDR	910	895	1.07	9.7	0.39	0.49
Regionalized-3	3	2	LDR	443	436	0.52	4.7	0.19	0.24
Centralized	WIPP	2	LDR	443	436	0.52	4.7	0.19	0.24

Notes:
(1) In current 1990 dollars.
(2) Compared to 1990 baseline.
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

Table II-7.3-11. LANL—TRUW—Infrastructure Impacts for Treatment

TRUW Alternatives	Number of Sites		Treat STD	Effect of Implementation of Alternatives									
				Land Use		Water		Waste Water		Power		Employment (FTE)	
	CH Treat	RH Treat		Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Peak Construction Employment	% of Current Employment (1)
No Action**	16	5	WIPP WAC	0	0.00	1850	0.02	1850	0.19	0.25	0.2	0	0.00
Decentralized***	16	5	WIPP WAC	15.4	0.10	33849	0.34	5214	0.52	1.04	0.87	433	7.00
Regionalized-1	5	2	Reduce Gas	15.1	0.09	34966	0.35	5922	0.59	1.28	1.06	475	7.70
Regionalized-2	5	2	LDR	14.9	0.09	34362	0.34	6974	0.70	1.42	1.19	461	7.40
Regionalized-3	3	2	LDR	1.2	0.01	28400	0.28	2019	0.20	1.94	1.62	234	3.80
Centralized	WIPP	2	LDR	1.2	0.01	28400	0.28	2019	0.20	1.94	1.62	234	3.80

Notes:
GPD = Gallons per Day
MW = Megawatts Electric
FTE = Full Time Equivalent
(1) Based on 1994 Site Employment.
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

Table II-7.3–12. LANL—TRUW—Cost

TRUW Alternatives	Number of Sites		Treat STD (2)	Total Cost (Millions) (1)	Life-Cycle Component				Functional Area		
	CH Treat	RH Treat			Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Retrieval Characterization (Millions)	Treatment (Millions)	Storage (Millions)
No Action**	11	5	WIPP - WAC	110	0	0	87	22	0	90	20
Decentralized***	16	5	WIPP - WAC	919	50	237	397	234	454	438	27
Regionalized-1	5	2	Reduce Gas	961	56	260	405	240	454	468	39
Regionalized-2	5	2	LDR	1030	56	250	480	245	454	539	37
Regionalized-3	3	2	LDR	501	20	139	148	195	454	48	0
Centralized	WIPP	2	LDR	501	20	139	148	195	454	48	0

Notes:
** For No Action Alternative, storage is indefinite; no disposal at WIPP to be assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
The Life Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum may not reflect the true total cost.
(1) In Current 1994 Dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.
(2) Treatment standard (STD) applied: treat to WIPP Waste Acceptance Criteria (WIPP WAC), treat for reduced gas generation (Reduce Gas), treat to Land Disposal Restrictions (LDR).

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7.4 LANL HLW

LANL is not one of the sites considered for the management of HLW. Therefore, Section 7.4 has been intentionally left blank.

7.5 LANL HW

Eleven tables immediately following portray the impacts of HW at LANL. These tables are presented as follows:

Impact Category

No.	Description	Table No.	Page No.
1.	LANL—HW—Treatment: Estimated Number of Fatalities	II-7.5-1	7-46
2.	LANL—HW—Treatment: Estimated Number of Cancer Incidences	II-7.5-2	7-47
3.	LANL—HW—Treatment: MEI Probability of Cancer Incidences	II-7.5-3	7-48
6.	LANL—HW—Treatment: Noncancer Health Risk From Chemical Exposure	II-7.5-4	7-49
7.	LANL—HW—Emissions in Tons per Year of Criteria Air Pollutants	II-7.5-5	7-50
8.	LANL—HW—Percent of Standard/Guideline for Criteria Air Pollutants	II-7.5-6	7-51
9.	LANL—HW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-7.5-7	7-52
10.	LANL—HW—Impacts on Water Resources Due to Increased Water Use	II-7.5-8	7-53
12.	LANL—HW—Socioeconomics Impacts for Treatment	II-7.5-9	7-54
13.	LANL—HW—Infrastructure Impacts for Treatment	II-7.5-10	7-55
14.	LANL—HW—Cost	II-7.5-11	7-56

Table II-7.5-1. LANL—HW—Treatment: Estimated Number of Fatalities

HW Alternatives	Number of Sites T	WM Worker Physical Hazards
No Action	2	- -
Decentralized	3	6.4E-03
Regionalized-1	5	1.7E-02
Regionalized-2	2	- -

Notes:
- - = Treatment is not considered for this alternative
T = Treatment

Table II-7.5-2. LANL—HW—Treatment: Estimated Number of Cancer Incidences

HW Alternatives	Number of Sites	Treatment		
	T	Offsite MEI Hazard Index	Noninvolved Worker MEI Hazard Index	WM Worker Exposure Index
No Action	2	- -	- -	- -
Decentralized	3	7.6E-03	1.9E-02	4.8E+00
Regionalized-1	5	3.1E-02	7.9E-02	6.1E+00
Regionalized-2	2	- -	- -	- -

Notes:
T = Treatment
MEI = Maximally Exposed Individual
- - = Treatment is not considered for this alternative.
Hazard Index = Sum of hazard quotient values for all noncarcinogenic chemicals. The Hazard Quotient is the chemical-specific ratio of media exposure concentrations to concentrations believed to have no appreciable adverse effects.
Exposure Index = Ratio of exposure concentration to chemical-specific occupational threshold limits.

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Table II-7.5–3. LANL—HW—Treatment: MEI Probability of Cancer Incidences

HW Alternatives	Number of Sites	Treatment	
	T	Offsite MEI Cancer Incidence Probability	Noninvolved MEI Cancer Incidence Probability
No Action	2	- -	- -
Decentralized	3	5.7E-07	1.4E-06
Regionalized-1	5	2.4E-06	5.9E-06
Regionalized-2	2	- -	- -

Notes:
T = Treatment
MEI = Maximally Exposed Individual
- - = Treatment is not considered for this alternative.

Table II-7.5-4. LANL—HW—Treatment: Noncancer Health Risk From Chemical Exposure

HW Alternatives	Number of Sites	Treatment		
	T	Offsite Population Chemical Cancer Incidence	Noninvolved Worker Chemical Cancer Incidence	WM Worker Chemical Cancer Incidence
No Action	2	- -	- -	- -
Decentralized	3	4.6E-03	2.3E-03	6.8E-02
Regionalized-1	5	1.9E-02	9.5E-03	3.0E-01
Regionalized-2	2	- -	- -	- -

Notes:
T = Treatment
- - = Treatment is not considered for this alternative.

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Table II-7.5-5. LANL—HW—Emissions in Tons per Year of Criteria Air Pollutants

HW Alternatives	Number of Sites	Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
	T	CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action	2	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized	3	3 (2/1)	5 (4/0)	0	0	0	1 (0/0)	0	0	0	0	0	0
Regionalized-1	5	5 (3/2)	9 (9/0)	0	1 (1/0)	1 (1/0)	1 (1/0)	0	0	0	1 (1/0)	2 (2/0)	0
Regionalized-2	2	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
T = Treatment
Emissions <1 ton per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions/worker vehicles emission)
(2) Values = total emissions (stationary-source emissions/mobile-source emission)

Table II-7.5-6. LANL—HW—Percent of Standard/Guideline for Criteria Air Pollutants

HW Alternatives	Number of Sites T	Construction: Percent of Tons/Year General Conformity Rule (1)					
		CO	NO2	Pb	PM10	SO2	VOC
No Action	2	--	--	--	--	--	--
Decentralized	3	--	--	--	--	--	--
Regionalized-1	5	--	--	--	--	--	--
Regionalized-2	2	--	--	--	--	--	--

HW Alternatives	Number of Sites T	Operations & Maintenance: Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
		CO (4)	NO2 (4)	Pb (4)	PM10 (4)	SO2 (4)	VOC (4)	CO	NO2	Pb	PM10	SO2	VOC
No Action	2	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized	3	0	0	0	2 (2/0)	1 (1/0)	0	0	0	0	0	0	0
Regionalized-1	5	0	1 (1/0)	0	8 (8/0)	4 (4/0)	0	0	0	0	0	0	0
Regionalized-2	2	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
T = Treatment
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) LANL is in an attainment area for all criteria pollutants, therefore the GCR does not apply.
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions for the Regionalized-2 Alternative are assumed to be negligible since no waste is treated at LANL under this alternative.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.

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Table II-7.5–7. LANL—HW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

HW Alternatives	Number of Sites T	Operations & Maintenance											
		Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action	2	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Decentralized	3	- -	- -	- -	0	- -	- -	0	0	- -	- -	- -	- -
Regionalized - 1	5	- -	- -	- -	0	- -	- -	0	0	- -	- -	- -	- -
Regionalized - 2	2	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

HW Alternatives	Number of Sites T	Operations & Maintenance									
		Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action	2	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Decentralized	3	- -	0	- -	- -	0	- -	0	0	0	37
Regionalized - 1	5	- -	0	- -	- -	0	- -	0	0	0	153
Regionalized - 2	2	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

Notes:
T = Treatment
Percentages <1% are shown as zeros.
- - = Emissions of certain hazardous or toxic air pollutants, including radionuclides, from HW treatment facilities are assumed to be negligible.

Table II-7.5-8. LANL—HW—Impacts on Water Resources Due to Increased Water Use

HW Alternatives	Number of Sites T	Construction Water Use GPD	Construction % Current Use	Construction % Stream Flow	Operations Water Use GPD	Operations % Current Use	Operations % Stream Flow	Operations Waste Water % Stream Flow
No Action	2	- -	- -	- -	- -	- -	- -	- -
Decentralized	3	775	<0.1	- -	328	<0.1	- -	- -
Regionalized-1	5	1777	<0.1	- -	907	<0.1	- -	- -
Regionalized-2	2	- -	- -	- -	- -	- -	- -	- -

Notes:
T = Treatment
Water supplied by groundwater in the Main Aquifer. Current water use = 4,100,000 gallons/day.
Wastewater discharged to onsite dry stream beds.
- - = Not considered for this site.
<0.1 indicates that the percentage is less than 0.1%.

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Table II-7.5-9. LANL—HW—Socioeconomics Impacts for Treatment

HW Alternatives	Number of Sites	Effect of Implementation of Alternatives					
			Jobs		Income		
	T	Cost (Millions) (1)	Annual Jobs	% Annual Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action	2	- -	- -	- -	- -	- -	- -
Decentralized	3	20	22	0.03	0.2	0.01	0.00
Regionalized 1	5	51	57	0.07	0.6	0.02	0.03
Regionalized 2	2	- -	- -	- -	- -	- -	- -

Notes:
T = Treatment
- - = Treatment is not considered for this alternative.
(1) In current 1990 dollars.
(2) Compared to 1990 baseline.

Table II-7.5-10. LANL—HW—Infrastructure Impacts for Treatment

HW Alternatives	Number of Sites	Effect of Implementation of Alternatives									
		Land Use		Water		Waste Water		Power		Employment (FTE)	
	T	Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	% Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Construction Employment	% of Current Employment (1)
No Action	2	--	--	--	--	--	--	--	--	--	--
Decentralized	3	1	0.00	775	0.01	346	0.03	0.13	0.10	9	0
Regionalized-1	5	1	0.01	1777	0.02	907	0.09	0.26	0.22	19	0
Regionalized-2	2	--	--	--	--	--	--	--	--	--	--

Notes:
T = Treatment
GPD = Gallons per Day
MW = Megawatts Electric
-- = Treatment is not considered for this alternative
(1) Based on 1994 Site Employment.

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Table II-7.5-11. LANL—HW—Cost

HW Alternatives	Number of Sites	Total Cost (Millions) (1)	Government Cost by Life-Cycle Component (1)				Cost by Functional Area (1)	
							Treatment & Disposal	
	T		Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Government (2) (Millions)	Commercial (Millions)
No Action	2	3	- -	- -	- -	- -	- -	3
Decentralized	3	26	2	9	12	1	23	3
Regionalized-1	5	66	4	20	33	1	58	8
Regionalized-2	2	- -	- -	- -	- -	- -	- -	- -

Notes:
T = Treatment
- - = Not considered for this site.
The Life Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum may not reflect the true total cost.
(1) In current 1994 Dollars; Total Cost = Sum of the Functional Areas.
(2) Government costs equal to the sum of the life-cycle components.

8.0 LLNL

LLNL currently is custodian of significant volumes of LLMW, LLW, and TRUW. Each of the waste types is treated independently in the following sections.

8.1 LLNL LLMW

Fifteen tables immediately following portray the impacts of LLMW at LLNL. These tables are presented as follows:

Impact Category

No.	Description	Table No.	Page No.
1.	LLNL—LLMW—Treatment and Disposal: Estimated Number of Fatalities	II-8.1-1	8-2
2.	LLNL—LLMW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects	II-8.1-2	8-3
3.	LLNL—LLMW—Disposal: Estimated Number of Cancer Incidences	II-8.1-3	8-4
4.	LLNL—LLMW—Treatment and Disposal: MEI Probability of Cancer Fatality	II-8.1-4	8-5
5.	LLNL—LLMW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects	II-8.1-5	8-6
6.	LLNL—LLMW—Treatment and Disposal: Noncancer Health Risk from Chemical Exposure	II-8.1-6	8-7
7.	LLNL—LLMW—Emissions in Tons per Year of Criteria Air Pollutants	II-8.1-7	8-8
8.	LLNL—LLMW—Percent of Standard/Guideline for Criteria Air Pollutants	II-8.1-8	8-9
9.	LLNL—LLMW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-8.1-9	8-10
10.	LLNL—LLMW—Impacts on Water Resources Due to Increased Water Use	II-8.1-10	8-11
11.	LLNL—LLMW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal (Contact-Handled)	II-8.1-11	8-12
12.	LLNL—LLMW—Percent of Drinking Water Standards for Hazardous Constituents in Groundwater from Disposal (Contact-Handled)	II-8.1-12	8-13
13.	LLNL—LLMW—Socioeconomics Impacts for Treatment and Disposal	II-8.1-13	8-14
14.	LLNL—LLMW—Infrastructure Impacts for Treatment and Disposal	II-8.1-14	8-15
15.	LLNL—LLMW—Cost	II-8.1-15	8-16

Table II-8.1-1. LLNL—LLMW—Treatment and Disposal: Estimated Number of Fatalities

LLMW Alternatives	Number of Sites		Treatment				Disposal	
			WM Worker		Offsite Population	Noninvolved Workers	WM Worker	
	T	D	Radiation Exposure	Physical Hazards	Radiation Exposure	Radiation Exposure	Radiation Exposure	Physical Hazards
No Action	3	-	1.8E-03	6.3E-02	1.9E-03	8.6E-05	- -	- -
Decentralized	37	16	7.8E-03	2.7E-01	1.5E-01	2.1E-03	4.1E-02	2.3E-02
Regionalized-1	11	12	2.3E-02	2.9E-01	1.6E-01	2.2E-03	4.0E-02	2.3E-02
Regionalized-2	7	6	6.2E-04	3.3E-02	4.4E-07	2.0E-08	- -	- -
Regionalized-3	7	1	6.2E-04	3.3E-02	4.4E-07	2.0E-08	- -	- -
Regionalized-4	4	6	6.2E-04	3.3E-02	4.4E-07	2.0E-08	- -	- -
Centralized	1	1	6.2E-04	3.3E-02	4.4E-07	2.0E-08	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this Alternative.

Table II-8.1-2. LLNL—LLMW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

LLMW Alternatives	Number of Sites		Offsite Population				Noninvolved Workers				WM Worker			
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects
No Action	3	-	3.8E+00	6.4E-03	1.8E-04	3.8E-04	1.8E-01	3.0E-04	4.4E-05	1.8E-05	4.6E+00	6.5E-03	5.8E-06	2.8E-04
Decentralized	37	16	3.1E+02	5.2E-01	8.0E-06	3.1E-02	4.2E+00	7.2E-03	1.9E-06	4.2E-04	2.0E+01	2.7E-02	9.5E-05	1.2E-03
Regionalized-1	11	12	3.1E+02	5.3E-01	8.4E-06	3.1E-02	4.3E+00	7.3E-03	2.0E-06	4.3E-04	5.8E+01	8.1E-02	1.0E-04	3.5E-03
Regionalized-2	7	6	8.8E-04	1.5E-06	4.5E-07	8.8E-08	4.1E-05	6.9E-08	1.1E-07	4.1E-09	1.5E+00	2.2E-03	2.9E-06	9.2E-05
Regionalized-3	7	1	8.8E-04	1.5E-06	4.5E-07	8.8E-08	4.1E-05	6.9E-08	1.1E-07	4.1E-09	1.5E+00	2.2E-03	2.9E-06	9.2E-05
Regionalized-4	4	6	8.8E-04	1.5E-06	4.5E-07	8.8E-08	4.1E-05	6.9E-08	1.1E-07	4.1E-09	1.5E+00	2.2E-03	2.9E-06	9.2E-05
Centralized	1	1	8.8E-04	1.5E-06	4.5E-07	8.8E-08	4.1E-05	6.9E-08	1.1E-07	4.1E-09	1.5E+00	2.2E-03	2.9E-06	9.2E-05

Notes:
T = Treatment
D = Disposal

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Table II-8.1-3. LLNL—LLMW—Disposal: Estimated Number of Cancer Incidences

LLMW Alternatives	Number of Sites		WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	3	-	- -	- -	- -
Decentralized	37	16	1.0E+02	1.4E-01	6.1E-03
Regionalized-1	11	12	1.0E+02	1.4E-01	6.1E-03
Regionalized-2	7	6	- -	- -	- -
Regionalized-3	7	1	- -	- -	- -
Regionalized-4	4	6	- -	- -	- -
Centralized	1	1	- -	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this Alternative.

Table II-8.1-4. LLNL—LLMW—Treatment and Disposal: MEI Probability of Cancer Fatality

LLMW Alternatives	Number of Sites		Treatment		Disposal
	T	D	Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability	Hypothetical Farm Family Most Exposed Lifetime MEI Cancer Fatality Probability
No Action	3	-	3.1E-08	3.0E-08	- -
Decentralized	37	16	2.5E-06	7.3E-07	3.3E-07
Regionalized-1	11	12	2.6E-06	7.4E-07	3.3E-07
Regionalized-2	7	6	7.2E-12	6.9E-12	- -
Regionalized-3	7	1	7.2E-12	6.9E-12	- -
Regionalized-4	4	6	7.2E-12	6.9E-12	- -
Centralized	1	1	7.2E-12	6.9E-12	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered under the Alternative

Table II-8.1-5. LLNL—LLMW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects

LLMW Alternatives	Number of Sites		Treatment								Disposal			
			Offsite Population MEI				Noninvolved Worker MEI				Most Exposed Farm Family Lifetime MEI			
	T	D	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability
No Action	3	-	6.2E-05	1.1E-07	4.0E-09	6.2E-09	6.0E-05	1.0E-07	1.3E-08	6.0E-09	- -	- -	- -	- -
Decentralized	37	16	5.0E-03	8.5E-06	1.8E-10	5.0E-07	1.5E-03	2.5E-06	5.6E-10	1.5E-07	6.5E-04	1.1E-06	8.4E-07	6.5E-08
Regionalized-1	11	12	5.1E-03	8.7E-06	1.9E-10	5.1E-07	1.5E-03	2.5E-06	6.0E-10	1.5E-07	6.5E-04	1.1E-06	8.4E-07	6.5E-08
Regionalized-2	7	6	1.4E-08	2.4E-11	1.0E-11	1.4E-12	1.4E-08	2.3E-11	3.2E-11	1.4E-12	- -	- -	- -	- -
Regionalized-3	7	1	1.4E-08	2.4E-11	1.0E-11	1.4E-12	1.4E-08	2.3E-11	3.2E-11	1.4E-12	- -	- -	- -	- -
Regionalized-4	4	6	1.4E-08	2.4E-11	1.0E-11	1.4E-12	1.4E-08	2.3E-11	3.2E-11	1.4E-12	- -	- -	- -	- -
Centralized	1	1	1.4E-08	2.4E-11	1.0E-11	1.4E-12	1.4E-08	2.3E-11	3.2E-11	1.4E-12	- -	- -	- -	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered for this alternative.

Table II-8.1-6. LLNL—LLMW—Treatment and Disposal: Noncancer Health Risk from Chemical Exposure

LLMW Alternatives	Number of Sites		Treatment			Disposal
	T	D	Offsite MEI Hazard Index	Noninvolved Worker MEI Hazard Index	WM Worker Exposure Index	Hypothetical Farm Family Most Exposed Lifetime Hazard Index
No Action	3	-	2.4E-06	7.6E-06	8.5E-06	- -
Decentralized	37	16	2.0E-07	6.6E-07	3.4E-04	5.5E-04
Regionalized-1	11	12	2.1E-07	6.7E-07	3.5E-04	5.5E-04
Regionalized-2	7	6	2.5E-09	7.9E-09	8.5E-06	- -
Regionalized-3	7	1	2.5E-09	7.9E-09	8.5E-06	- -
Regionalized-4	4	6	2.5E-09	7.9E-09	8.5E-06	- -
Centralized	1	1	2.5E-09	7.9E-09	8.5E-06	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this alternative.
MEI = Maximally Exposed Individual
Hazard Index = Sum of hazard quotient values for all noncarcinogenic chemicals. The hazard quotient is the chemical-specific ratio of media exposure concentrations to concentrations believed to have no appreciable adverse effects.
Exposure Index = Ratio of Exposure concentration to chemical-specific occupational threshold limits.

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Table II-8.1-7. LLNL—LLMW—Emissions in Tons per Year of Criteria Air Pollutants

LLMW Alternatives	Number of Sites		Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	52 (29/23)	81 (76/5)	0	6 (6/0)	7 (7/0)	10 (7/3)	6 (1/5)	4 (3/1)	0	1 (1/0)	0	1 (0/1)
Decentralized	37	16	39 (7/32)	24 (18/16)	0	1 (1/0)	2 (2/0)	6 (2/4)	14 (0/14)	4 (1/3)	0	0	0	2 (0/2)
Regionalized-1	11	12	79 (7/72)	33 (19/14)	0	1 (1/0)	2 (2/0)	11 (2/9)	33 (0/33)	8 (1/7)	0	0	0	4 (0/4)
Regionalized-2	7	6	5 (0/5)	2 (1/1)	0	0	0	1 (0/1)	4 (0/4)	1 (0/1)	0	0	0	1 (0/1)
Regionalized-3	7	1	5 (0/5)	2 (1/1)	0	0	0	1 (0/1)	4 (0/4)	1 (0/1)	0	0	0	1 (0/1)
Regionalized-4	4	6	5 (0/5)	2 (1/1)	0	0	0	1 (0/1)	4 (0/4)	1 (0/1)	0	0	0	1 (0/1)
Centralized	1	1	5 (0/5)	2 (1/1)	0	0	0	1 (0/1)	4 (0/4)	1 (0/1)	0	0	0	1 (0/1)

Notes:
T = Treatment
D = Disposal
Emissions <1 tons per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions / worker vehicles emission).
(2) Values = total emissions (stationary-source emissions / mobile-source emission).

Table II-8.1-8. LLNL—LLMW—Percent of Standard/Guideline for Criteria Air Pollutants

LLMW Alternatives	Number of Sites		Construction					
			Percent of Tons/Year General Conformity Rule (1)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	52 (29/23)	81 (76/5)	--	--	--	20 (15/5)
Decentralized	37	16	39 (7/32)	24 (18/6)	--	--	--	11 (3/8)
Regionalized-1	11	12	79 (7/72)	33 (19/14)	--	--	--	21 (4/17)
Regionalized-2	7	6	5 (0/5)	2 (1/1)	--	--	--	1 (0/1)
Regionalized-3	7	1	5 (0/5)	2 (1/1)	--	--	--	1 (0/1)
Regionalized-4	4	6	5 (0/5)	2 (1/1)	--	--	--	1 (0/1)
Centralized	1	1	5 (0/5)	2 (1/1)	--	--	--	1 (0/1)

LLMW Alternatives	Number of Sites		Operations & Maintenance											
			Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
	T	D	CO (6)	NO2 (5)	Pb (4)	PM10 (4)	SO2 (4)	VOC (5)	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	6 (1/5)	4 (3/1)	0	3	0	1 (0/1)	--	--	--	--	--	--
Decentralized	37	16	14 (0/14)	4 (1/3)	0	5	0	3 (0/3)	0	0	0	1	3	0
Regionalized-1	11	12	33 (0/33)	8 (1/7)	0	5	0	8 (0/8)	0	0	0	1	3	0
Regionalized-2	7	6	4 (0/4)	1 (0/1)	0	0	0	1(0/1)	--	--	--	--	--	--
Regionalized-3	7	1	4 (0/4)	1 (0/1)	0	0	0	1(0/1)	--	--	--	--	--	--
Regionalized-4	4	6	4 (0/4)	1 (0/1)	0	0	0	1(0/1)	--	--	--	--	--	--
Centralized	1	1	4 (0/4)	1 (0/1)	0	0	0	1(0/1)	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) GCR de minimus levels are applied, since PSD regulations are not applicable to construction activities. Values = % of total emissions (% of equipment emissions / % of worker vehicles emission).
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions are assumed to be negligible for all but the Decentralized and Regionalized-1 Alternatives.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.
(5) Nonattainment area for ozone. Pollutant is an ozone precursor, therefore GCR de minimus levels are applied. Values = % of total emissions (% of stationary-source emissions / % of mobile-source emissions).
(6) Nonattainment area for this pollutant, therefore GCR de minimus levels are applied. Values = % of total emissions (% of stationary-source emissions / % of mobile-source emissions).

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Table II-8.1-9. LLNL—LLMW—Percent of Standards/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

LLMW Alternatives	Number of Sites		Operations & Maintenance											
	T	D	Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action	3	-	0	0	0	--	--	0	--	--	0	0	0	0
Decentralized	37	16	5	0	0	--	--	0	--	--	0	0	0	0
Regionalized-1	11	12	5	0	0	--	--	0	--	--	0	0	0	0
Regionalized-2	7	6	0	0	0	--	--	0	--	--	0	0	0	0
Regionalized-3	7	1	0	0	0	--	--	0	--	--	0	0	0	0
Regionalized-4	4	6	0	0	0	--	--	0	--	--	0	0	0	0
Centralized	1	1	0	0	0	--	--	0	--	--	0	0	0	0

LLMW Alternatives	Number of Sites		Operations & Maintenance									
	T	D	Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action	3	-	--	0	0	0	--	0	0	0	--	--
Decentralized	37	16	--	0	0	0	--	0	0	0	--	--
Regionalized-1	11	12	--	0	0	0	--	0	0	0	--	--
Regionalized-2	7	6	--	0	0	0	--	0	0	0	--	--
Regionalized-3	7	1	--	0	0	0	--	0	0	0	--	--
Regionalized-4	4	6	--	0	0	0	--	0	0	0	--	--
Centralized	1	1	--	0	0	0	--	0	0	0	--	--

Notes:
T = Treatment
D = Disposal
-- = Emissions of this hazardous or toxic air pollutant are assumed to be negligible.
Percentages <1% are shown as zeros.

Table II-8.1-10. LLNL—LLMW—Impacts on Water Resources Due to Increased Water Use

LLMW Alternatives	Number of Sites		Construction			Operations			
	T	D	Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action	3	-	70507	81.0	- -	2905	3.3	- -	- -
Decentralized	37	16	17574	20.2	- -	6791	7.8	- -	- -
Regionalized-1	11	12	19103	22.0	- -	7769	8.9	- -	- -
Regionalized-2	7	6	1277	1.5	- -	652	0.7	- -	- -
Regionalized-3	7	1	1277	1.5	- -	652	0.7	- -	- -
Regionalized-4	4	6	1277	1.5	- -	652	0.7	- -	- -
Centralized	1	1	1277	1.5	- -	652	0.7	- -	- -

Notes:
T = Treatment
D = Disposal
Water supplied by deep groundwater. Current water use = 87,000 gallons/day.
Wastewater discharged to onsite evaporation ponds and dry stream beds.
- - = Stream Flow and Waste Water Stream Flow is not considered for this site.

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Table II-8.1-11. LLNL—LLMW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal (Contact-Handled)

LLMW Alternatives	Number of Sites T	Number of Sites D	Ac 225	Ac 227	Am 241	Am 242	Am 243	C 14	Cs 135	Cs 137	Cm 242	Cm 244	Cm 245	I 129	Pb 210	Np 237	Ni 59	Ni 63	Pd 107	Pu 238	Pu 239	Pu 240	Pu 241
No Action	3	-	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-2	7	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	4	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

LLMW Alternatives	Number of Sites T	Number of Sites D	Po 210	K 40	Pa 231	Ra 223	Ra 226	Sm 151	Se 79	Sr 90	Tc 99	Th 227	Th 228	Th 229	Th 230	Th 232	Sn 126	U 233	U 234	U 235	U 236	U 238	Y 90	Zr 93
No Action	3	-	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-2	7	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	4	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
- - = No disposal at this site for this alternative.

Table II-8.1-12. LLNL—LLMW—Percent of Drinking Water Standards for Hazardous Constituents in Groundwater from Disposal (Contact-Handled)

LLMW Alternatives	T	D	Acetone	Arsenic	Barium	Benzene	Cadmium	Carbon Tetrachloride	Chromium	Cyanide
No Action	3	-	--	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	8	0	0	0	0
Regionalized-1	11	12	0	0	0	8	0	0	0	0
Regionalized-2	7	6	--	--	--	--	--	--	--	--
Regionalized-3	7	1	--	--	--	--	--	--	--	--
Regionalized-4	4	6	--	--	--	--	--	--	--	--
Centralized	1	1	--	--	--	--	--	--	--	--

LLMW Alternatives	T	D	1,2-dichloro-ethane	Lead	Mercury	Methylene Chloride	Selenium	Silver	1,2,2-trichloro-1,1-trifluoroethane
No Action	3	-	--	--	--	--	--	--	--
Decentralized	37	16	6	0	0	7	0	0	0
Regionalized-1	11	12	6	0	0	7	0	0	0
Regionalized-2	7	6	--	--	--	--	--	--	--
Regionalized-3	7	1	--	--	--	--	--	--	--
Regionalized-4	4	6	--	--	--	--	--	--	--
Centralized	1	1	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
"--" = No disposal at this site for this alternative.

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Table II-8.1-13. LLNL—LLMW—Socioeconomics Impacts for Treatment and Disposal

LLMW Alternatives	Number of Sites		Effect of Implementation of Alternatives					
				Jobs		Income		
	T	D	Cost (Millions) (1)	Annual Jobs	% Annual Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action	3	-	237	223	0.02	2.5	0.01	0.01
Decentralized	37	16	296	358	0.03	3.8	0.01	0.01
Regionalized-1	11	12	749	880	0.08	9.7	0.02	0.02
Regionalized-2	7	6	68	80	0.01	0.9	0.00	0.00
Regionalized-3	7	1	68	80	0.01	0.9	0.00	0.00
Regionalized-4	4	6	68	80	0.01	0.9	0.00	0.00
Centralized	1	1	68	80	0.01	0.9	0.00	0.00

Notes:
T = Treatment
D = Disposal
(1) In current 1990 dollars.
(2) Compared to 1990 baseline

Table II-8.1-14. LLNL—LLMW—Infrastructure Impacts for Treatment and Disposal

LLMW Alternatives	Number of Sites		Effect of Implementation of Alternatives									
			Land Use		Water		Waste Water		Power		Employment (FTE)	
	T	D	Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	% Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Peak Construction Employment	% of Current Employment (1)
No Action	3	-	21.7	0.28	70507	2.80	2905	0.17	10.1	10.10	175	2
Decentralized	37	16	12.6	0.16	17574	0.70	6761	0.40	1.19	1.19	247	3
Regionalized-1	11	12	13.9	0.18	19103	0.76	7769	0.46	1.32	1.32	557	6
Regionalized-2	7	6	1.1	0.01	1277	0.05	652	0.04	0.71	0.71	38	0.4
Regionalized-3	7	1	1.1	0.01	1277	0.05	652	0.04	0.71	0.71	38	0.4
Regionalized-4	4	6	1.1	0.01	1277	0.05	652	0.04	0.71	0.71	38	0.4
Centralized	1	1	1.1	0.01	1277	0.05	652	0.04	0.71	0.71	38	0.4

Notes:
T = Treatment
D = Disposal
GPD = Gallons per Day
MW = Megawatts
(1) Based on 1991 Site Employment

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Table II-8.1-15. LLNL—LLMW—Cost

LLMW Alternatives	Number of Sites		Total Cost (Millions) (1)	Cost by Life-Cycle Component (1)				Cost by Functional Area (1)		
	T	D		Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Treatment (Millions)	Storage (Millions)	Disposal (Millions)
No Action	3	-	269	25	87	128	28	90	179	0
Decentralized	37	16	334	40	125	151	19	334	0	0
Regionalized-1	11	12	846	99	262	443	43	700	0	146
Regionalized-2	7	6	77	4	21	38	13	77	0	0
Regionalized-3	7	1	77	4	21	38	13	77	0	0
Regionalized-4	4	6	77	4	21	38	13	77	0	0
Centralized	1	1	77	4	21	38	13	77	0	0

Notes:
T = Treatment
D = Disposal
The Life-Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum of these may not reflect the true total cost.
(1) In current 1994 dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

8.2 LLNL LLW

Thirteen tables immediately following portray the impacts of LLW at LLNL. These tables are presented as follows:

Impact Category

No.	Description	Table No.	Page No.
1.	LLNL—LLW—Treatment and Disposal: Estimated Number of Fatalities	II-8.2-1	8-18
2.	LLNL—LLW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects	II-8.2-2	8-19
3.	LLNL—LLW—Disposal: Estimated Number of Cancer Incidences and Genetic Effects	II-8.2-3	8-20
4.	LLNL—LLW—Treatment and Disposal: MEI Probability of Cancer Fatality	II-8.2-4	8-21
5.	LLNL—LLW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects	II-8.2-5	8-22
7.	LLNL—LLW—Emissions in Tons per Year of Criteria Air Pollutants	II-8.2-6	8-23
8.	LLNL—LLW—Percent of Standard/Guideline for Criteria Air Pollutants	II-8.2-7	8-24
9.	LLNL—LLW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-8.2-8	8-25
10.	LLNL—LLW—Impacts on Water Resources Due to Increased Water Use	II-8.2-9	8-26
11.	LLNL—LLW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal	II-8.2-10	8-27
12.	LLNL—LLW—Socioeconomic Impacts for Treatment and Disposal	II-8.2-11	8-28
13.	LLNL—LLW—Infrastructure Impacts for Treatment and Disposal	II-8.2-12	8-29
14.	LLNL—LLW—Cost	II-8.2-13	8-30

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Table II-8.2-1. LLNL—LLW—Treatment and Disposal: Estimated Number of Fatalities

LLW Alternatives	Number of Sites		Treatment				Disposal	
			WM Worker		Offsite Population	Noninvolved Workers	WM Worker	
	T	D	Radiation Exposure	Physical Hazards	Radiation Exposure	Radiation Exposure	Radiation Exposure	Physical Hazards
No Action	10**	6	1.2E-03	6.9E-02	3.5E-07	1.6E-08	- -	- -
Decentralized		16	2.5E-03	4.7E-02	1.0E-02	1.4E-04	1.6E-01	7.0E-02
Regionalized-1		12	2.5E-03	5.7E-02	1.0E-02	1.4E-04	1.6E-01	7.0E-02
Regionalized-2	11	12	5.0E-02	9.9E-02	3.9E-01	5.3E-03	1.3E-01	5.4E-02
Regionalized-3		6	2.5E-03	5.7E-02	1.0E-02	1.4E-04	- -	- -
Regionalized-4	7	6	2.5E-03	5.7E-02	4.4E-03	6.0E-05	- -	- -
Regionalized-5	4	6	2.5E-03	5.7E-02	4.4E-03	6.0E-05	- -	- -
Regionalized-6		2	2.5E-03	5.7E-02	1.0E-02	1.4E-04	- -	- -
Regionalized-7		2	2.5E-03	5.7E-02	1.0E-02	1.4E-04	- -	- -
Centralized-1		1	2.5E-03	5.7E-02	1.0E-02	1.4E-04	- -	- -
Centralized-2		1	2.5E-03	5.7E-02	1.0E-02	1.4E-04	- -	- -
Centralized-3	7	1	2.5E-03	5.7E-02	4.4E-03	6.0E-05	- -	- -
Centralized-4	7	1	2.5E-03	5.7E-02	4.4E-03	6.0E-05	- -	- -
Centralized-5	1	1	2.5E-03	5.7E-02	4.4E-03	6.0E-05	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered under the alternative
** Ten sites use existing facilities for Volume Reduction

Table II-8.2-2. LLNL—LLW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

LLW Alternatives	Number of Sites		Offsite Population			Noninvolved Worker			WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	10**	6	7.1E-04	1.2E-06	7.1E-08	3.2E-05	5.5E-08	3.2E-09	2.9E+00	4.1E-03	1.8E-04
Decentralized		16	2.0E+01	3.4E-02	2.0E-03	2.8E-01	4.7E-04	2.8E-05	6.3E+00	8.9E-03	3.8E-04
Regionalized-1		12	2.0E+01	3.4E-02	2.0E-03	2.8E-01	4.7E-04	2.8E-05	6.3E+00	8.9E-03	3.8E-04
Regionalized-2	11	12	7.7E+02	1.3E+00	7.7E-02	1.1E+01	1.8E-02	1.1E-03	1.2E+02	1.7E-01	7.5E-03
Regionalized-3		6	2.0E+01	3.4E-02	2.0E-03	2.8E-01	4.7E-04	2.8E-05	6.3E+00	8.9E-03	3.8E-04
Regionalized-4	7	6	8.7E+00	1.5E-02	8.7E-02	1.2E-01	2.1E-04	1.2E-05	6.3E+00	8.9E-03	3.8E-04
Regionalized-5	4	6	8.7E+00	1.5E-02	8.7E-02	1.2E-01	2.0E-04	1.2E-05	6.3E+00	8.9E-03	3.8E-04
Regionalized-6		2	2.0E+01	3.4E-02	2.0E-03	2.8E-01	4.7E-04	2.8E-05	6.3E+00	8.9E-03	3.8E-04
Regionalized-7		2	2.0E+01	3.4E-02	2.0E-03	2.8E-01	4.7E-04	2.8E-05	6.3E+00	8.9E-03	3.8E-04
Centralized-1		1	2.0E+01	3.4E-02	2.0E-03	2.8E-01	4.7E-04	2.8E-05	6.3E+00	8.9E-03	3.8E-04
Centralized-2		1	2.0E+01	3.4E-02	2.0E-03	2.8E-01	4.7E-04	2.8E-05	6.3E+00	8.9E-03	3.8E-04
Centralized-3	7	1	8.7E+00	1.5E-02	8.7E-04	1.2E-01	2.0E-04	1.2E-05	6.3E+00	8.9E-03	3.8E-04
Centralized-4	7	1	8.7E+00	1.5E-02	8.7E-04	1.2E-01	2.0E-04	1.2E-05	6.3E+00	8.9E-03	3.8E-04
Centralized-5	1	1	8.7E+00	1.5E-02	8.7E-04	1.2E-01	2.0E-04	1.2E-05	6.3E+00	8.9E-03	3.8E-04

Notes:
T = Treatment
D = Disposal
** Ten sites use existing facilities for Volume Reduction.

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Table II-8.2-3. LLNL—LLW—Disposal: Estimated Number of Cancer Incidences and Genetic Effects

LLW Alternatives	Number of Sites		WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	10**	6	- -	- -	- -
Decentralized		16	4.0E+02	5.6E-01	2.4E-02
Regionalized-1		12	4.0E+02	5.6E-01	2.4E-02
Regionalized-2	11	12	3.3E+02	4.7E-01	2.0E-02
Regionalized-3		6	- -	- -	- -
Regionalized-4	7	6	- -	- -	- -
Regionalized-5	4	6	- -	- -	- -
Regionalized-6		2	- -	- -	- -
Regionalized-7		2	- -	- -	- -
Centralized-1		1	- -	- -	- -
Centralized-2		1	- -	- -	- -
Centralized-3	7	1	- -	- -	- -
Centralized-4	7	1	- -	- -	- -
Centralized-5	1	1	- -	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered under the alternative.
** Ten sites use existing facilities for Volume Reduction.

Table II-8.2-4. LLNL—LLW—Treatment and Disposal: MEI Probability of Cancer Fatality

LLW Alternatives	Number of Sites		Treatment		Disposal
	T	D	Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability	Hypothetical Farm Family - Most Exposed Lifetime MEI Cancer Fatality Probability
No Action	10**	6	6.0E-12	5.5E-12	- -
Decentralized		16	1.6E-07	4.7E-08	1.1E-06
Regionalized-1		12	1.6E-07	4.7E-08	1.1E-06
Regionalized-2	11	12	6.3E-06	1.8E-06	1.1E-06
Regionalized-3		6	1.6E-07	4.7E-08	- -
Regionalized-4	7	6	7.1E-08	2.1E-08	- -
Regionalized-5	4	6	7.1E-08	2.1E-08	- -
Regionalized-6		2	1.6E-07	4.7E-08	- -
Regionalized-7		2	1.6E-07	4.7E-08	- -
Centralized-1		1	1.6E-07	4.7E-08	- -
Centralized-2		1	1.6E-07	4.7E-08	- -
Centralized-3	7	1	7.1E-08	2.1E-08	- -
Centralized-4	7	1	7.1E-08	2.1E-08	- -
Centralized-5	1	1	7.1E-08	2.1E-08	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered under the Alternative.
** Ten sites use existing facilities for Volume Reduction.

Table II-8.2-5. LLNL—LLW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects

LLW Alternatives	Number of Sites		Treatment						Disposal		
			Offsite MEI			Noninvolved Worker MEI			Most Exposed Lifetime MEI		
	T	D	Dose (rem)	Radiation Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Radiation Genetic Effects Probability
No Action	10**	6	1.2E-08	2.0E-11	1.2E-12	1.1E-08	1.9E-11	1.1E-12	- -	- -	- -
Decentralized		16	3.3E-04	5.5E-07	3.3E-08	9.4E-05	1.6E-07	9.4E-09	2.2E-03	3.7E-06	2.2E-07
Regionalized-1		12	3.3E-04	5.5E-07	3.3E-08	9.4E-05	1.6E-07	9.4E-09	2.2E-03	3.7E-06	2.2E-07
Regionalized-2	11	12	1.3E-02	2.1E-05	1.3E-06	3.6E-03	6.2E-06	3.6E-07	2.2E-03	3.7E-06	2.2E-07
Regionalized-3		6	3.3E-04	5.5E-07	3.3E-08	9.4E-05	1.6E-07	9.4E-09	- -	- -	- -
Regionalized-4	7	6	1.4E-04	2.4E-07	1.4E-08	4.1E-05	7.0E-08	4.1E-09	- -	- -	- -
Regionalized-5	4	6	1.4E-04	2.4E-07	1.4E-08	4.1E-05	7.0E-08	4.1E-09	- -	- -	- -
Regionalized-6		2	3.3E-04	5.5E-07	3.3E-08	9.4E-05	1.6E-07	9.4E-09	- -	- -	- -
Regionalized-7		2	3.3E-04	5.5E-07	3.3E-08	9.4E-05	1.6E-07	9.4E-09	- -	- -	- -
Centralized-1		1	3.3E-04	5.5E-07	3.3E-08	9.4E-05	1.6E-07	9.4E-09	- -	- -	- -
Centralized-2		1	3.3E-04	5.5E-07	3.3E-08	9.4E-05	1.6E-07	9.4E-09	- -	- -	- -
Centralized-3	7	1	1.4E-04	2.4E-07	1.4E-08	4.1E-05	7.0E-08	4.1E-09	- -	- -	- -
Centralized-4	7	1	1.4E-04	2.4E-07	1.4E-08	4.1E-05	7.0E-08	4.1E-09	- -	- -	- -
Centralized-5	1	1	1.4E-04	2.4E-07	1.4E-08	4.1E-05	7.0E-08	4.1E-09	- -	- -	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered under the alternative.
** Ten sites use existing facilities for Volume Reduction.

Table II-8.2-6. LLNL—LLW—Emissions in Tons per Year of Criteria Air Pollutants

LLW Alternatives	Number of Sites		Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action	10**	6	9 (2/7)	6 (5/1)	0	0	0	1 (0/1)	8 (0/8)	2 (0/2)	0	0	0	1 (0/1)
Decentralized		16	15 (3/12)	9 (7/2)	0	1 (1/0)	1 (1/0)	2 (1/1)	24 (0/24)	5 (0/5)	0	0	0	3 (0/3)
Regionalized-1		12	15 (3/12)	9 (7/2)	0	1 (1/0)	1 (1/0)	2 (1/1)	24 (0/24)	5 (0/5)	0	0	0	3 (0/3)
Regionalized-2	11	12	26 (7/19)	22 (18/4)	0	2 (1/0)	2 (2/0)	4 (2/2)	29 (0/29)	6 (0/6)	0	0	0	4 (0/3)
Regionalized-3		6	16 (1/15)	6 (3/3)	0	0	0	2 (0/2)	11 (0/11)	2 (0/2)	0	0	0	1 (0/1)
Regionalized-4	7	6	15 (1/14)	6 (3/3)	0	0	0	2 (0/2)	10 (0/10)	2 (0/2)	0	0	0	1 (0/1)
Regionalized-5	4	6	15 (1/14)	6 (3/3)	0	0	0	2 (0/2)	10 (0/10)	2 (0/2)	0	0	0	1 (0/1)
Regionalized-6		2	16 (1/15)	6 (3/3)	0	0	0	2 (0/2)	11 (0/11)	2 (0/2)	0	0	0	1 (0/1)
Regionalzied-7		2	16 (1/15)	6 (3/3)	0	0	0	2 (0/2)	11 (0/11)	2 (0/2)	0	0	0	1 (0/1)
Centralized-1		1	16 (1/15)	6 (3/3)	0	0	0	2 (0/2)	11 (0/11)	2 (0/2)	0	0	0	1 (0/1)
Centralized-2		1	16 (1/15)	6 (3/3)	0	0	0	2 (0/2)	11 (0/11)	2 (0/2)	0	0	0	1 (0/1)
Centralized-3	7	1	15 (1/14)	6 (3/3)	0	0	0	2 (0/2)	10 (0/10)	2 (0/2)	0	0	0	1 (0/1)
Centralized-4	7	1	15 (1/14)	6 (3/3)	0	0	0	2 (0/2)	10 (0/10)	2 (0/2)	0	0	0	1 (0/1)
Centralized-5	1	1	15 (1/14)	6 (3/3)	0	0	0	2 (0/2)	10 (0/10)	2 (0/2)	0	0	0	1 (0/1)

Notes:
T = Treatment
D = Disposal
Emissions <1 ton per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions/worker vehicles emission)
(2) Values = total emissions (stationary-source emissions/mobile-source emission)
** Ten sites use existing facilities for Volume Reduction.

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Table II-8.2-7. LLNL—LLW—Percent of Standard/Guideline for Criteria Air Pollutants

LLW Alternatives	Number of Sites		Construction					
			Percent of Tons/Year General Conformity Rule (1)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC
No Action	10**	6	9 (2/7)	6 (5/1)	--	--	--	3 (1/2)
Decentralized		16	15 (3/12)	9 (7/2)	--	--	--	4 (1/3)
Regionalized-1		12	15 (3/12)	9 (7/2)	--	--	--	4 (1/3)
Regionalized-2	11	12	26 (7/19)	22 (18/4)	--	--	--	8 (4/5)
Regionalized-3		6	16 (1/15)	6 (3/3)	--	--	--	4 (1/3)
Regionalized-4	7	6	16 (1/15)	6 (3/3)	--	--	--	4 (1/3)
Regionalized-5	4	6	16 (1/15)	6 (3/3)	--	--	--	4 (1/3)
Regionalized-6		2	16 (1/15)	6 (3/3)	--	--	--	4 (1/3)
Regionalzied-7		2	16 (1/15)	6 (3/3)	--	--	--	4 (1/3)
Centralized-1		1	16 (1/15)	6 (3/3)	--	--	--	4 (1/3)
Centralized-2		1	16 (1/15)	6 (3/3)	--	--	--	4 (1/3)
Centralized-3	7	1	16 (1/15)	6 (3/3)	--	--	--	4 (1/3)
Centralized-4	7	1	16 (1/15)	6 (3/3)	--	--	--	4 (1/3)

LLW Alternatives	Number of Sites		Operations & Maintenance											
			Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
	T	D	CO (6)	NO2 (5)	Pb (4)	PM10 (4)	SO2 (4)	VOC (5)	CO	NO2	Pb	PM10	SO2	VOC
No Action	10**	6	8 (0/8)	2 (0/2)	0	0	0	2 (0/2)	--	--	--	--	--	--
Decentralized		16	24 (0/24)	5 (0/5)	0	0	0	6 (0/6)	--	--	--	--	--	--
Regionalized-1		12	24 (0/24)	5 (0/5)	0	0	0	6 (0/6)	--	--	--	--	--	--
Regionalized-2	11	12	29 (0/29)	6 (0/6)	0	1	0	7 (0/7)	0	0	0	0	0	0
Regionalized-3		6	11 (0/11)	2 (0/2)	0	0	0	3 (0/3)	--	--	--	--	--	--
Regionalized-4	7	6	11 (0/11)	2 (0/2)	0	0	0	3 (0/3)	--	--	--	--	--	--
Regionalized-5	4	6	11 (0/11)	2 (0/2)	0	0	0	3 (0/3)	--	--	--	--	--	--
Regionalized-6		2	11 (0/11)	2 (0/2)	0	0	0	3 (0/3)	--	--	--	--	--	--
Regionalized-7		2	11 (0/11)	2 (0/2)	0	0	0	3 (0/3)	--	--	--	--	--	--
Centralized-1		1	11 (0/11)	2 (0/2)	0	0	0	3 (0/3)	--	--	--	--	--	--
Centralized-2		1	11 (0/11)	2 (0/2)	0	0	0	3 (0/3)	--	--	--	--	--	--
Centralized-3	7	1	11 (0/11)	2 (0/2)	0	0	0	3 (0/3)	--	--	--	--	--	--
Centralized-4	7	1	11 (0/11)	2 (0/2)	0	0	0	3 (0/3)	--	--	--	--	--	--
Centralized-5	1	1	11 (0/11)	2 (0/2)	0	0	0	3 (0/3)	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) GCR de minimus levels are applied, since PSD regulations are not applicable to construction activities. Values = % of total emissions (% of equipment emissions / % of worker vehicle emissions).
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for thet pollutant. Stationary-source emissions for all alternatives are assumed to be negligible.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.
(5) Nonattainment area for ozone. Pollutant is an ozone precursor, therefore GCR de minimus levels are applied. Values = % of total emissions (% of stationary-source emissions / % of mobile-source emissions).
(6) Nonattainment area for this pollutant, therefore GCR de minimus levels are applied. Values = % of total emissions (% of stationary-source emissions / % of mobile-source emissions).
** Ten sites use existing facilities for Volume Reduction.

Table II-8.2-8. LLNL—LLW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

LLW Alternatives	Number of Sites		Operations & Maintenance											
	T	D	Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action	10**	6	0	--	--	--	--	--	--	--	--	--	--	--
Decentralized		16	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-1		12	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-2	11	12	13	--	--	--	--	--	--	--	--	--	--	--
Regionalized-3		6	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	7	6	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-5	4	6	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-6		2	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-1		1	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-4	7	1	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	0	--	--	--	--	--	--	--	--	--	--	--

LLW Alternatives	Number of Sites		Operations & Maintenance									
	T	D	Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action	10**	6	--	--	--	--	--	--	--	--	--	--
Decentralized		16	--	--	--	--	--	--	--	--	--	--
Regionalized-1		12	--	--	--	--	--	--	--	--	--	--
Regionalized-2	11	12	--	--	--	--	--	--	--	--	--	--
Regionalized-3		6	--	--	--	--	--	--	--	--	--	--
Regionalized-4	7	6	--	--	--	--	--	--	--	--	--	--
Regionalized-5	4	6	--	--	--	--	--	--	--	--	--	--
Regionalized-6		2	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	--	--	--	--	--	--	--	--	--	--
Centralized-1		1	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--	--	--	--	--
Centralized-4	7	1	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--	--	--	--	--

Notes:
T= Treatment
D = Disposal
- - = Emissions of this hazardous or toxic air pollutant are assumed to be negligible.
Percentages <1% are shown as zeros.
** Ten sites use existing facilities for Volume Reduction.

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Table II-8.2-9. LLNL—LLW—Impacts on Water Resources Due to Increased Water Use

LLW Alternatives	Number of Sites		Construction			Operations			
	T	D	Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action	10**	6	1224	1.4	- -	683	0.8	- -	- -
Decentralized		16	7036	8.1	- -	2958	3.4	- -	- -
Regionalized-1		12	7036	8.1	- -	2958	3.4	- -	- -
Regionalized-2	11	12	19972	23.0	- -	4025	4.6	- -	- -
Regionalized-3		6	4156	4.8	- -	1592	1.8	- -	- -
Regionalized-4	7	6	4156	4.8	- -	1592	1.8	- -	- -
Regionalized-5	4	6	4156	4.8	- -	1592	1.8	- -	- -
Regionalized-6		2	4156	4.8	- -	1592	1.8	- -	- -
Regionalized-7		2	4156	4.8	- -	1592	1.8	- -	- -
Centralized-1		1	4156	4.8	- -	1592	1.8	- -	- -
Centralized-2		1	4156	4.8	- -	1592	1.8	- -	- -
Centralized-3	7	1	4156	4.8	- -	1592	1.8	- -	- -
Centralized-4	7	1	4156	4.8	- -	1592	1.8	- -	- -
Centralized-5	1	1	4156	4.8	- -	1592	1.8	- -	- -

Notes:
T = Treatment
D = Disposal
Water supplied by deep groundwater. Current water use = 87,000 gallons/day.
Wastewater discharged to onsite evaporation ponds and dry stream beds.
** Ten sites use existing facilities for Volume Reduction.
- - = Stream Flow is not considered for this alternative.
See text for description of impacts if water is supplied by the Hetch Hetchy Aqueduct.

Table II-8.2–10. LLNL—LLW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal

LLW Alternatives	Number of Sites T	Number of Sites D	Ac 225	Ac 227	Am 241	Am 242	Am 243	C 14	Cs 135	Cs 137	Cm 242	Cm 244	Cm 245	I 129	Pb 210	Np 237	Ni 59	Ni 63	Pd 107	Pu 238	Pu 239	Pu 240	Pu 241
No Action	10**	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized		16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1		12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-2	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-3		6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	7	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-5	4	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-6		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-1		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-4	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

LLW Alternatives	Number of Sites T	Number of Sites D	Po 210	K 40	Pa 231	Ra 223	Ra 226	Sm 151	Se 79	Sr 90	Tc 99	Th 227	Th 228	Th 229	Th 230	Th 232	Sn 126	U 233	U 234	U 235	U 236	U 238	Y 90	Zr 93
No Action	10**	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized		16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1		12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-2	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-3		6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	7	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-5	4	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-6		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-1		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-4	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
** Ten sites use existing facilities for Volume Reduction
- - = Disposal is not considered for this Alternative.

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Table II-8.2-11. LLNL—LLW—Socioeconomic Impacts for Treatment and Disposal

LLW Alternatives	Number of Sites		Effect of Implementation of Alternatives					
				Jobs		Income		
	T	D	Cost (Millions) (1)	Jobs	% Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action	10**	6	202	190	0.01	2.1	0.01	0.00
Decentralized		16	360	423	0.03	4.7	0.01	0.01
Regionalized-1		12	360	423	0.03	4.7	0.01	0.01
Regionalized-2	11	12	524	616	0.04	6.8	0.01	0.02
Regionalized-3		6	189	222	0.01	2.5	0.00	0.01
Regionalized-4	7	6	189	222	0.01	2.5	0.00	0.01
Regionalized-5		6	189	222	0.01	2.5	0.00	0.01
Regionalized-6		2	189	222	0.01	2.5	0.00	0.01
Regionalized-7		2	189	222	0.01	2.5	0.00	0.01
Centralized-1		1	189	222	0.01	2.5	0.00	0.01
Centralized-2		1	189	222	0.01	2.5	0.00	0.01
Centralized-3	7	1	189	222	0.01	2.5	0.00	0.01
Centralized-4	7	1	189	222	0.01	2.5	0.00	0.01
Centralized-5	1	1	189	222	0.01	2.5	0.00	0.01

Notes:
T = Treatment
D = Disposal
(1) In constant 1990 dollars.
(2) Compared to 1990 baseline.
** Ten sites use existing facilities for Volume Reduction.

Table II-8.2-12. LLNL—LLW—Infrastructure Impacts for Treatment and Disposal

LLW Alternatives	Number of Sites		Effect of Implementation of Alternatives									
			Land Use		Water		Waste Water		Power		Employment (FTE)	
	T	D	Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	% Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Peak Construction Employment	% of Current Employment (1)
No Action	10**	6	1.0	0.01	1224	0.05	683	0.04	0.12	0.12	53	1
Decentralized		16	5.3	0.07	7036	0.28	2958	0.18	0.75	0.79	1681	2
Regionalized-1		12	5.3	0.07	7036	0.28	2958	0.18	0.75	0.79	168	2
Regionalized-2	11	12	10.0	0.13	19972	0.80	4025	0.24	1.05	1.05	340	4
Regionalized-3		6	3.6	0.05	4156	0.16	1592	0.09	0.42	0.45	114	1
Regionalized-4	7	6	3.6	0.04	4156	0.15	1592	0.09	0.42	0.45	114	1
Regionalized-5	4	6	3.6	0.04	4156	0.15	1592	0.09	0.42	0.45	114	1
Regionalized-6		2	3.6	0.04	4156	0.16	1592	0.09	0.42	0.45	114	1
Regionalized-7		2	3.6	0.04	4156	0.16	1592	0.09	0.42	0.45	114	1
Centralized-1		1	3.6	0.04	4156	0.16	1592	0.09	0.42	0.45	114	1
Centralized-2		1	3.6	0.04	4156	0.16	1592	0.09	0.42	0.45	114	1
Centralized-3	7	1	3.6	0.04	4156	0.15	1592	0.09	0.42	0.45	114	1
Centralized-4	7	1	3.6	0.04	4156	0.15	1592	0.09	0.42	0.45	114	1
Centralized-5	1	1	3.6	0.04	4156	0.15	1592	0.09	0.42	0.45	114	1

Notes:
T = Treatment
D = Disposal
GPD = Gallons per Day
MW = Megawatts Electric
FTE = Full Time Equivalent
(1) Based on 1994 Site Employment.
** Ten sites use existing facilities for Volume Reduction.

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Table II-8.2-13. LLNL—LLW—Cost

LLW Alternatives	Number of Sites		Total Cost (Millions) (1)	Cost by Life-Cycle Component (1)				Cost by Functional Area (1)		
	T	D		Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Treatment (Millions)	Storage (Millions)	Disposal (Millions)
No Action	10**	6	229	8	27	181	13	229	0	0
Decentralized		16	408	36	68	224	80	183	0	225
Regionalized-1		12	408	36	68	224	80	183	0	225
Regionalized-2	11	12	593	56	162	332	42	282	0	311
Regionalized-3		6	214	17	58	117	22	214	0	0
Regionalized-4		2	214	17	58	117	22	214	0	0
Regionalized-5		2	214	17	58	117	22	214	0	0
Regionalized-6		2	214	17	58	117	22	214	0	0
Regionalized-7		2	214	17	58	117	22	214	0	0
Centralized-1		1	214	17	58	117	22	214	0	0
Centralized-2		1	214	17	58	117	22	214	0	0
Centralized-3		2	214	17	58	117	22	214	0	0
Centralized-4		2	214	17	58	117	22	214	0	0
Centralized-5		2	214	17	58	117	22	214	0	0

Notes:
** Ten sites use existing facilities for Volume Reduction
T = Treatment
D = Disposal
The Life Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum may not reflect the true total cost.
(1) In Current 1994 Dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

8.3 LLNL TRUW

Twelve tables immediately following portray the impacts of TRUW at LLNL. These tables are presented as follows:

Impact Category

No.	Description	Table No.	Page No.
1.	LLNL—TRUW—Treatment: Estimated Number of Fatalities	II-8.3-1	8-32
2.	LLNL—TRUW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects	II-8.3-2	8-33
4.	LLNL—TRUW—Treatment: MEI Probability of Cancer Fatality	II-8.3-3	8-34
5.	LLNL—TRUW—Treatment: MEI Probability of Cancer Incidences and Genetic Effects	II-8.3-4	8-35
6.	LLNL—TRUW—Treatment: Noncancer Health Risk From Chemical Exposure	II-8.3-5	8-36
7.	LLNL—TRUW—Emissions in Tons per Year of Criteria Air Pollutants	II-8.3-6	8-37
8.	LLNL—TRUW—Percent of Standard/Guideline for Criteria Air Pollutants	II-8.3-7	8-38
9.	LLNL—TRUW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-8.3-8	8-39
10.	LLNL—TRUW—Impacts on Water Resources Due to Increased Water Use	II-8.3-9	8-40
12.	LLNL—TRUW—Socioeconomic Impacts for Treatment	II-8.3-10	8-41
13.	LLNL—TRUW—Infrastructure Impacts for Treatment	II-8.3-11	8-42
14.	LLNL—TRUW—Cost	II-8.3-12	8-43

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Table II-8.3-1. LLNL—TRUW—Treatment: Estimated Number of Fatalities

TRUW Alternatives	Treatment						
	Number of Sites		Treat STD	WM Worker		Offsite Population Radiation Exposure	Noninvolved Workers Radiation Exposure
	CH Treat	RH Treat		Radiation Exposure	Physical Hazards		
No Action **	16	5	WIPP WAC	7.1E-06	3.0E-02	1.1E-06	5.3E-08
Decentralized ***	16	5	WIPP WAC	5.6E-04	1.1E-01	3.5E-06	1.7E-07
Regionalized-1	5	2	Reduce Gas	5.7E-04	5.6E-02	3.6E-06	1.8E-07
Regionalized-2	5	2	LDR	5.7E-04	5.6E-02	3.6E-06	1.8E-07
Regionalized-3	3	2	LDR	5.7E-04	5.6E-02	3.6E-06	1.8E-07
Centralized	WIPP	2	LDR	5.7E-04	5.6E-02	3.6E-06	1.8E-07

Notes:
** For No Action Alternative, storage is indefinite; no disposal at WIPP is assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at 16 sites, then transfered to interim storage at 10 sites, then to WIPP.

Table II-8.3-2. LLNL—TRUW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

TRUW Alternatives	Number of Sites		Treat STD	Offsite Population				Noninvolved Workers				WM Workers			
	CH Treat	RH Treat		Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects
No Action**	16	5	WIPP WAC	2.2E-03	3.7E-06	1.4E-08	2.2E-07	1.1E-04	1.8E-07	3.4E-09	1.1E-08	1.8E-02	2.5E-05	2.6E-07	1.1E-06
Decentralized***	16	5	WIPP WAC	6.9E-03	1.2E-05	1.3E-07	6.9E-07	3.4E-04	5.8E-07	3.0E-08	3.4E-08	1.4E+00	1.9E-03	8.8E-07	8.4E-05
Regionalized-1	5	2	Reduce Gas	7.3E-03	1.2E-05	2.2E-07	7.3E-07	3.6E-04	6.1E-07	5.2E-08	3.6E-08	1.4E+00	2.0E-03	1.9E-06	8.6E-05
Regionalized-2	5	2	LDR	7.3E-03	1.2E-05	2.2E-07	7.3E-07	3.6E-04	6.1E-07	5.2E-08	3.6E-08	1.4E+00	2.0E-03	1.9E-06	8.6E-05
Regionalized-3	3	2	LDR	7.3E-03	1.2E-05	2.2E-07	7.3E-07	3.6E-04	6.1E-07	5.2E-08	3.6E-08	1.4E+00	2.0E-03	1.9E-06	8.6E-05
Centralized	WIPP	2	LDR	7.3E-03	1.2E-05	2.2E-07	7.3E-07	3.6E-04	6.1E-07	5.2E-08	3.6E-08	1.4E+00	2.0E-03	1.9E-06	8.6E-05

Notes:
** For No Action Alternative, storage is indefinite; no disposal at WIPP is assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
T = Treatment
D = Disposal

Table II-8.3-3. LLNL—TRUW—Treatment: MEI Probability of Cancer Fatality

TRUW Alternatives	Number of Sites		Treat STD	Treatment	
	CH Treat	RH Treat		Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability
No Action**	16	5	WIPP WAC	1.8E-11	1.8E-11
Decentralized***	16	5	WIPP WAC	5.7E-11	5.7E-11
Regionalized-1	5	2	Reduce Gas	5.9E-11	6.0E-11
Regionalized-2	5	2	LDR	5.9E-11	6.0E-11
Regionalized-3	3	2	LDR	5.9E-11	6.0E-11
Centralized	WIPP	2	LDR	5.9E-11	6.0E-11

Notes:
MEI = Maximally Exposed Individual
** For No Action Alternative, storage is indefinite; no disposal of WIPP is assumed, for all other alternatives disposal at WIPP is assumed.
***In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then transferred to interim storage at 10 sites, then to WIPP.

Table II-8.3-4. LLNL—TRUW—Treatment: MEI Probability of Cancer Incidences and Genetic Effects

TRUW Alternatives	Number of Sites		Treat STD	Treatment							
				Offsite MEI				Noninvolved Worker MEI			
	CH Treat	RH Treat		Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability
No Action **	16	5	WIPP WAC	3.6E-08	6.0E-11	3.1E-13	3.6E-12	3.6E-08	6.1E-11	9.9E-13	3.6E-12
Decentralized ***	16	5	WIPP WAC	1.1E-07	1.9E-10	2.8E-12	1.1E-11	1.2E-07	2.0E-10	8.9E-12	1.2E-11
Regionalized-1	5	2	Reduce Gas	1.2E-07	2.0E-10	4.8E-12	1.2E-11	1.2E-07	2.0E-10	1.5E-11	1.2E-11
Regionalized-2	5	2	LDR	1.2E-07	2.0E-10	4.8E-12	1.2E-11	1.2E-07	2.0E-10	1.5E-11	1.2E-11
Regionalized-3	3	2	LDR	1.2E-07	2.0E-10	4.8E-12	1.2E-11	1.2E-07	2.0E-10	1.5E-11	1.2E-11
Centralized	WIPP	2	LDR	1.2E-07	2.0E-10	4.8E-12	1.2E-11	1.2E-07	2.0E-10	1.5E-11	1.2E-11

Notes:
** For No Action Alternative, storage is indefinite; no disposal at WIPP is assumed for all other alternatives, disposal of WIPP is assumed.
*** In Decentralized Alternative, TRUW is process at all 16 sites, then transferred to interim storage at 10 sites then to WIPP.
MEI = Maximally Exposed Individual

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Table II-8.3-5. LLNL—TRUW—Treatment: Noncancer Health Risk From Chemical Exposure

TRUW Alternatives	Number of Sites		Treat STD	Treatment		
	CH Treat	RH Treat		Offsite MEI Hazard Index	Noninvolved Worker MEI Hazard Index	WM Worker Exposure Index
No Action**	16	5	WIPP WAC	2.6E-11	8.2E-11	2.6E-06
Decentralized***	16	5	WIPP WAC	1.5E-10	4.8E-10	5.8E-06
Regionalized-1	5	2	Reduce Gas	2.2E-10	6.9E-10	2.1E-05
Regionalized-2	5	2	LDR	2.2E-10	6.9E-10	2.1E-05
Regionalized-3	3	2	LDR	2.2E-10	6.9E-10	2.1E-05
Centralized	WIPP	2	LDR	2.2E-10	6.9E-10	2.1E-05

Notes:
MEI = Maximally Exposed Individual
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
Hazard Index = Sum of hazard quotient values for all noncarcinogenic chemicals. The Hazard Quotient is the chemical-specific ratio of media exposure concentrations to concentrations exposure concentrations to concentrations believed to have no appreciable adverse effects.
Exposure Index Ratio of exposure concentration to chemical-specific occupational threshold limits.

Table II-8.3-6. LLNL—TRUW—Emissions in Tons per Year of Criteria Air Pollutants

TRUW Alternatives	Number of Sites		Treat STD	Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
	CH Treat	RH Treat		CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action**	16	5	WIPP WAC	- -	- -	- -	- -	- -	- -	3 (0/3)	1 (0/1)	0	0	0	0
Decentralized***	16	5	WIPP WAC	13 (2/11)	7 (5/2)	0	0	0	1 (0/1)	8 (0/8)	2 (0/2)	0	0	0	01 (0/1)
Regionalized-1	5	2	Reduce Gas	9 (0/9)	3 (1/2)	0	0	0	1 (0/1)	6 (0/6)	1 (0/1)	0	0	0	01 (0/1)
Regionalized-2	5	2	LDR	20 (2/18)	10 (6/4)	0	0	1 (1/0)	3 (1/2)	6 (0/6)	2 (0/2)	0	0	0	01 (0/1)
Regionalized-3	3	2	LDR	20 (2/18)	10 (6/4)	0	0	1 (1/0)	3 (1/2)	6 (0/6)	2 (0/2)	0	0	0	01 (0/1)
Centralized	WIPP	2	LDR	20 (2/18)	10 (6/4)	0	0	1 (1/0)	3 (1/2)	6 (0/6)	2 (0/2)	0	0	0	01 (0/1)

Notes:
Emissions <1 ton per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions / worker vehicles emission)
(3) Values = total emissions (stationary-source emissions / mobile-source emission)
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

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Table II-8.3-7. LLNL—TRUW—Percent of Standard/Guideline for Criteria Air Pollutants

TRUW Alternatives	Number of Sites		Treat STD	Construction					
				Percent of Tons/Year General Conformity Rule (1)					
	CH Treat	RH Treat		CO	NO2	Pb	PM10	SO2	VOC
No Action	16	5	WIPP WAC	- -	- -	- -	- -	- -	- -
Decentralized	16	5	WIPP WAC	13 (2/11)	7 (5/2)	0	0	0	4 (1/3)
Regionalized-1	5	2	Reduce Gas	9 (0/9)	3 (0/2)	0	0	0	2 (/0/2)
Regionalized-2	5	2	LDR	20 (2/18)	10 (6/4)	0	0	0	5 (1/4)
Regionalized-3	3	2	LDR	20 (2/18)	10 (6/4)	0	0	0	5 (1/4)
Centralized	WIPP	2	LDR	20 (2/18)	10 (6/4)	0	0	0	5 (1/4)

TRUW Alternatives	Number of Sites		Treat STD	Operations & Maintenance											
				Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
	CH Treat	RH Treat		CO (6)	NO2 (5)	Pb (4)	PM10 (4)	SO2 (4)	VOC (5)	CO	NO2	Pb	PM10	SO2	VOC
No Action	16	5	WIPP WAC	3 (0/3)	1 (0/1)	0	0	0	1 (0/1)	- -	- -	- -	- -	- -	- -
Decentralized	16	5	WIPP WAC	8 (0/8)	2 (0/2)	0	0	0	2 (0/2)	- -	- -	- -	- -	- -	- -
Regionalized-1	5	2	Reduce Gas	6 (0/6)	1 (0/1)	0	0	0	1 (0/1)	- -	- -	- -	- -	- -	- -
Regionalized-2	5	2	LDR	9 (0/9)	2 (0/2)	0	0	0	2 (0/2)	- -	- -	- -	- -	- -	- -
Regionalized-3	3	2	LDR	9 (0/9)	2 (0/2)	0	0	0	2 (0/2)	- -	- -	- -	- -	- -	- -
Centralized	WIPP	2	LDR	9 (0/9)	2 (0/2)	0	0	0	2 (0/2)	- -	- -	- -	- -	- -	- -

Notes:
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) LLNL is in an attainment area for all criteria pollutants, therefore the GCR does not apply.
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions for all alternatives assumed to be negligible.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.
(5) Nonattainment area for ozone. Pollutant is an ozone precursor, therefore GCR de minimus levels are applied. Values = % of total emissions (% of stationary-source emissions / % of mobile-source emissions).
(6) Nonattainment area for this pollutant, therefore GCR de minimus levels are applied. Values = % of total emissions (% of stationary-source emissions / % of mobile-source emissions).
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

Table II-8.3-8. LLNL—TRUW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

TRUW Alternatives	Number of Sites		Treat STD	Operations & Maintenance											
	CH Treat	RH Treat		Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action**	16	5	WIPP - WAC	0	--	--	--	0	0	--	--	--	--	--	--
Decentralized***	16	5	WIPP - WAC	0	--	--	--	0	0	--	--	--	--	--	--
Regionalized-1	5	2	Reduce Gas	0	--	--	--	0	0	--	--	--	--	--	--
Regionalized-2	5	2	LDR	0	--	--	--	0	0	--	--	--	--	--	--
Regionalized-3	3	2	LDR	0	--	--	--	0	0	--	--	--	--	--	--
Centralized	WIPP	2	LDR	0	--	--	--	0	0	--	--	--	--	--	--

TRUW Alternatives	Number of Sites		Treat STD	Operations & Maintenance									
	CH Treat	RH Treat		Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action**	16	5	WIPP - WAC	0	0	--	--	--	0	0	--	--	--
Decentralized***	16	5	WIPP - WAC	0	0	--	--	--	0	0	--	--	--
Regionalized-1	5	2	Reduce Gas	0	0	--	--	--	0	0	--	--	--
Regionalized-2	5	2	LDR	0	0	--	--	--	0	0	--	--	--
Regionalized-3	3	2	LDR	0	0	--	--	--	0	0	--	--	--
Centralized	WIPP	2	LDR	0	0	--	--	--	0	0	--	--	--

Notes:

** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.

*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

-- = Emissions of this hazardous or toxic air pollutant are assumed to be negligible.

Percentages <1% are shown as zeros. CH = contact handled. RH = remote handled.

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Table II-8.3-9. LLNL—TRUW—Impacts on Water Resources Due to Increased Water Use

TRUW Alternatives	Number of Sites		Treat STD	Construction			Operations			
	CH Treat	RH Treat		Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action**	16	5	WIPP WAC	- -	- -	- -	898	1.0	- -	- -
Decentralized***	16	5	WIPP WAC	2455	2.8	- -	1345	1.5	- -	- -
Regionalized-1	5	2	Reduce Gas	2455	2.8	- -	809	0.9	- -	- -
Regionalized-2	5	2	LDR	2455	2.8	- -	809	0.9	- -	- -
Regionalized-3	3	2	LDR	2455	2.8	- -	809	0.9	- -	- -
Centralized	WIPP	2	LDR	2455	2.8	- -	809	0.9	- -	- -

Notes:
Water supplied by deep groundwater. Current water use = 87,000 gallons/day.
Wastewater discharged to onsite evaporation ponds and dry stream beds.
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
- - = Sream Flow and Waste Water Stream Flow are not considered for this site.

Table II-8.3-10. LLNL—TRUW—Socioeconomic Impacts for Treatment

TRUW Alternatives	Number of Sites		Effect of Implementation of Alternatives						
					Jobs		Income		
	CH Treat	RH Treat	Treat STD	Cost (Millions) (1)	Annual Jobs	% Annual Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action**	16	5	WIPP WAC	77	72	0.09	0.8	0.03	0.00
Decentralized***	16	5	WIPP WAC	207	244	0.29	2.7	0.11	0.01
Regionalized-1	5	2	Reduce Gas	167	196	0.23	2.2	0.09	0.00
Regionalized-2	5	2	LDR	257	303	0.36	3.3	0.13	0.01
Regionalized-3	3	2	LDR	257	303	0.36	3.3	0.13	0.01
Centralized	WIPP	2	LDR	257	303	0.36	3.3	0.13	0.01

Notes:
(1) In current 1990 dollars.
(2) Compared to 1990 baseline.
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

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Table II-8.3-11. LLNL—TRUW—Infrastructure Impacts for Treatment

TRUW Alternatives	Number of Sites		Treat STD	Effect of Implementation of Alternatives									
				Land Use		Water		Waste Water		Power		Employment (FTE)	
	CH Treat	RH Treat		Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Peak Construction Employment	% of Current Employment (1)
No Action**	16	5	WIPP WAC	0	0.00	898	0.04	898	0.05	0.1	0.10	0	0.00
Decentralized***	16	5	WIPP WAC	1.6	0.02	2455	0.10	1345	0.08	0.21	0.21	123	1.40
Regionalized-1	5	2	Reduce Gas	1.6	0.02	2455	0.10	809	0.05	0.21	0.21	106	1.20
Regionalized-2	5	2	LDR	1.6	0.02	2455	0.10	809	0.05	0.21	0.21	199	2.30
Regionalized-3	3	2	LDR	1.6	0.02	2455	0.10	809	0.05	0.21	0.21	199	2.30
Centralized	WIPP	2	LDR	1.6	0.02	2455	0.10	809	0.05	0.21	0.21	199	2.30

Notes:
GPD = Gallons per Day
MW = Megawatts Electric
FTE = Full Time Equivalent
(1) Based on 1994 Site Employment.
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

Table II-8.3-12. LLNL—TRUW—Cost

TRUW Alternatives	Number of Sites		Treat STD (2)	Total Cost (Millions) (1)	Life-Cycle Component				Functional Area		
	CH Treat	RH Treat			Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Retrieval Characterization (Millions)	Treatment (Millions)	Storage (Millions)
No Action**	11	5	WIPP - WAC	87	0	0	73	14	0	74	12
Decentralized***	16	5	WIPP - WAC	234	17	63	132	21	0	221	14
Regionalized-1	5	2	Reduce Gas	188	15	54	109	10	0	188	0
Regionalized-2	5	2	LDR	291	27	107	145	13	0	291	0
Regionalized-3	3	2	LDR	291	27	107	145	13	0	291	0
Centralized	WIPP	2	LDR	291	27	107	145	13	0	291	0

Notes:
** For No Action Alternative, storage is indefinite; no disposal at WIPP to be assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
The Life Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum may not reflect the true total cost.
(1) In Current 1994 Dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.
(2) Treatment standard (STD) applied: treat to WIPP Waste Acceptance Criteria (WIPP WAC), treat for reduced gas generation (Reduce Gas), treat to Land Disposal Restrictions (LDR).

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9.0 NTS

NTS currently is custodian of significant volumes of LLMW, LLW, and TRUW. Each of the waste types is treated independently in the following sections.

9.1 NTS LLMW

Fifteen tables immediately following portray the impacts of LLMW at NTS. These tables are presented as follows:

Impact Category

No.	Description	Table No.	Page No.
1.	NTS—LLMW—Treatment and Disposal: Estimated Number of Fatalities	II-9.1-1	9-2
2.	NTS—LLMW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects	II-9.1-2	9-3
3.	NTS—LLMW—Disposal: Estimated Number of Cancer Incidences	II-9.1-3	9-4
4.	NTS—LLMW—Treatment and Disposal: MEI Probability of Cancer Fatality	II-9.1-4	9-5
5.	NTS—LLMW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects	II-9.1-5	9-6
6.	NTS—LLMW—Treatment and Disposal: Noncancer Health Risk from Chemical Exposure	II-9.1-6	9-7
7.	NTS—LLMW—Emissions in Tons per Year of Criteria Air Pollutants	II-9.1-7	9-8
8.	NTS—LLMW—Percent of Standard/Guideline for Criteria Air Pollutants	II-9.1-8	9-9
9.	NTS—LLMW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-9.1-9	9-10
10.	NTS—LLMW—Impacts on Water Resources Due to Increased Water Use	II-9.1-10	9-11
11.	NTS—LLMW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal (Contact-Handled)	II-9.1-11	9-12
12.	NTS—LLMW—Percent of Drinking Water Standards for Hazardous Constituents in Groundwater from Disposal (Contact-Handled)	II-9.1-12	9-13
13.	NTS—LLMW—Socioeconomics Impacts for Treatment and Disposal	II-9.1-13	9-14
14.	NTS—LLMW—Infrastructure Impacts for Treatment and Disposal	II-9.1-14	9-15
15.	NTS—LLMW—Cost	II-9.1-15	9-16

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Table II-9.1-1. NTS—LLMW—Treatment and Disposal: Estimated Number of Fatalities

LLMW Alternatives	Number of Sites		Treatment				Disposal	
			WM Worker		Offsite Population	Noninvolved Workers	WM Worker	
	T	D	Radiation Exposure	Physical Hazards	Radiation Exposure	Radiation Exposure	Radiation Exposure	Physical Hazards
No Action	3	-	5.2E-07	4.4E-05	3.2E-11	8.4E-11	- -	- -
Decentralized	37	16	2.6E-07	2.3E-05	7.0E-15	1.9E-14	5.3E-04	1.2E-02
Regionalized-1	11	12	4.6E-06	1.2E-04	7.0E-15	1.9E-14	5.3E-04	1.3E-02
Regionalized-2	7	6	2.6E-07	2.3E-05	7.0E-15	1.9E-14	7.2E-06	3.8E-05
Regionalized-3	7	1	2.6E-07	2.3E-05	7.0E-15	1.9E-14	3.7E-01	1.9E-01
Regionalized-4	4	6	2.6E-07	2.3E-05	7.0E-15	1.9E-14	7.2E-06	3.2E-04
Centralized	1	1	2.6E-07	2.3E-05	7.0E-15	1.9E-14	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Treatment and/or disposal is not considered for this Alternative.

Table II-9.1-2. NTS—LLMW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

LLMW Alternatives	Number of Sites		Offsite Population				Noninvolved Workers				WM Worker			
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects
No Action	3	-	6.5E-08	1.1E-10	2.9E-13	6.5E-12	1.7E-07	2.9E-10	4.0E-12	1.7E-11	1.3E-03	1.8E-06	1.5E-13	7.8E-08
Decentralized	37	16	1.5E-11	2.5E-14	1.8E-09	0.0E+00	3.8E-11	6.5E-14	2.5E-08	0.0E+00	6.5E-04	9.1E-07	7.5E-14	3.9E-08
Regionalized -1	11	12	1.5E-11	2.5E-14	1.8E-09	0.0E+00	3.8E-11	6.4E-14	2.5E-08	0.0E+00	1.2E-02	1.6E-05	7.5E-14	6.9E-07
Regionalized-2	7	6	1.5E-11	2.5E-14	0.0E+00	0.0E+00	3.8E-11	6.5E-14	9.2E-14	0.0E+00	6.5E-04	9.1E-07	7.5E-14	3.9E-08
Regionalized-3	7	1	1.5E-11	2.5E-14	7.1E-08	0.0E+00	3.8E-11	6.5E-14	9.5E-07	0.0E+00	6.5E-04	9.1E-07	7.5E-14	3.9E-08
Regionalized-4	4	6	1.5E-11	2.5E-14	0.0E+00	0.0E+00	3.8E-11	6.5E-14	9.2E-14	0.0E+00	6.5E-04	9.1E-07	7.5E-14	3.9E-08
Centralized	1	1	1.5E-11	2.5E-14	0.0E+00	0.0E+00	3.8E-11	6.5E-14	9.2E-14	0.0E+00	6.5E-04	9.1E-07	7.5E-14	3.9E-08

Notes:
T = Treatment
D = Disposal

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Table II-9.1-3. NTS—LLMW—Disposal: Estimated Number of Cancer Incidences

LLMW Alternatives	Number of Sites		WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	3	-	- -	- -	- -
Decentralized	37	16	1.3E+00	1.9E-03	7.9E-05
Regionalized-1	11	12	1.3E+00	1.9E-03	7.9E-05
Regionalized-2	7	6	1.8E-02	2.5E-05	1.1E-06
Regionalized-3	7	1	9.2E+02	1.3E+00	5.5E-02
Regionalized-4	4	6	1.8E-02	2.5E-05	1.1E-06
Centralized	1	1	- -	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this Alternative.

Table II-9.1-4. NTS—LLMW—Treatment and Disposal: MEI Probability of Cancer Fatality

LLMW Alternatives	Number of Sites		Treatment		Disposal
	T	D	Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability	Hypothetical Farm Family Most Exposed Lifetime MEI Cancer Fatality Probability
No Action	3	-	8.0E-15	3.9E-13	- -
Decentralized	37	16	0.0E+00	0.0E+00	0.0E+00
Regionalized-1	11	12	0.0E+00	0.0E+00	0.0E+00
Regionalized-2	7	6	0.0E+00	0.0E+00	0.0E+00
Regionalized-3	7	1	0.0E+00	0.0E+00	0.0E+00
Regionalized-4	4	6	0.0E+00	0.0E+00	0.0E+00
Centralized	1	1	0.0E+00	0.0E+00	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Treatment and/or disposal is not considered under the Alternative

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Table II-9.1-5. NTS—LLMW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects

LLMW Alternatives	Number of Sites		Treatment								Disposal			
			Offsite Population MEI				Noninvolved Worker MEI				Most Exposed Farm Family Lifetime MEI			
	T	D	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability
No Action	3	-	1.7E-11	2.8E-14	0.0E+00	0.0E+00	7.8E-10	1.3E-12	1.7E-14	7.8E-14	- -	- -	- -	- -
Decentralized	37	16	0.0E+00	0.0E+00	4.8E-13	0.0E+00	1.8E-13	0.0E+00	1.0E-10	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Regionalized-1	11	12	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.8E-13	0.0E+00	1.0E-10	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Regionalized-2	7	6	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.8E-13	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Regionalized-3	7	1	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.8E-13	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Regionalized-4	4	6	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.8E-13	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Centralized	1	1	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.8E-13	0.0E+00	0.0E+00	0.0E+00	- -	- -	- -	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Treatment and/or disposal is not considered for this alternative.

Table II-9.1-6. NTS—LLMW—Treatment and Disposal: Noncancer Health Risk from Chemical Exposure

LLMW Alternatives	Number of Sites		Treatment			Disposal
	T	D	Offsite MEI Hazard Index	Noninvolved Worker MEI Hazard Index	WM Worker Exposure Index	Hypothetical Farm Family Most Exposed Lifetime Hazard Index
No Action	3	-	5.8E-14	1.3E-11	8.1E-10	- -
Decentralized	37	16	3.0E-10	6.4E-08	8.1E-10	2.4E-02
Regionalized-1	11	12	3.0E-10	6.4E-08	8.1E-10	2.4E-02
Regionalized-2	7	6	0.0E+00	0.0E+00	8.1E-10	6.4E-08
Regionalized-3	7	1	1.1E-08	2.5E-06	8.1E-10	3.1E-01
Regionalized-4	4	6	0.0E+00	0.0E+00	8.1E-10	6.4E-08
Centralized	1	1	0.0E+00	0.0E+00	8.1E-10	- -

Notes:
T = Treatment
D = Disposal
- - = Treatment and/or Disposal is not considered for this alternative.
MEI = Maximally Exposed Individual
Hazard Index = Sum of hazard quotient values for all noncarcinogenic chemicals. The hazard quotient is the chemical-specific ratio of media exposure concentrations to concentrations believed to have no appreciable adverse effects.
Exposure Index = Ratio of Exposure concentration to chemical-specific occupational threshold limits.

Table II-9.1-7. NTS—LLMW—Emissions in Tons per Year of Criteria Air Pollutants

LLMW Alternatives	T	D	Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
			CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	0	0	0	0	0	0	0	0	0	0	0	0
Decentralized	37	16	20 (12/8)	34 (32/2)	0	3 (3/0)	3 (3/0)	4 (3/1)	3 (0/3)	2 (1/1)	0	0	0	0
Regionalized-1	11	12	23 (12/11)	34 (32/2)	0	3 (3/0)	3 (3/0)	4 (3/1)	3 (0/3)	2 (1/1)	0	0	0	0
Regionalized-2	7	6	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-3	7	1	99 (7/92)	36 (18/18)	0	1 (1/0)	2 (2/0)	13 (2/11)	90 (0/90)	19 (0/19)	0	0	0	11 (0/11)
Regionalized-4	4	6	0	0	0	0	0	0	0	0	0	0	0	0
Centralized	1	1	0	0	0	0	0	0	0	0	0	0	0	0

Notes:
T = Treatment
D = Disposal
Emissions <1 tons per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions / worker vehicles emission).
(2) Values = total emissions (stationary-source emissions / mobile-source emission).

Table II-9.1-8. NTS—LLMW—Percent of Standard/Guideline for Criteria Air Pollutants

LLMW Alternatives	Number of Sites		Construction					
			Percent of Tons/Year General Conformity Rule (1)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	0	--	--	0	--	--
Decentralized	37	16	20 (12/8)	--	--	3 (3/0)	--	--
Regionalized-1	11	12	23 (12/11	--	--	3 (3/0)	--	--
Regionalized-2	7	6	0	--	--	0	--	--
Regionalized-3	7	1	99 (7/92)	--	--	1 (1/0)	--	--
Regionalized-4	4	6	0	--	--	0	--	--
Centralized	1	1	0	--	--	0	--	--

LLMW Alternatives	Number of Sites		Operations & Maintenance											
			Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
	T	D	CO (5)	NO2 (4)	Pb (4)	PM10 (5)	SO2 (4)	VOC (4)	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	0	0	0	0	0	0	--	--	--	--	--	--
Decentralized	37	16	3 (0/3)	2	0	0	0	0	0	0	0	0	0	0
Regionalized-1	11	12	3 (0/3)	2	0	0	0	0	--	--	--	--	--	--
Regionalized-2	7	6	0	0	0	0	0	0	--	--	--	--	--	--
Regionalized-3	7	1	90 (0/90)	1	0	0	0	0	--	--	--	--	--	--
Regionalized-4	4	6	0	0	0	0	0	0	--	--	--	--	--	--
Centralized	1	1	0	0	0	0	0	0	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide. VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) GCR de minimus levels are applied, since PSD regulations are not applicable to construction activities. Values = % of total emissions (% of equipment emissions / % of worker vehicles emission).
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions are assumed to be negligible for all but the Decentralized Alternative.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.
(5) Nonattainment area for this pollutant, therefore GCR de minimus levels are applied. Values = % of total emissions (% of stationary-source emissions / % of mobile-source emissions)

Table II-9.1-9. NTS—LLMW—Percent of Standards/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

LLMW Alternatives	Number of Sites		Operations & Maintenance											
	T	D	Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action	3	-	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Decentralized	37	16	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Regionalized-1	11	12	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Regionalized-2	7	6	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Regionalized-3	7	1	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Regionalized-4	4	6	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Centralized	1	1	0	0	0	- -	- -	0	- -	- -	0	0	0	0

LLMW Alternatives	Number of Sites		Operations & Maintenance									
	T	D	Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action	3	-	- -	0	0	0	- -	0	0	0	- -	- -
Decentralized	37	16	- -	0	0	0	- -	0	0	0	- -	- -
Regionalized-1	11	12	- -	0	0	0	- -	0	0	0	- -	- -
Regionalized-2	7	6	- -	0	0	0	- -	0	0	0	- -	- -
Regionalized-3	7	1	- -	0	0	0	- -	0	0	0	- -	- -
Regionalized-4	4	6	- -	0	0	0	- -	0	0	0	- -	- -
Centralized	1	1	- -	0	0	0	- -	0	0	0	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Emissions of this hazardous or toxic air pollutant are assumed to be negligible.
Percentages <1% are shown as zeros.

Table II-9.1-10. NTS—LLMW—Impacts on Water Resources Due to Increased Water Use

LLMW Alternatives	Number of Sites		Construction			Operations			
	T	D	Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action	3	-	0	0.0	- -	0	0.0	- -	- -
Decentralized	37	16	14856	1.1	- -	384	<0.1	- -	- -
Regionalized-1	11	12	14901	1.1	- -	422	<0.1	- -	- -
Regionalized-2	7	6	- -	- -	- -	- -	- -	- -	- -
Regionalized-3	7	1	16344	1.2	- -	7603	0.6	- -	- -
Regionalized-4	4	6	- -	- -	- -	- -	- -	- -	- -
Centralized	1	1	- -	- -	- -	- -	- -	- -	- -

Notes:
T = Treatment
D = Disposal
Water supplied by groundwater. Current water use = 1,367,000 gallons/day.
Wastewater discharged to onsite evaporation ponds.
- - = Treatment and/or Disposal is not considered for this alternative, but where treatment and/or disposal is considere waste water stream flow are not considered for ths site.
<0.1 indicates that the percentage is less than 0.1%.

Table II-9.1-11. NTS—LLMW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal (Contact-Handled)

LLMW Alternatives	Number of Sites T	Number of Sites D	Ac 225	Ac 227	Am 241	Am 242	Am 243	C 14	Cs 135	Cs 137	Cm 242	Cm 244	Cm 245	I 129	Pb 210	Np 237	Ni 59	Ni 63	Pd 107	Pu 238	Pu 239	Pu 240	Pu 241
No Action	3	-	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Decentralized	37	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-2	7	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-3	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-4	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centralized	1	1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

LLMW Alternatives	Number of Sites T	Number of Sites D	Po 210	K 40	Pa 231	Ra 223	Ra 226	Sm 151	Se 79	Sr 90	Tc 99	Th 227	Th 228	Th 229	Th 230	Th 232	Sn 126	U 233	U 234	U 235	U 236	U 238	Y 90	Zr 93
No Action	3	-	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Decentralized	37	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-2	7	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-3	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-4	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centralized	1	1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

Notes:
T = Treatment
D = Disposal
- - = No disposal at this site for this alternative.

Table II-9.1-12. NTS—LLMW—Percent of Drinking Water Standards for Hazardous Constituents in Groundwater from Disposal (Contact-Handled)

LLMW Alternatives	T	D	Acetone	Arsenic	Barium	Benzene	Cadmium	Carbon Tetrachloride	Chromium	Cyanide
No Action	3	-	--	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	40	0	0	0	0
Regionalized-1	11	12	0	0	0	40	0	0	0	0
Regionalized-2	7	6	0	0	0	0	0	0	0	0
Regionalized-3	7	1	0	0	0	2000	0	1	0	0
Regionalized-4	4	6	0	0	0	0	0	0	0	0
Centralized	1	1	--	--	--	--	--	--	--	--

LLMW Alternatives	T	D	1,2-dichloro-ethane	Lead	Mercury	Methylene Chloride	Selenium	Silver	1,2,2-trichloro-1,1-trifluoroethane
No Action	3	-	--	--	--	--	--	--	--
Decentralized	37	16	400	0	0	1000	0	0	0
Regionalized-1	11	12	400	0	0	1000	0	0	0
Regionalized-2	7	6	0	0	0	0	0	0	0
Regionalized-3	7	1	5000	0	0	10000	0	0	0
Regionalized-4	4	6	0	0	0	0	0	0	0
Centralized	1	1	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
"--" = No disposal at this site for this alternative.

Table II-9.1-13. NTS—LLMW—Socioeconomics Impacts for Treatment and Disposal

LLMW Alternatives	Number of Sites		Effect of Implementation of Alternatives					
				Jobs		Income		
	T	D	Cost (Millions) (1)	Annual Jobs	% Annual Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action	3	-	12	9	0.00	0.1	0.00	0.00
Decentralized	37	16	83	80	0.02	0.9	0.01	0.01
Regionalized-1	11	12	95	93	0.02	1.0	0.01	0.01
Regionalized-2	7	6	0	0	0.00	0.0	0.00	0.00
Regionalized-3	7	1	902	879	0.19	9.9	0.07	0.17
Regionalized-4	4	6	0	0	0.00	0.0	0.00	0.00
Centralized	1	1	0	0	0.00	0.0	0.00	0.00

Notes:
T = Treatment
D = Disposal
(1) In current 1990 dollars.
(2) Compared to 1990 baseline

Table II-9.1-14. NTS—LLMW—Infrastructure Impacts for Treatment and Disposal

LLMW Alternatives	Number of Sites		Effect of Implementation of Alternatives									
			Land Use		Water		Waste Water		Power		Employment (FTE)	
	T	D	Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	% Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Peak Construction Employment	% of Current Employment (1)
No Action	49	-	0	0	0	0	0	0	0	0	13	0.2
Decentralized	49	16	8.22	0.001	14856	0.53	384	0.11	0.83	1.85	63	1
Regionalized-1	11	12	8.34	0.001	14901	0.54	422	0.12	0.84	1.86	83	1
Regionalized-2	7	6	0	0	0	0	0	0	0	0	0	0
Regionalized-3	7	1	8.34	0.001	16344	0.59	7602.6	2.25	1.95	4.32	712	10
Regionalized-4	4	6	0	0	0	0	0	0	0	0	0	0
Centralized	1	1	0	0	0	0	0	0	0	0	0	0

Notes:
(1) T is defined as Treatment, D is defined as Disposal

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Table II-9.1-15. NTS—LLMW—Cost

LLMW Alternatives	Number of Sites		Total Cost (Millions) (1)	Cost by Life-Cycle Component (1)				Cost by Functional Area (1)		
	T	D		Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Treatment (Millions)	Storage (Millions)	Disposal (Millions)
No Action	3	-	13	2	6	4	2	6	7	0
Decentralized	37	16	94	13	27	50	4	0	0	94
Regionalized-1	11	12	108	22	27	55	4	0	0	108
Regionalized-2	7	6	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-3	7	1	1021	71	90	692	167	0	0	1021
Regionalized-4	4	6	- -	- -	- -	- -	- -	- -	- -	- -
Centralized	1	1	- -	- -	- -	- -	- -	- -	- -	- -

Notes:
T = Treatment
D = Disposal
The Life-Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum of these may not reflect the true total cost.
(1) In current 1994 dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

9.2 NTS LLW

Thirteen tables immediately following portray the impacts of LLW at NTS. These tables are presented as follows:

Impact Category

No.	Description	Table No.	Page No.
1.	NTS—LLW—Treatment and Disposal: Estimated Number of Fatalities	II-9.2-1	9-18
2.	NTS—LLW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects	II-9.2-2	9-19
3.	NTS—LLW—Disposal: Estimated Number of Cancer Incidences and Genetic Effects	II-9.2-3	9-20
4.	NTS—LLW—Treatment and Disposal: MEI Probability of Cancer Fatality	II-9.2-4	9-21
5.	NTS—LLW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects	II-9.2-5	9-22
7.	NTS—LLW—Emissions in Tons per Year of Criteria Air Pollutants	II-9.2-6	9-23
8.	NTS—LLW—Percent of Standard/Guideline for Criteria Air Pollutants	II-9.2-7	9-24
9.	NTS—LLW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-9.2-8	9-25
10.	NTS—LLW—Impacts on Water Resources Due to Increased Water Use	II-9.2-9	9-26
11.	NTS—LLW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal	II-9.2-10	9-27
12.	NTS—LLW—Socioeconomic Impacts for Treatment and Disposal	II-9.2-11	9-28
13.	NTS—LLW—Infrastructure Impacts for Treatment and Disposal	II-9.2-12	9-29
14.	NTS—LLW—Cost	II-9.2-13	9-30

Table II-9.2-1. NTS—LLW—Treatment and Disposal: Estimated Number of Fatalities

LLW Alternatives	Number of Sites		Treatment				Disposal	
			WM Worker		Offsite Population	Noninvolved Workers	WM Worker	
	T	D	Radiation Exposure	Physical Hazards	Radiation Exposure	Radiation Exposure	Radiation Exposure	Physical Hazards
No Action	10**	6	- -	- -	- -	- -	8.0E-02	4.1E-01
Decentralized		16	- -	- -	- -	- -	- -	- -
Regionalized-1		12	- -	- -	- -	- -	- -	- -
Regionalized-2	11	12	- -	- -	- -	- -	- -	- -
Regionalized-3		6	- -	- -	- -	- -	1.6E-01	6.7E-02
Regionalized-4	7	6	- -	- -	- -	- -	1.1E-01	4.8E-02
Regionalized-5	4	6	- -	- -	- -	- -	1.1E-01	4.8E-02
Regionalized-6		2	- -	- -	- -	- -	- -	- -
Regionalized-7		2	- -	- -	- -	- -	1.2E+00	5.6E-01
Centralized-1		1	- -	- -	- -	- -	- -	- -
Centralized-2		1	- -	- -	- -	- -	2.8E+00	1.3E+00
Centralized-3	7	1	- -	- -	- -	- -	- -	- -
Centralized-4	7	1	- -	- -	- -	- -	1.8E+00	8.5E-01
Centralized-5	1	1	- -	- -	- -	- -	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Treatment and/or disposal is not considered under the alternative
** Ten sites use existing facilities for Volume Reduction

Table II-9.2-2. NTS—LLW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

LLW Alternatives	Number of Sites		Offsite Population			Noninvolved Worker			WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	10**	6	--	--	--	--	--	--	--	--	--
Decentralized		16	--	--	--	--	--	--	--	--	--
Regionalized-1		12	--	--	--	--	--	--	--	--	--
Regionalized-2	11	12	--	--	--	--	--	--	--	--	--
Regionalized-3		6	--	--	--	--	--	--	--	--	--
Regionalized-4	7	6	--	--	--	--	--	--	--	--	--
Regionalized-5	4	6	--	--	--	--	--	--	--	--	--
Regionalized-6		2	--	--	--	--	--	--	--	--	--
Regionalized-7		2	--	--	--	--	--	--	--	--	--
Centralized-1		1	--	--	--	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--	--	--	--
Centralized-4	7	1	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
** Ten sites use existing facilities for Volume Reduction.
-- = NTS is only considered as a disposal site for LLW.

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Table II-9.2-3. NTS—LLW—Disposal: Estimated Number of Cancer Incidences and Genetic Effects

LLW Alternatives	Number of Sites		WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	10**	6	2.0E+02	2.8E-01	1.2E-02
Decentralized		16	- -	- -	- -
Regionalized-1		12	- -	- -	- -
Regionalized-2	11	12	- -	- -	- -
Regionalized-3		6	4.1E+02	5.7E-01	2.5E-02
Regionalized-4	7	6	2.8E+02	3.9E-01	1.7E-02
Regionalized-5	4	6	2.8E+02	3.9E-01	1.7E-02
Regionalized-6		2	- -	- -	- -
Regionalized-7		2	2.9E+03	4.1E+00	1.7E-01
Centralized-1		1	- -	- -	- -
Centralized-2		1	6.9E+03	9.7E+00	4.2E-01
Centralized-3	7	1	- -	- -	- -
Centralized-4	7	1	4.4E+03	6.2E+00	2.7E-01
Centralized-5	1	1	- -	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered under the alternative.
** Ten sites use existing facilities for Volume Reduction.

Table II-9.2–4. NTS—LLW—Treatment and Disposal: MEI Probability of Cancer Fatality

LLW Altenatives	Number of Sites		Treatment		Disposal
	T	D	Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability	Hypothetical Farm Family - Most Exposed Lifetime MEI Cancer Fatality Probability
No Action	10**	6	- -	- -	0.0E+00
Decentralized		16	- -	- -	- -
Regionalized-1		12	- -	- -	- -
Regionalized-2	11	12	- -	- -	- -
Regionalized-3		6	- -	- -	0.0E+00
Regionalized-4	7	6	- -	- -	0.0E+00
Regionalized-5	4	6	- -	- -	0.0E+00
Regionalized-6		2	- -	- -	- -
Regionalized-7		2	- -	- -	0.0E+00
Centralized-1		1	- -	- -	- -
Centralized-2		1	- -	- -	0.0E+00
Centralized-3	7	1	- -	- -	- -
Centralized-4	7	1	- -	- -	0.0E+00
Centralized-5	1	1	- -	- -	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Treatment and/or disposal is not considered under the Alternative.
** Ten sites use existing facilities for Volume Reduction.

Table II-9.2–5. NTS—LLW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects

LLW Alternatives	Number of Sites		Treatment						Disposal		
			Offsite MEI			Noninvolved Worker MEI			Most Exposed Lifetime MEI		
	T	D	Dose (rem)	Radiation Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Radiation Genetic Effects Probability
No Action	10**	6	--	--	--	--	--	--	0.0E+00	0.0E+00	0.0E+00
Decentralized		16	--	--	--	--	--	--	--	--	--
Regionalized-1		12	--	--	--	--	--	--	--	--	--
Regionalized-2	11	12	--	--	--	--	--	--	--	--	--
Regionalized-3		6	--	--	--	--	--	--	0.0E+00	0.0E+00	0.0E+00
Regionalized-4	7	6	--	--	--	--	--	--	0.0E+00	0.0E+00	0.0E+00
Regionalized-5	4	6	--	--	--	--	--	--	0.0E+00	0.0E+00	0.0E+00
Regionalized-6		2	--	--	--	--	--	--	--	--	--
Regionalized-7		2	--	--	--	--	--	--	0.0E+00	0.0E+00	0.0E+00
Centralized-1		1	--	--	--	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--	0.0E+00	0.0E+00	0.0E+00
Centralized-3	7	1	--	--	--	--	--	--	--	--	--
Centralized-4	7	1	--	--	--	--	--	--	0.0E+00	0.0E+00	0.0E+00
Centralized-5	1	1	--	--	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
-- = Treatment and Disposal is not considered under the alternative.
** Ten sites use existing facilities for Volume Reduction.

Table II-9.2–6. NTS—LLW—Emissions in Tons per Year of Criteria Air Pollutants

LLW Alternatives	Number of Sites		Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action	10**	6	0	0	0	0	0	0	67 (0/67)	16 (0/16)	0	0	0	8 (0/8)
Decentralized		16	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1		12	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-2	11	12	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-3		6	1 (1/0)	3 (3/0)	0	0	0	0	13 (0/13)	3 (0/3)	0	0	0	2 (0/2)
Regionalized-4	7	6	1 (1/0)	3 (3/0)	0	0	0	0	13 (0/13)	3 (0/3)	0	0	0	2 (0/2)
Regionalized-5	4	6	1 (1/0)	3 (3/0)	0	0	0	0	13 (0/13)	3 (0/3)	0	0	0	2 (0/2)
Regionalized-6		2	0	0	0	0	0	0	0	0	0	0	0	0
Regionalzied-7		2	10 (10/0)	27 (27/0)	0	2 (2/0)	3 (3/0)	3 (3/0)	103 (0/103)	25 (0/25)	0	0	0	13 (0/13)
Centralized-1		1	0	0	0	0	0	0	0	0	0	0	0	0
Centralized-2		1	38 (38/0)	100 (100/0)	0	8 (8/0)	9 (9/0)	10 (10/0)	217 (1/217)	62 (1/61)	0	1 (0/1)	0	27 (0/27)
Centralized-3	7	1	0	0	0	0	0	0	0	0	0	0	0	0
Centralized-4	7	1	22 (22/0)	56 (56/0)	0	4 (4/0)	5 (5/0)	5 (5/0)	101 (0/101)	21 (0/20)	0	0	0	12 (0/12)
Centralized-5	1	1	0	0	0	0	0	0	0	0	0	0	0	0

Notes:
T = Treatment
D = Disposal
Emissions <1 ton per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions/worker vehicles emission)
(2) Values = total emissions (stationary-source emissions/mobile-source emission)
** Ten sites use existing facilities for Volume Reduction.

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Table II-9.2-7. NTS—LLW—Percent of Standard/Guideline for Criteria Air Pollutants

LLW Alternatives	T	D	Construction: Percent of Tons/Year General Conformity Rule (1)					
			CO	NO2	Pb	PM10	SO2	VOC
No Action	10**	6	0	--	--	0	--	--
Decentralized		16	0	--	--	0	--	--
Regionalized-1		12	0	--	--	0	--	--
Regionalized-2	11	12	0	--	--	0	--	--
Regionalized-3		6	1 (1/0)	--	--	0	--	--
Regionalized-4	7	6	1 (1/0)	--	--	0	--	--
Regionalized-5	4	6	1 (1/0)	--	--	0	--	--
Regionalized-6		2	0	--	--	0	--	--
Regionalzied-7		2	10 (10/0)	--	--	2 (2/0)	--	--
Centralized-1		1	0	--	--	0	--	--
Centralized-2		1	38 (38/0)	--	--	8 (8/0)	--	--
Centralized-3	7	1	0	--	--	0	--	--
Centralized-4	7	1	22 (22/0)	--	--	4 (4/0)	--	--
Centralized-5	1	1	0	--	--	0	--	--

LLW Alternatives	T	D	Operations & Maintenance: Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
			CO (5)	NO2 (4)	Pb (4)	PM10 (5)	SO2 (4)	VOC (4)	CO	NO2	Pb	PM10	SO2	VOC
No Action	10**	6	67 (0/67)	0	0	0	0	0	--	--	--	--	--	--
Decentralized		16	0	0	0	0	0	0	--	--	--	--	--	--
Regionalized-1		12	0	0	0	0	0	0	--	--	--	--	--	--
Regionalized-2	11	12	0	0	0	0	0	0	--	--	--	--	--	--
Regionalized-3		6	13 (0/13)	0	0	0	0	0	--	--	--	--	--	--
Regionalized-4	7	6	13 (0/13)	0	0	0	0	0	--	--	--	--	--	--
Regionalized-5	4	6	13 (0/13)	0	0	0	0	0	--	--	--	--	--	--
Regionalized-6		2	0	0	0	0	0	0	--	--	--	--	--	--
Regionalzied-7		2	103 (0/103)	1 (1/0)	0	0	0	0	--	--	--	--	--	--
Centralized-1		1	0	0	0	0	0	0	--	--	--	--	--	--
Centralized-2		1	217 (0/217)	3 (3/0)	0	2 (0/1)	0	0	--	--	--	--	--	--
Centralized-3	7	1	0	0	0	0	0	0	--	--	--	--	--	--
Centralized-4	7	1	101 (0/101)	1 (1/0)	0	0	0	0	--	--	--	--	--	--
Centralized-5	1	1	0	0	0	0	0	0	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) GCR de minimus levels are applied, since PSD regulations are not applicable to construction activities. Values = % of total emissions (% of equipment emissions / % of worker vehicle emissions)
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions for all alternatives are assumed to be negligible.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.
(5) Nonattainment area for this pollutant, therefore GCR de minimus levels are applied. Values = % of total emissions (% of stationary-source emissions / '% of mobile-source emissions).
** Ten sites use existing facilities for Volume Reduction.

Table II-9.2-8. NTS—LLW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

LLW Alternatives	Number of Sites		Operations & Maintenance											
	T	D	Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action	10**	6	0	--	--	--	--	--	--	--	--	--	--	--
Decentralized		16	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-1		12	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-2	11	12	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-3		6	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	7	6	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-5	4	6	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-6		2	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-1		1	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-4	7	1	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	0	--	--	--	--	--	--	--	--	--	--	--

LLW Alternatives	Number of Sites		Operations & Maintenance									
	T	D	Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action	10**	6	--	--	--	--	--	--	--	--	--	--
Decentralized		16	--	--	--	--	--	--	--	--	--	--
Regionalized-1		12	--	--	--	--	--	--	--	--	--	--
Regionalized-2	11	12	--	--	--	--	--	--	--	--	--	--
Regionalized-3		6	--	--	--	--	--	--	--	--	--	--
Regionalized-4	7	6	--	--	--	--	--	--	--	--	--	--
Regionalized-5	4	6	--	--	--	--	--	--	--	--	--	--
Regionalized-6		2	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	--	--	--	--	--	--	--	--	--	--
Centralized-1		1	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--	--	--	--	--
Centralized-4	7	1	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--	--	--	--	--

Notes:
T= Treatment
D = Disposal
- - = Emissions of this hazardous or toxic air pollutant are assumed to be negligible.
Percentages <1% are shown as zeros.
** Ten sites use existing facilities for Volume Reduction.

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Table II-9.2-9. NTS—LLW—Impacts on Water Resources Due to Increased Water Use

LLW Alternatives	Number of Sites		Construction			Operations			
	T	D	Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action	10**	6	0	0.0	- -	1426	0.1	- -	- -
Decentralized		16	- -	- -	- -	- -	- -	- -	- -
Regionalized-1		12	- -	- -	- -	- -	- -	- -	- -
Regionalized-2	11	12	- -	- -	- -	- -	- -	- -	- -
Regionalized-3		6	2513	0.2	- -	1778	0.1	- -	- -
Regionalized-4	7	6	2513	0.2	- -	1778	0.1	- -	- -
Regionalized-5	4	6	2513	0.2	- -	1778	0.1	- -	- -
Regionalized-6		2	- -	- -	- -	- -	- -	- -	- -
Regionalized-7		2	24057	1.8	- -	9769	0.7	- -	- -
Centralized-1		1	- -	- -	- -	- -	- -	- -	- -
Centralized-2		1	88386	6.5	- -	35891	2.6	- -	- -
Centralized-3	7	1	- -	- -	- -	- -	- -	- -	- -
Centralized-4	7	1	49647	3.6	- -	20000	1.5	- -	- -
Centralized-5	1	1	- -	- -	- -	- -	- -	- -	- -

Notes:
T = Treatment
D = Disposal
Water supplied by groundwater. Current water use = 1,367,000 gallons/day.
Wastewater discharged to onsite evaporation ponds.
** Ten sites use existing facilities for Volume Reduction.
- - = NTS is not considered under the alternative; for alternatives that disposal is considered at NTS, Waste Water Stream Flow is not considered.

Table II-9.2-10. NTS—LLW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal

LLW Alternatives	Number of Sites T	Number of Sites D	Ac 225	Ac 227	Am 241	Am 242	Am 243	C 14	Cs 135	Cs 137	Cm 242	Cm 244	Cm 245	I 129	Pb 210	Np 237	Ni 59	Ni 63	Pd 107	Pu 238	Pu 239	Pu 240	Pu 241
No Action	10**	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Decentralized		16	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-1		12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-2	11	12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-3		6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-4	7	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-5	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-6		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centralized-1		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centralized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-4	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centralized-5	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

LLW Alternatives	Number of Sites T	Number of Sites D	Po 210	K 40	Pa 231	Ra 223	Ra 226	Sm 151	Se 79	Sr 90	Tc 99	Th 227	Th 228	Th 229	Th 230	Th 232	Sn 126	U 233	U 234	U 235	U 236	U 238	Y 90	Zr 93
No Action	10**	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Decentralized		16	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-1		12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-2	11	12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-3		6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-4	7	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-5	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-6		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centralized-1		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centralized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-4	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centralized-5	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
** Ten sites use existing facilities for Volume Reduction
-- = Disposal is not considered for this Alternative.

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Table II-9.2-11. NTS—LLW—Socioeconomic Impacts for Treatment and Disposal

LLW Alternatives	Number of Sites		Effect of Implementation of Alternatives					
				Jobs		Income		
	T	D	Cost (Millions) (1)	Jobs	% Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action	10**	6	1196	932	0.21	10.5	0.07	0.19
Decentralized		16	- -	- -	- -	- -	- -	- -
Regionalized-1		12	- -	- -	- -	- -	- -	- -
Regionalized-2	11	12	- -	- -	- -	- -	- -	- -
Regionalized-3		6	186	181	0.04	2.0	0.01	0.03
Regionalized-4	7	6	186	181	0.04	2.0	0.01	0.03
Regionalized-5		6	186	181	0.04	2.0	0.01	0.03
Regionalized-6		2	- -	- -	- -	- -	- -	- -
Regionalized-7		2	1550	1511	0.33	17.0	0.12	0.30
Centralized-1		1	- -	- -	- -	- -	- -	- -
Centralized-2		1	3420	3332	0.73	37.5	0.26	0.82
Centralized-3	7	1	- -	- -	- -	- -	- -	- -
Centralized-4	7	1	2352	2292	0.50	25.8	0.18	0.57
Centralized-5	1	1	- -	- -	- -	- -	- -	- -

Notes:
T = Treatment
D = Disposal
(1) In constant 1990 dollars.
(2) Compared to 1990 baseline.
** Ten sites use existing facilities for Volume Reduction

Table II-9.2-12. NTS—LLW—Infrastructure Impacts for Treatment and Disposal

LLW Alternatives	Number of Sites		Effect of Implementation of Alternatives									
			Land Use		Water		Waste Water		Power		Employment (FTE)	
	T	D	Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	% Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Peak Construction Employment	% of Current Employment (1)
No Action	10**	6	1.5	0.00	1426	0.05	1426	0.43	0.21	0.46	0	0
Decentralized		16	--	--	--	--	--	--	--	--	--	--
Regionalized-1		12	--	--	--	--	--	--	--	--	--	--
Regionalized-2	11	12	--	--	--	--	--	--	--	--	--	--
Regionalized-3		6	1.4	0.00	2513	0.09	1778	0.53	0.47	0.74	45	1
Regionalized-4	7	6	1.4	0.00	2513	0.09	1778	0.53	0.47	0.74	45	1
Regionalized-5	4	6	1.4	0.00	2513	0.09	1778	0.53	0.47	0.74	45	1
Regionalized-6		2	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	10.4	0.10	24057	0.87	9769	2.89	2.43	5.4	967	14
Centralized-1		1	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	38.3	0.40	88386	3.18	35891	10.62	8.93	19.85	1808	26
Centralized-3	7	1	--	--	--	--	--	--	--	--	--	--
Centralized-4	7	1	21.5	0.20	49647	1.79	20000	5.92	5.02	11.15	1000	14
Centralized-5	1	1	--	--	--	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
GPD = Gallons per Day
MW = Megawatts Electric
FTE = Full Time Equivalent
(1) Based on 1991 Site Employment.
** Ten sites use existing facilities for Volume Reduction.

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Table II-9.2-13. NTS—LLW—Cost

LLW Alternatives	Number of Sites		Total Cost (Millions) (1)	Cost by Life-Cycle Component (1)				Cost by Functional Area (1)		
	T	D		Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Treatment (Millions)	Storage (Millions)	Disposal (Millions)
No Action	10**	6	1353	0	0	1186	166	0	0	1353
Decentralized		16	0	0	0	0	0	0	0	0
Regionalized 1		12	0	0	0	0	0	0	0	0
Regionalized 2	11	12	0	0	0	0	0	0	0	0
Regionalized 3	7	6	210	13	15	165	18	0	0	210
Regionalized 4	7	6	210	13	15	165	18	0	0	210
Regionalized 5	4	6	210	13	15	165	18	0	0	210
Regionalized 6		2	0	0	0	0	0	0	0	0
Regionalized 7		2	1753	130	206	1317	101	0	0	1753
Centralized 1		1	0	0	0	0	0	0	0	0
Centralized 2		1	3869	310	543	2877	139	0	0	3869
Centralized 3	7	1	0	0	0	0	0	0	0	0
Centralized 4	7	1	2662	176	821	1532	134	0	0	2662
Centralized 5	1	1	0	0	0	0	0	0	0	0

Notes:
** Ten sites use existing facilities for Volume Reduction
T = Treatment
D = Disposal
The Life Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum may not reflect the true total cost.
(1) In Current 1994 Dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

9.3 NTS TRUW

Twelve tables immediately following portray the impacts of TRUW at NTS. These tables are presented as follows:

Impact Category

No.	Description	Table No.	Page No.
1.	NTS—TRUW—Treatment: Estimated Number of Fatalities	II-9.3-1	9-31
2.	NTS—TRUW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects	II-9.3-2	9-33
4.	NTS—TRUW—Treatment: MEI Probability of Cancer Fatality	II-9.3-3	9-34
5.	NTS—TRUW—Treatment: MEI Probability of Cancer Incidences and Genetic Effects	II-9.3-4	9-35
6.	NTS—TRUW—Treatment: Noncancer Health Risk From Chemical Exposure	II-9.3-5	9-36
7.	NTS—TRUW—Emissions in Tons per Year of Criteria Air Pollutants	II-9.3-6	9-37
8.	NTS—TRUW—Percent of Standard/Guideline for Criteria Air Pollutants	II-9.3-7	9-38
9.	NTS—TRUW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-9.3-8	9-39
10.	NTS—TRUW—Impacts on Water Resources Due to Increased Water Use	II-9.3-9	9-40
12.	NTS—TRUW—Socioeconomic Impacts for Treatment	II-9.3-10	9-41
13.	NTS—TRUW—Infrastructure Impacts for Treatment	II-9.3-11	9-42
14.	NTS—TRUW—Cost	II-9.3-12	9-43

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Table II-9.3-1. NTS—TRUW—Treatment: Estimated Number of Fatalities

TRUW Alternatives	Treatment						
	Number of Sites		Treat STD	WM Worker		Offsite Population Radiation Exposure	Noninvolved Workers Radiation Exposure
	CH Treat	RH Treat		Radiation Exposure	Physical Hazards		
No Action **	16	5	WIPP WAC	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Decentralized ***	16	5	WIPP WAC	2.1E-04	6.8E-02	1.1E-10	3.2E-10
Regionalized-1	5	2	Reduce Gas	2.0E-04	4.2E-02	1.5E-10	4.2E-10
Regionalized-2	5	2	LDR	2.0E-04	4.2E-02	1.5E-10	4.2E-10
Regionalized-3	3	2	LDR	2.0E-04	4.2E-02	1.5E-10	4.2E-10
Centralized	WIPP	2	LDR	2.0E-04	4.2E-02	1.5E-10	4.2E-10

Notes:
** For No Action Alternative, storage is indefinite; no disposal at WIPP is assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at 16 sites, then transfered to interim storage at 10 sites, then to WIPP.

Table II-9.3–2. NTS—TRUW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

TRUW Alternatives	Number of Sites		Treat STD	Offsite Population				Noninvolved Workers				WM Workers			
	CH Treat	RH Treat		Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects
No Action**	16	5	WIPP WAC	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Decentralized***	16	5	WIPP WAC	2.3E-07	3.9E-10	3.8E-13	2.3E-11	6.4E-07	1.1E-09	5.1E-12	6.4E-11	5.2E-01	7.3E-04	8.8E-10	3.1E-05
Regionalized-1	5	2	Reduce Gas	3.0E-07	5.1E-10	1.1E-12	3.0E-11	8.4E-07	1.4E-09	1.5E-11	8.4E-11	5.0E-01	7.0E-04	4.4E-09	3.0E-05
Regionalized-2	5	2	LDR	3.0E-07	5.1E-10	1.1E-12	3.0E-11	8.4E-07	1.4E-09	1.5E-11	8.4E-11	5.0E-01	7.0E-04	4.4E-09	3.0E-05
Regionalized-3	3	2	LDR	3.0E-07	5.1E-10	1.1E-12	3.0E-11	8.4E-07	1.4E-09	1.5E-11	8.4E-11	5.0E-01	7.0E-04	4.4E-09	3.0E-05
Centralized	WIPP	2	LDR	3.0E-07	5.1E-10	1.1E-12	3.0E-11	8.4E-07	1.4E-09	1.5E-11	8.4E-11	5.0E-01	7.0E-04	4.4E-09	3.0E-05

Notes:
** For No Action Alternative, storage is indefinite; no disposal at WIPP is assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
T = Treatment
D = Disposal

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Table II-9.3-3. NTS—TRUW—Treatment: MEI Probability of Cancer Fatality

TRUW Alternatives	Number of Sites		Treat STD	Treatment	
	CH Treat	RH Treat		Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability
No Action**	16	5	WIPP WAC	- -	- -
Decentralized***	16	5	WIPP WAC	3.0E-14	1.5E-12
Regionalized-1	5	2	Reduce Gas	3.9E-14	1.9E-12
Regionalized-2	5	2	LDR	3.9E-14	1.9E-12
Regionalized-3	3	2	LDR	3.9E-14	1.9E-12
Centralized	WIPP	2	LDR	3.9E-14	1.9E-12

Notes:
- - = Treatment is not considered for this alternative.
MEI = Maximally Exposed Individual
** For No Action Alternative, storage is indefinite; no disposal of WIPP is assumed, for all other alternatives disposal at WIPP is assumed.
***In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then transferred to interim storage

Table II-9.3–4. NTS—TRUW—Treatment: MEI Probability of Cancer Incidences and Genetic Effects

TRUW Alternatives	Number of Sites		Treat STD	Treatment							
				Offsite MEI				Noninvolved Worker MEI			
	CH Treat	RH Treat		Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability
No Action **	16	5	WIPP WAC	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Decentralized ***	16	5	WIPP WAC	5.9E-11	1.0E-13	0.0E+00	0.0E+00	2.9E-09	5.0E-12	2.1E-14	2.9E-13
Regionalized-1	5	2	Reduce Gas	7.8E-11	1.3E-13	0.0E+00	8.0E-15	3.9E-09	6.6E-12	6.2E-14	3.9E-13
Regionalized-2	5	2	LDR	7.8E-11	1.3E-13	0.0E+00	8.0E-15	3.9E-09	6.6E-12	6.2E-14	3.9E-13
Regionalized-3	3	2	LDR	7.8E-11	1.3E-13	0.0E+00	8.0E-15	3.9E-09	6.6E-12	6.2E-14	3.9E-13
Centralized	WIPP	2	LDR	7.8E-11	1.3E-13	0.0E+00	8.0E-15	3.9E-09	6.6E-12	6.2E-14	3.9E-13

Notes:
** For No Action Alternative, storage is indefinite; no disposal at WIPP is assumed for all other alternatives, disposal of WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites then to WIPP.
MEI = Maximally Exposed Individual

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Table II-9.3-5. NTS—TRUW—Treatment: Noncancer Health Risk From Chemical Exposure

TRUW Alternatives	Number of Sites		Treat STD	Treatment		
	CH Treat	RH Treat		Offsite MEI Hazard Index	Noninvolved Worker MEI Hazard Index	WM Worker Exposure Index
No Action**	16	5	WIPP WAC	- -	- -	- -
Decentralized***	16	5	WIPP WAC	1.4E-13	3.0E-11	3.2E-08
Regionalized-1	5	2	Reduce Gas	3.8E-13	8.2E-11	1.8E-07
Regionalized-2	5	2	LDR	3.8E-13	8.2E-11	1.8E-07
Regionalized-3	3	2	LDR	3.8E-13	8.2E-11	1.8E-07
Centralized	WIPP	2	LDR	3.8E-13	8.2E-11	1.8E-07

Notes:
MEI = Maximally Exposed Individual
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
- - = Treatment is not considered under this alternative.
Hazard Index = Sum of hazard quotient values for all noncarcinogenic chemicals. The Hazard Quotient is the chemical-specific ratio of media exposure concentrations to concentrations exposure concentrations to concentrations believed to have no appreciable adverse effects.
Exposure Index = Ratio of exposure concentration to chemical-specific occupational threshold

Table II-9.3-6. NTS—TRUW—Emissions in Tons per Year of Criteria Air Pollutants

TRUW Alternatives	Number of Sites CH Treat	Number of Sites RH Treat	Treat STD	Construction Emissions in Tons/Year (1) CO	NO2	Pb	PM10	SO2	VOC	Operations & Maintenance Emissions in Tons/Year (2) CO	NO2	Pb	PM10	SO2	VOC
No Action**	16	5	WIPP WAC	--	--	--	--	--	--	2 (0/2)	0	0	0	0	0
Decentralized***	16	5	WIPP WAC	5 (1/5)	3 (2/1)	0	0	0	01 (0/1)	3 (0/3)	1 (0/1)	0	0	0	0
Regionalized-1	5	2	Reduce Gas	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-2	5	2	LDR	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-3	3	2	LDR	0	0	0	0	0	0	0	0	0	0	0	0
Centralized	WIPP	2	LDR	0	0	0	0	0	0	0	0	0	0	0	0

Notes:
Emissions <1 ton per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions / worker vehicles emission)
(2) Values = total emissions (stationary-source emissions / mobile-source emission)
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

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Table II-9.3-7. NTS—TRUW—Percent of Standard/Guideline for Criteria Air Pollutants

TRUW Alternatives	Number of Sites		Treat STD	Construction					
				Percent of Tons/Year General Conformity Rule (1)					
	CH Treat	RH Treat		CO	NO2	Pb	PM10	SO2	VOC
No Action	16	5	WIPP WAC	- -	- -	- -	- -	- -	- -
Decentralized	16	5	WIPP WAC	5 (1/5)	- -	- -	0	- -	- -
Regionalized-1	5	2	Reduce Gas	0	- -	- -	0	- -	- -
Regionalized-2	5	2	LDR	0	- -	- -	0	- -	- -
Regionalized-3	3	2	LDR	0	- -	- -	0	- -	- -
Centralized	WIPP	2	LDR	0	- -	- -	0	- -	- -

TRUW Alternatives	Number of Sites		Treat STD	Operations & Maintenance											
				Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
	CH Treat	RH Treat		CO (5)	NO2 (4)	Pb (4)	PM10 (5)	SO2 (4)	VOC (4)	CO	NO2	Pb	PM10	SO2	VOC
No Action	16	5	WIPP WAC	2 (0/2)	0	0	0	0	0	- -	- -	- -	- -	- -	- -
Decentralized	16	5	WIPP WAC	3 (0/3)	0	0	0	0	0	- -	- -	- -	- -	- -	- -
Regionalized-1	5	2	Reduce Gas	0	0	0	0	0	0	- -	- -	- -	- -	- -	- -
Regionalized-2	5	2	LDR	0	0	0	0	0	0	- -	- -	- -	- -	- -	- -
Regionalized-3	3	2	LDR	0	0	0	0	0	0	- -	- -	- -	- -	- -	- -
Centralized	WIPP	2	LDR	0	0	0	0	0	0	- -	- -	- -	- -	- -	- -

Notes:
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) NTS is in an attainment area for all criteria pollutants, therefore the GCR does not apply.
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions for all alternatives assumed to be negligible.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.
(5) Nonattainment area for this pollutant, therefore GCR de minimus levels are applied. Values = % of total emissions (% of stationary-source emissions / % of mobile-source emissions).
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

Table II-9.3-8. NTS—TRUW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

TRUW Alternatives	Number of Sites		Treat STD	Operations & Maintenance											
	CH Treat	RH Treat		Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action**	16	5	WIPP - WAC	0	--	--	--	0	0	--	--	--	--	--	--
Decentralized***	16	5	WIPP - WAC	0	--	--	--	0	0	--	--	--	--	--	--
Regionalized-1	5	2	Reduce Gas	0	--	--	--	0	0	--	--	--	--	--	--
Regionalized-2	5	2	LDR	0	--	--	--	0	0	--	--	--	--	--	--
Regionalized-3	3	2	LDR	0	--	--	--	0	0	--	--	--	--	--	--
Centralized	WIPP	2	LDR	0	--	--	--	0	0	--	--	--	--	--	--

TRUW Alternatives	Number of Sites		Treat STD	Operations & Maintenance									
	CH Treat	RH Treat		Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action**	16	5	WIPP - WAC	0	0	--	--	--	0	0	--	--	--
Decentralized***	16	5	WIPP - WAC	0	0	--	--	--	0	0	--	--	--
Regionalized-1	5	2	Reduce Gas	0	0	--	--	--	0	0	--	--	--
Regionalized-2	5	2	LDR	0	0	--	--	--	0	0	--	--	--
Regionalized-3	3	2	LDR	0	0	--	--	--	0	0	--	--	--
Centralized	WIPP	2	LDR	0	0	--	--	--	0	0	--	--	--

Notes:

** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.

*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

-- = Emissions of this hazardous or toxic air pollutant are assumed to be negligible.

Percentages <1% are shown as zeros. CH = contact handled. RH = remote handled.

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Table II-9.3-9. NTS—TRUW—Impacts on Water Resources Due to Increased Water Use

TRUW Alternatives	Number of Sites		Treat STD	Construction			Operations			
	CH Treat	RH Treat		Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action**	16	5	WIPP WAC	- -	- -	- -	514	<0.1	- -	- -
Decentralized***	16	5	WIPP WAC	1465	0.1	- -	609	<0.1	- -	- -
Regionalized-1	5	2	Reduce Gas	- -	- -	- -	38	<0.1	- -	- -
Regionalized-2	5	2	LDR	- -	- -	- -	38	<0.1	- -	- -
Regionalized-3	3	2	LDR	- -	- -	- -	38	<0.1	- -	- -
Centralized	WIPP	2	LDR	- -	- -	- -	38	<0.1	- -	- -

Notes:
Water supplied by groundwater. Current water use = 1,367,000 gallons/day.
Wastewater discharged to onsite evaporation ponds.
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
- - = Construction is not considered for the alternative, and Stream Flow and Waste Water Stream Flow are not consideed for this site.

Table II-9.3-10. NTS—TRUW—Socioeconomic Impacts for Treatment

TRUW Alternatives	Number of Sites		Effect of Implementation of Alternatives						
					Jobs		Income		
	CH Treat	RH Treat	Treat STD	Cost (Millions) (1)	Annual Jobs	% Annual Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action**	16	5	WIPP WAC	43	34	0.01	0.4	0.00	0.01
Decentralized***	16	5	WIPP WAC	85	83	0.02	0.9	0.01	0.01
Regionalized-1	5	2	Reduce Gas	6	6	0.00	0.1	0.00	0.00
Regionalized-2	5	2	LDR	6	6	0.00	0.1	0.00	0.00
Regionalized-3	3	2	LDR	6	6	0.00	0.1	0.00	0.00
Centralized	WIPP	2	LDR	6	6	0.00	0.1	0.00	0.00

Notes:
(1) In current 1990 dollars.
(2) Compared to 1990 baseline.
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

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Table II-9.3-11. NTS—TRUW—Infrastructure Impacts for Treatment

TRUW Alternatives	Number of Sites		Treat STD	Effect of Implementation of Alternatives									
				Land Use		Water		Waste Water		Power		Employment (FTE)	
	CH Treat	RH Treat		Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Peak Construction Employment	% of Current Employment (1)
No Action**	16	5	WIPP WAC	0	0.00	514	0.02	514	0.15	0.02	0.04	0	0.00
Decentralized***	16	5	WIPP WAC	1.2	0.00	1465	0.05	609	0.18	0.12	0.26	51	0.70
Regionalized-1	5	2	Reduce Gas	0	0.00	38	0.00	38	0.01	0.02	0.04	0	0.00
Regionalized-2	5	2	LDR	0	0.00	38	0.00	38	0.01	0.02	0.04	0	0.00
Regionalized-3	3	2	LDR	0	0.00	38	0.00	38	0.01	0.02	0.04	0	0.00
Centralized	WIPP	2	LDR	0	0.00	38	0.00	38	0.01	0.02	0.04	0	0.00

Notes:
GPD = Gallons per Day
MW = Megawatts Electric
FTE = Full Time Equivalent
(1) Based on 1991 Site Employment.
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

Table II-9.3-12. NTS—TRUW—Cost

TRUW Alternatives	Number of Sites		Treat STD (2)	Total Cost (Millions) (1)	Life-Cycle Component				Functional Area		
	CH Treat	RH Treat			Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Retrieval Characterization (Millions)	Treatment (Millions)	Storage (Millions)
No Action**	11	5	WIPP - WAC	49	0	0	35	14	0	38	11
Decentralized***	16	5	WIPP - WAC	96	6	27	46	17	0	84	12
Regionalized-1	5	2	Reduce Gas	7	0	0	7	0	0	7	0
Regionalized-2	5	2	LDR	7	0	0	7	0	0	7	0
Regionalized-3	3	2	LDR	7	0	0	7	0	0	7	0
Centralized	WIPP	2	LDR	7	0	0	7	0	0	7	0

Notes:
** For No Action Alternative, storage is indefinite; no disposal at WIPP to be assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
The Life Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum may not reflect the true total cost.
(1) In Current 1994 Dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.
(2) Treatment standard (STD) applied: treat to WIPP Waste Acceptance Criteria (WIPP WAC), treat for reduced gas generation (Reduce Gas), treat to Land Disposal Restrictions (LDR).

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10.0 ORR

ORR currently is custodian of significant volumes of LLMW, LLW, and TRUW. Each of the waste types is treated independently in the following sections.

10.1 ORR LLMW

Fifteen tables immediately following portray the impacts of LLMW at ORR. These tables are presented as follows:

Impact Category

No.	Description	Table No.	Page No.
1.	ORR—LLMW—Treatment and Disposal: Estimated Number of Fatalities	II-10.1-1	10-3
2.	ORR—LLMW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects	II-10.1-2	10-4
3.	ORR—LLMW—Disposal: Estimated Number of Cancer Incidences	II-10.1-3	10-5
4.	ORR—LLMW—Treatment and Disposal: MEI Probability of Cancer Fatality	II-10.1-4	10-6
5.	ORR—LLMW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects	II-10.1-5	10-7
6.	ORR—LLMW—Treatment and Disposal: Noncancer Health Risk from Chemical Exposure	II-10.1-6	10-8
7.	ORR—LLMW—Emissions in Tons per Year of Criteria Air Pollutants	II-10.1-7	10-9
8.	ORR—LLMW—Percent of Standard/Guideline for Criteria Air Pollutants	II-10.1-8	10-10
9.	ORR—LLMW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-10.1-9	10-11
10.	ORR—LLMW—Impacts on Water Resources Due to Increased Water Use	II-10.1-10	10-12
11.	ORR—LLMW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal (Contact-Handled	II-10.1-11	10-13
12.	ORR—LLMW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria for Disposal (Remote-Handled)	II-10-12	10-14
13.	ORR—LLMW—Percent of Drinking Water Standards for Hazardous Constituents in Groundwater from Disposal (Contact-Handled)	II-10-13	10-15
14.	ORR—LLMW—Percent of Drinking Water Standards for Hazardous Constituents in Groundwater from Disposal (Remote-Handled)	II-10.1-14	10-16
15.	ORR—LLMW—Socioeconomics Impacts for Treatment and Disposal	II-10.1-15	10-17

16.	ORR—LLMW—Infrastructure Impacts for Treatment and Disposal	II-10.1-16	10-18
17.	ORR—LLMW—Cost	II-10.1-17	10-19

Table II-10.1-1. ORR—LLMW—Treatment and Disposal: Estimated Number of Fatalities

LLMW Alternatives	Number of Sites		Treatment				Disposal	
			WM Worker		Offsite Population	Noninvolved Workers	WM Worker	
	T	D	Radiation Exposure	Physical Hazards	Radiation Exposure	Radiation Exposure	Radiation Exposure	Physical Hazards
No Action	3	-	2.7E-01	5.5E-01	2.4E-01	1.0E-02	- -	- -
Decentralized	37	16	1.7E-01	6.0E-01	1.1E-03	4.4E-05	7.9E-02	4.8E-02
Regionalized-1	11	12	1.1E-01	4.8E-01	9.3E-04	3.8E-05	7.1E-02	4.8E-02
Regionalized-2	7	6	1.2E-01	4.8E-01	1.2E-03	5.0E-05	9.3E-04	5.6E-02
Regionalized-3	7	1	1.2E-01	4.8E-01	1.2E-03	5.0E-05	- -	- -
Regionalized-4	4	6	2.4E-01	7.1E-01	1.6E-03	6.6E-05	9.4E-02	5.5E-02
Centralized	1	1	2.4E-02	1.4E-01	6.8E-06	2.3E-07	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this Alternative.

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Table II-10.1-2. ORR—LLMW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

LLMW Alternatives	Number of Sites		Offsite Population				Noninvolved Workers				WM Worker			
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects
No Action	3	-	4.8E+02	8.2E-01	4.7E-04	4.8E-02	2.0E+01	3.4E-02	1.6E-04	2.0E-03	6.7E+02	9.4E-01	9.3E-03	4.0E-02
Decentralized	37	16	2.2E+00	3.7E-03	2.2E-05	2.2E-04	8.9E-02	1.5E-04	7.5E-06	8.9E-06	4.4E+02	6.1E-01	5.8E-03	2.6E-02
Regionalized -1	11	12	1.9E+00	3.2E-03	1.9E-05	1.9E-04	7.6E-02	1.3E-04	6.5E-06	7.6E-06	2.8E+02	3.9E-01	5.1E-03	1.7E-02
Regionalized-2	7	6	2.4E+00	4.1E-03	1.9E-05	2.4E-04	1.0E-01	1.7E-04	6.5E-06	1.0E-05	3.0E+02	4.2E-01	5.2E-03	1.8E-02
Regionalized-3	7	1	2.4E+00	4.1E-03	1.9E-05	2.4E-04	1.0E-01	1.7E-04	6.5E-06	1.0E-05	3.0E+02	4.2E-01	5.2E-03	1.8E-02
Regionalized-4	4	6	3.3E+00	5.6E-03	2.9E-05	3.3E-04	1.3E-01	2.2E-04	9.7E-06	1.3E-05	6.0E+02	8.4E-01	8.6E-03	3.6E-02
Centralized	1	1	1.4E-02	2.3E-05	1.1E-06	1.4E-06	4.5E-04	7.7E-07	3.7E-07	4.5E-08	6.0E+01	8.4E-02	1.5E-04	3.6E-03

Notes:
T = Treatment
D = Disposal

Table II-10.1-3. ORR—LLMW—Disposal: Estimated Number of Cancer Incidences

LLMW Alternatives	Number of Sites		WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	3	-	- -	- -	- -
Decentralized	37	16	2.0E+02	2.8E-01	1.2E-02
Regionalized-1	11	12	1.8E+02	2.5E-01	1.1E-02
Regionalized-2	7	6	2.3E+02	3.3E-01	1.4E-02
Regionalized-3	7	1	- -	- -	- -
Regionalized-4	4	6	2.4E+02	3.3E-01	1.4E-02
Centralized	1	1	- -	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this Alternative.

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Table II-10.1-4. ORR—LLMW—Treatment and Disposal: MEI Probability of Cancer Fatality

LLMW Alternatives	Number of Sites		Treatment		Disposal
	T	D	Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability	Hypothetical Farm Family Most Exposed Lifetime MEI Cancer Fatality Probability
No Action	3	-	7.4E-06	9.2E-06	- -
Decentralized	37	16	3.3E-08	4.0E-08	9.5E-07
Regionalized-1	11	12	2.9E-08	3.5E-08	7.6E-07
Regionalized-2	7	6	3.6E-08	4.5E-08	8.9E-07
Regionalized-3	7	1	3.6E-08	4.5E-08	- -
Regionalized-4	4	6	5.0E-08	5.9E-08	1.1E-06
Centralized	1	1	2.1E-10	2.1E-10	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered under the Alternative

Table II-10.1-5. ORR—LLMW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects

LLMW Alternatives	Number of Sites		Treatment								Disposal			
			Offsite Population MEI				Noninvolved Worker MEI				Most Exposed Farm Family Lifetime MEI			
	T	D	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability
No Action	3	-	1.5E-02	2.5E-05	2.5E-08	1.5E-06	1.8E-02	3.1E-05	1.5E-07	1.8E-06	--	--	--	--
Decentralized	37	16	6.7E-05	1.1E-07	1.2E-09	6.7E-09	8.1E-05	1.4E-07	7.1E-09	8.1E-09	1.9E-03	3.2E-06	1.6E-03	1.9E-07
Regionalized-1	11	12	5.7E-05	9.7E-08	1.0E-09	5.7E-09	6.9E-05	1.2E-07	6.2E-09	6.9E-09	1.5E-03	2.6E-06	1.6E-03	1.5E-01
Regionalized-2	7	6	7.3E-05	1.2E-07	1.0E-09	7.3E-09	1.0E-01	1.7E-04	6.5E-06	1.0E-05	1.8E-03	3.0E-06	2.9E-03	1.8E-07
Regionalized-3	7	1	7.3E-05	1.2E-07	1.0E-09	7.3E-09	1.0E-01	1.7E-04	6.5E-06	1.0E-05	--	--	--	--
Regionalized-4	4	6	1.0E-04	1.7E-07	1.5E-09	1.0E-08	1.2E-04	2.0E-07	9.3E-09	1.2E-08	2.2E-03	3.7E-06	2.9E-03	2.2E-07
Centralized	1	1	4.2E-07	7.1E-10	5.8E-11	4.2E-11	4.1E-07	7.0E-10	3.6E-10	4.1E-11	--	--	--	--

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
-- = Disposal is not considered for this alternative.

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Table II-10.1-6. ORR—LLMW—Treatment and Disposal: Noncancer Health Risk from Chemical Exposure

LLMW Alternatives	Number of Sites		Treatment			Disposal
	T	D	Offsite MEI Hazard Index	Noninvolved Worker MEI Hazard Index	WM Worker Exposure Index	Hypothetical Farm Family Most Exposed Lifetime Hazard Index
No Action	3	-	2.3E-05	1.4E-04	1.2E-02	- -
Decentralized	37	16	1.4E-06	8.8E-06	1.2E-02	7.8E-01
Regionalized-1	11	12	1.4E-06	8.7E-06	1.2E-02	7.7E-01
Regionalized-2	7	6	1.4E-06	8.8E-06	1.3E-02	1.1E+00
Regionalized-3	7	1	1.4E-06	8.8E-06	1.3E-02	- -
Regionalized-4	4	6	2.0E-06	1.3E-05	1.6E-02	1.1E+00
Centralized	1	1	9.5E-09	3.7E-07	2.9E-04	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for No Action Alternative for LLMW.
MEI = Maximally Exposed Individual
Hazard Index = Sum of hazard quotient values for all noncarcinogenic chemicals. The hazard quotient is the chemical-specific ratio of media exposure concentrations to concentrations believed to have no appreciable adverse effects.
Exposure Index = Ratio of Exposure concentration to chemical-specific occupational threshold limits.

Table II-10.1-7. ORR—LLMW—Emissions in Tons per Year of Criteria Air Pollutants

LLMW Alternatives	Number of Sites		Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	180 (4/176)	45 (10/35)	0	1(1/0)	1(1/0)	22 (1/21)	68 (2/66)	17 (4/13)	0	4 (4/0)	0	8 (0/8)
Decentralized	37	16	134 (6/128)	42 (16/26)	0	1 (1/0)	2 (2/0)	17 (2/15)	92 (2/90)	31 (13/18)	0	7 (7/0)	1 (1/0)	11 (0/11)
Regionalized-1	11	12	134 (6/128)	42 (16/26)	0	1 (1/0)	2 (2/0)	17 (2/15)	92 (2/90)	31 (13/18)	0	7 (7/0)	1 (1/0)	11 (0/11)
Regionalized-2	7	6	134 (6/128)	42 (16/26)	0	1 (1/0)	2 (2/0)	17 (2/15)	92 (2/90)	31 (13/18)	0	7 (7/0)	1 (1/0)	11 (0/11)
Regionalized-3	7	1	192 (5/187)	49 (12/37)	0	1 (1/0)	1 (1/0)	23 (1/22)	98 (1/97)	22 (2/20)	0	7 (7/0)	1 (1/0)	12 (0/12)
Regionalized-4	4	6	235 (10/225)	70 (25/45)	0	2 (2/0)	2 (2/0)	29 (2/27)	144 (3/141)	36 (8/28)	0	12 (12/0)	1 (1/0)	17 (0/17)
Centralized	1	1	153 (3/150)	36 (6/30)	0	0	0	18 (0/18)	64 (0/64)	13 (0/13)	0	0	0	8 (0/8)

Notes:
T = Treatment
D = Disposal
Emissions <1 tons per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions / worker vehicles emission).
(2) Values = total emissions (stationary-source emissions / mobile-source emission).

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Table II-10.1-8. ORR—LLMW—Percent of Standard/Guideline for Criteria Air Pollutants

LLMW Alternatives	Number of Sites		Construction					
			Percent of Tons/Year General Conformity Rule (1)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	--	--	--	--	--	--
Decentralized	37	16	--	--	--	--	--	--
Regionalized - 1	11	12	--	--	--	--	--	--
Regionalized - 2	7	6	--	--	--	--	--	--
Regionalized - 3	7	1	--	--	--	--	--	--
Regionalized - 4	4	6	--	--	--	--	--	--
Centralized	1	1	--	--	--	--	--	--

LLMW Alternatives	Number of Sites		Operations & Maintenance											
			Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
	T	D	CO (4)	NO2 (4)	Pb (4)	PM10 (4)	SO2 (4)	VOC (4)	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	2	19	0	26	1	1	0	0	0	7	18	0
Decentralized	37	16	2	33	0	50	2	1	0	0	0	13	37	0
Regionalized - 1	11	12	2	33	0	50	2	1	0	0	0	13	37	0
Regionalized - 2	7	6	2	33	0	50	2	1	0	0	0	13	37	0
Regionalized - 3	7	1	1	26	0	46	1	0	0	0	0	13	37	0
Regionalized - 4	4	6	3	51	0	77	2	1	0	0	0	20	57	0
Centralized	1	1	0	1	0	0	0	0	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide. VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) ORR is in an attainment area for all criteria pollutants, therefore the GCR doe not apply.
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions for the Centralized Alternative are assumed to be negligible since ther is no incineration at ORR under this alternative.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.

Table II-10.1-9. ORR—LLMW—Percent of Standards/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

LLMW Alternatives	Number of Sites		Operations & Maintenance											
	T	D	Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action	3	-	7	0	0	- -	- -	0	- -	- -	0	0	0	0
Decentralized	37	16	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Regionalized-	11	12	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Regionalized-	7	6	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Regionalized-	7	1	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Regionalized-	4	6	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Centralized	1	1	0	0	0	- -	- -	0	- -	- -	0	0	0	0

LLMW Alternatives	Number of Sites		Operations & Maintenance									
	T	D	Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action	3	-	- -	0	0	0	- -	0	0	0	- -	- -
Decentralized	37	16	- -	0	0	0	- -	0	0	0	- -	- -
Regionalized-	11	12	- -	0	0	0	- -	0	0	0	- -	- -
Regionalized-	7	6	- -	0	0	0	- -	0	0	0	- -	- -
Regionalized-	7	1	- -	0	0	0	- -	0	0	0	- -	- -
Regionalized-	4	6	- -	0	0	0	- -	0	0	0	- -	- -
Centralized	1	1	- -	0	0	0	- -	0	0	0	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Emissions of this hazardous or toxic air pollutant are assumed to be negligible.
Percentages <1% are shown as zeros.

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Table II-10.1-10. ORR—LLMW—Impacts on Water Resources Due to Increased Water Use

LLMW Alternatives	Number of Sites		Construction			Operations			
	T	D	Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action	3	-	9920	0.1	<0.1	11491	0.1	<0.1	<0.1
Decentralized	37	16	24085	0.1	<0.1	14992	0.1	<0.1	<0.1
Regionalized-1	11	12	24085	0.1	<0.1	14992	0.1	<0.1	<0.1
Regionalized-2	7	6	24085	0.1	<0.1	14992	0.1	<0.1	<0.1
Regionalized-3	7	1	16203	0.1	<0.1	10579	0.1	<0.1	<0.1
Regionalized-4	4	6	32846	0.2	<0.1	20085	0.1	<0.1	<0.1
Centralized	1	1	7888	<0.1	<0.1	4686	<0.1	<0.1	<0.1

Notes:
T = Treatment
D = Disposal
Water supplied by surface water in the Clinch River. Current water use = 18,300,000 gallons/day.
Wastewater discharged to the Clinch River.
Average flow rate of the Clinch River = 3,003,000,000 gallons/day.
- - = Stream Flow is not considered for this site.
<0.1 indicates that the percentage is less than 0.1%.

Table II-10.1-11. ORR—LLMW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal (Contact-Handled)

LLMW Alternatives	Number of Sites T	Number of Sites D	Ac 225	Ac 227	Am 241	Am 242	Am 243	C 14	Cs 135	Cs 137	Cm 242	Cm 244	Cm 245	I 129	Pb 210	Np 237	Ni 59	Ni 63	Pd 107	Pu 238	Pu 239	Pu 240	Pu 241
No Action	3	-	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	50	30	0
Regionalized-1	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	40	20	0
Regionalized-2	7	6	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	40	30	0
Regionalized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	50	30	0
Centralized	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

LLMW Alternatives	Number of Sites T	Number of Sites D	Po 210	K 40	Pa 231	Ra 223	Ra 226	Sm 151	Se 79	Sr 90	Tc 99	Th 227	Th 228	Th 229	Th 230	Th 232	Sn 126	U 233	U 234	U 235	U 236	U 238	Y 90	Zr 93
No Action	3	-	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	0	0	0	0	0	40	0	0	0	0	0	0	0	0	0	0	7	0	0
Regionalized-1	11	12	0	0	0	0	0	0	0	0	30	0	0	0	0	0	0	0	0	0	0	5	0	0
Regionalized-2	7	6	0	0	0	0	0	0	0	0	200	0	0	0	0	0	0	0	0	0	0	10	0	0
Regionalized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	4	6	0	0	0	0	0	0	0	0	200	0	0	0	0	0	0	0	0	0	0	10	0	0
Centralized	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
- - = No disposal of CH-LLMW at this site for this alternative.

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Table II-10.1-12. ORR—LLMW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal (Remote-Handled)

LLMW Alternatives	T	D *	Ac 225	Ac 227	Am 241	Am 242	Am 243	C 14	Cs 135	Cs 137	Cm 242	Cm 244	Cm 245	I 129	Pb 210	Np 237	Ni 59	Ni 63	Pd 107	Pu 238	Pu 239	Pu 240	Pu 241
No Action	3	-	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	0	0	0	0	0	0	0	0	0	0	30	0	0	0	0	1000	600	0
Regionalized-1	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	30	0	0	0	0	1000	600	0
Regionalized-2	7	6	0	0	0	0	0	0	0	0	0	0	0	0	0	30	0	0	0	0	1000	600	0
Regionalized-3	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	30	0	0	0	0	1000	600	0
Regionalized-4	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	30	0	0	0	0	1000	600	0
Centralized	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	30	0	0	0	0	1000	600	0

LLMW Alternatives	T	D *	Po 210	K 40	Pa 231	Ra 223	Ra 226	Sm 151	Se 79	Sr 90	Tc 99	Th 227	Th 228	Th 229	Th 230	Th 232	Sn 126	U 233	U 234	U 235	U 236	U 238	Y 90	Zr 93
No Action	3	-	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Decentralized	37	16	0	0	0	0	0	0	0	0	900	0	0	0	0	0	0	0	1	0	0	100	0	0
Regionalized-1	11	12	0	0	0	0	0	0	0	0	900	0	0	0	0	0	0	0	1	0	0	100	0	0
Regionalized-2	7	6	0	0	0	0	0	0	0	0	900	0	0	0	0	0	0	0	1	0	0	100	0	0
Regionalized-3	7	1	0	0	0	0	0	0	0	0	900	0	0	0	0	0	0	0	1	0	0	100	0	0
Regionalized-4	4	6	0	0	0	0	0	0	0	0	900	0	0	0	0	0	0	0	1	0	0	100	0	0
Centralized	1	1	0	0	0	0	0	0	0	0	900	0	0	0	0	0	0	0	1	0	0	100	0	0

Notes:
T = Treatment
D = Disposal
* = In addition to the CH-LLMW disposal sites indicated below, disposal of RH-LLMW occurs at four sites (Hanford, INEL, ORR and SRS) for all alternatives except No Action.
- - = No disposal at this site for this alternative.

Table II-10.1-13. ORR—LLMW—Percent of Drinking Water Standards for Hazardous Constituents in Groundwater from Disposal (Contact-Handled)

LLMW Alternatives	T	D	Acetone	Arsenic	Barium	Benzene	Cadmium	Carbon Tetrachloride	Chromium	Cyanide
No Action	3	-	--	--	--	--	--	--	--	--
Decentralized	37	16	0	0	500	0	0	0	0	1
Regionalized-1	11	12	0	0	500	0	0	0	0	1
Regionalized-2	7	6	0	0	700	0	0	0	0	3
Regionalized-3	7	1	--	--	--	--	--	--	--	--
Regionalized-4	4	6	0	0	700	0	0	0	0	4
Centralized	1	1	--	--	--	--	--	--	--	--

LLMW Alternatives	T	D	1,2-dichloro-ethane	Lead	Mercury	Methylene Chloride	Selenium	Silver	1,2,2-trichloro-1,1-trifluoroethane
No Action	3	-	--	--	--	--	--	--	--
Decentralized	37	16	10000	0	0	10000	0	0	0
Regionalized-1	11	12	10000	0	0	10000	0	0	0
Regionalized-2	7	6	20000	0	0	30000	0	0	0
Regionalized-3	7	1	--	--	--	--	--	--	--
Regionalized-4	4	6	20000	0	0	30000	0	0	0
Centralized	1	1	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
"--" = No disposal at this site for this alternative.

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Table II-10.1-14. ORR—LLMW—Percent of Drinking Water Standards for Hazardous Constituents in Groundwater from Disposal (Remote-Handled)

LLMW Alternatives	T	D *	Acetone	Arsenic	Barium	Benzene	Cadmium	Carbon Tetrachloride	Chromium
No Action	3	-	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	0	0	0	0
Regionalized-1	11	12	0	0	0	0	0	0	0
Regionalized-2	7	6	0	0	0	0	0	0	0
Regionalized-3	7	1	0	0	0	0	0	0	0
Regionalized-4	4	6	0	0	0	0	0	0	0
Centralized	1	1	0	0	0	0	0	0	0

LLMW Alternatives	T	D *	1,2-dichloro-ethane	Lead	Mercury	Methylene Chloride	Selenium	Silver	1,2,2-trichloro-1,1-trifluoroethane
No Action	3	-	--	--	--	--	--	--	--
Decentralized	37	16	10	0	0	20	0	0	0
Regionalized-1	11	12	10	0	0	20	0	0	0
Regionalized-2	7	6	10	0	0	20	0	0	0
Regionalized-3	7	1	10	0	0	20	0	0	0
Regionalized-4	4	6	10	0	0	20	0	0	0
Centralized	1	1	10	0	0	20	0	0	0

Notes:
T = Treatment
D = Disposal
* = In addition to the CH-LLMW disposal sites indicated below, disposal of RH-LLMW occurs at four sites (Hanford, INEL, ORR and SRS) for all alternatives except No Action.
"--" = No disposal at this site for this alternative.

Table II-10.1-15. ORR—LLMW—Socioeconomics Impacts for Treatment and Disposal

LLMW Alternatives	Number of Sites		Effect of Implementation of Alternatives					
				Jobs		Income		
	T	D	Cost (Millions) (1)	Annual Jobs	% Annual Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action	3	-	825	733	0.25	8.3	0.10	0.16
Decentralized	37	16	1566	1739	0.60	19.7	0.24	0.30
Regionalized-1	11	12	1566	1739	0.60	19.7	0.24	0.30
Regionalized-2	7	6	1566	1739	0.60	19.7	0.24	0.29
Regionalized-3	7	1	1367	1519	0.53	17.2	0.21	0.25
Regionalized-4	4	6	1973	2192	0.76	24.8	0.31	0.38
Centralized	1	1	872	969	0.34	11.0	0.13	0.15

Notes:
T = Treatment
D = Disposal
(1) In current 1990 dollars.
(2) Compared to 1990 baseline

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Table II-10.1-16. ORR—LLMW—Infrastructure Impacts for Treatment and Disposal

LLMW Alternatives	Number of Sites		Effect of Implementation of Alternatives									
			Land Use		Water		Waste Water		Power		Employment (FTE)	
	T	D	Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	% Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Peak Construction Employment	% of Current Employment (1)
No Action	49	-	5.83	0.10	11491	0.03	11491	0.28	2.62	0.4	324	2
Decentralized	49	16	12.38	0.22	24085	0.06	14992	0.37	3.7	0.56	995	5
Regionalized-1	11	12	12.38	0.22	24085	0.06	14992	0.37	3.7	0.56	995	5
Regionalized-2	7	6	12.62	0.22	24085	0.06	14992	0.37	4.6	0.7	995	5
Regionalized-3	7	1	10.52	0.19	16203	0.04	10579	0.26	2.45	0.37	933	4
Regionalized-4	4	6	19.05	0.34	32846	0.08	20085	0.49	6.65	1.01	1225	6
Centralized	1	1	5.31	0.09	7888	0.02	4686	0.11	0.74	0.11	644	3

Notes:
(1) T is defined as Treatment, D is defined as Disposal

Table II-10.1-17. ORR—LLMW—Cost

LLMW Alternatives	Number of Sites		Total Cost (Millions) (1)	Cost by Life-Cycle Component (1)				Cost by Functional Area (1)		
	T	D		Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Treatment (Millions)	Storage (Millions)	Disposal (Millions)
No Action	3	-	934	38	170	667	59	509	424	0
Decentralized	37	16	1772	143	528	1005	95	1456	0	316
Regionalized-1	11	12	1772	143	528	1005	95	1456	0	316
Regionalized-2	7	6	1772	143	528	1005	95	1456	0	316
Regionalized-3	7	1	1547	128	494	855	70	1456	0	92
Regionalized-4	4	6	2233	184	635	1292	120	1867	0	366
Centralized	1	1	987	80	360	502	45	895	0	92

Notes:
T = Treatment
D = Disposal
The Life-Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum of these may not reflect the true total cost.
(1) In current 1994 dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

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10.2 ORR LLW

Thirteen tables immediately following portray the impacts of LLW at ORR. These tables are presented as follows:

Impact Category

No.	Description	Table No.	Page No.
1.	ORR—LLW—Treatment and Disposal: Estimated Number of Fatalities	II-10.2-1	10-21
2.	ORR—LLW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects	II-10.2-2	10-22
3.	ORR—LLW—Disposal: Estimated Number of Cancer Incidences and Genetic Effects	II-10.2-3	10-23
4.	ORR—LLW—Treatment and Disposal: MEI Probability of Cancer Fatality	II-10.2-4	10-24
5.	ORR—LLW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects	II-10.2-5	10-25
7.	ORR—LLW—Emissions in Tons per Year of Criteria Air Pollutants	II-10.2-6	10-26
8.	ORR—LLW—Percent of Standard/Guideline for Criteria Air Pollutants	II-10.2-7	10-27
9.	ORR—LLW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-10.2-8	10-28
10.	ORR—LLW—Impacts on Water Resources Due to Increased Water Use	II-10.2-9	10-29
11.	ORR—LLW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal	II-10.2-10	10-30
12.	ORR—LLW—Socioeconomic Impacts for Treatment and Disposal	II-10.2-11	10-31
13.	ORR—LLW—Infrastructure Impacts for Treatment and Disposal	II-10.2-12	10-32
14.	ORR—LLW—Cost	II-10.2-13	10-33

Table II-10.2-1. ORR—LLW—Treatment and Disposal: Estimated Number of Fatalities

LLW Alternatives	Number of Sites		Treatment				Disposal	
			WM Worker		Offsite Population	Noninvolved Workers	WM Worker	
	T	D	Radiation Exposure	Physical Hazards	Radiation Exposure	Radiation Exposure	Radiation Exposure	Physical Hazards
No Action	10**	6	6.8E-02	4.7E-01	1.1E-02	3.7E-04	3.8E-02	3.1E-01
Decentralized		16	3.5E-02	4.2E-01	5.9E-06	2.1E-07	3.0E-02	4.3E-01
Regionalized-1		12	3.5E-02	4.1E-01	5.9E-06	2.1E-07	3.0E-02	4.3E-01
Regionalized-2	11	12	1.3E-01	1.3E+00	1.5E-05	3.4E-07	4.7E-02	1.5E-01
Regionalized-3		6	3.5E-02	4.2E-01	5.7E-06	1.9E-07	5.1E-02	8.3E-01
Regionalized-4	7	6	1.4E-01	1.3E+00	1.9E-05	5.1E-07	4.9E-02	4.2E-01
Regionalized-5	4	6	1.7E-01	1.9E+00	4.6E-02	6.8E-04	4.9E-02	4.2E-01
Regionalized-6		2	3.5E-02	5.6E-01	5.9E-06	2.1E-07	- -	- -
Regionalized-7		2	3.5E-02	5.6E-01	5.9E-06	2.1E-07	- -	- -
Centralized-1		1	3.5E-02	5.6E-01	5.9E-06	2.1E-07	- -	- -
Centralized-2		1	3.5E-02	5.6E-01	5.9E-06	2.1E-07	- -	- -
Centralized-3	7	1	1.4E-01	1.3E+00	1.9E-05	5.1E-07	- -	- -
Centralized-4	7	1	1.4E-01	1.3E+00	1.9E-05	5.1E-07	- -	- -
Centralized-5	1	1	3.5E-02	5.6E-01	5.9E-06	2.1E-07	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered under the alternative
** Ten sites use existing facilities for Volume Reduction

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Table II-10.2–2. ORR—LLW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

LLW Alternatives	Number of Sites		Offsite Population			Noninvolved Worker			WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	10**	6	2.2E+01	3.8E-02	2.2E-03	7.5E-01	1.3E-03	7.5E-05	1.7E+02	2.4E-01	1.0E-02
Decentralized		16	1.1E-02	1.9E-05	1.1E-06	3.9E-04	6.6E-07	3.9E-08	8.7E+01	1.2E-01	5.2E-03
Regionalized-1		12	1.1E-02	1.9E-05	1.1E-06	3.9E-04	6.6E-07	3.9E-08	8.7E+01	1.2E-01	5.2E-03
Regionalized-2	11	12	3.0E-02	5.1E-05	3.0E-06	6.7E-04	1.1E-06	6.7E-08	3.5E+02	4.9E-01	2.1E-02
Regionalized-3		6	1.1E-02	1.9E-05	1.1E-06	3.9E-04	6.6E-07	3.9E-08	8.7E+01	1.2E-01	5.2E-03
Regionalized-4	7	6	3.7E-02	6.3E-05	3.7E-06	1.0E-03	1.7E-06	1.0E-07	3.4E+02	4.8E-01	2.0E-02
Regionalized-5	4	6	9.2E+01	1.6E-01	9.2E-03	1.4E+00	2.3E-03	1.4E-04	4.2E+02	5.9E-01	2.5E-02
Regionalized-6		2	1.2E-02	2.0E-05	1.2E-06	4.2E-04	7.1E-07	4.2E-08	8.7E+01	1.2E-01	5.2E-03
Regionalized-7		2	1.2E-02	2.0E-05	1.2E-06	4.2E-04	7.1E-07	4.2E-08	8.7E+01	1.2E-01	5.2E-03
Centralized-1		1	1.2E-02	2.0E-05	1.2E-06	4.2E-04	7.1E-07	4.2E-08	8.7E+01	1.2E-01	5.2E-03
Centralized-2		1	1.2E-02	2.0E-05	1.2E-06	4.2E-04	7.1E-07	4.2E-08	8.7E+01	1.2E-01	5.2E-03
Centralized-3	7	1	3.7E-02	6.3E-05	3.7E-06	1.0E-03	1.7E-06	1.0E-07	3.4E+02	4.8E-01	2.0E-02
Centralized-4	7	1	3.7E-02	6.3E-05	3.7E-06	1.0E-03	1.7E-06	1.0E-07	3.4E+02	4.8E-01	2.0E-02
Centralized-5	1	1	1.1E-02	1.9E-05	1.1E-06	3.9E-04	6.6E-07	3.9E-08	8.7E+01	1.2E-01	5.2E-03

Notes:
T = Treatment
D = Disposal
** Ten sites use existing facilities for Volume Reduction.

Table II-10.2–3. ORR—LLW—Disposal: Estimated Number of Cancer Incidences and Genetic Effects

LLW Alternatives	Number of Sites		WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	10**	6	9.5E+01	1.3E-01	5.7E-03
Decentralized		16	7.4E+01	1.0E-01	4.4E-03
Regionalized-1		12	7.4E+01	1.0E-01	4.4E-03
Regionalized-2	11	12	1.2E+02	1.6E-01	7.1E-03
Regionalized-3		6	1.3E+02	1.8E-01	7.7E-03
Regionalized-4	7	6	1.2E+02	1.7E-01	7.4E-03
Regionalized-5	4	6	1.2E+02	1.7E-01	7.4E-03
Regionalized-6		2	- -	- -	- -
Regionalized-7		2	- -	- -	- -
Centralized-1		1	- -	- -	- -
Centralized-2		1	- -	- -	- -
Centralized-3	7	1	- -	- -	- -
Centralized-4	7	1	- -	- -	- -
Centralized-5	1	1	- -	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered under the alternative.
** Ten sites use existing facilities for Volume Reduction.

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Table II-10.2–4. ORR—LLW—Treatment and Disposal: MEI Probability of Cancer Fatality

LLW Alternatives	Number of Sites		Treatment		Disposal
	T	D	Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability	Hypothetical Farm Family - Most Exposed Lifetime MEI Cancer Fatality Probability
No Action	10**	6	3.5E-07	3.4E-07	2.1E-08
Decentralized		16	1.8E-10	1.7E-10	2.5E-07
Regionalized-1		12	1.8E-10	1.7E-10	2.5E-07
Regionalized-2	11	12	4.6E-10	3.0E-10	1.2E-06
Regionalized-3		6	1.8E-10	1.7E-10	3.1E-05
Regionalized-4	7	6	5.7E-10	4.6E-10	7.1E-05
Regionalized-5	4	6	1.4E-06	6.1E-07	7.1E-05
Regionalized-6		2	1.8E-10	1.8E-10	- -
Regionalized-7		2	1.8E-10	1.8E-10	- -
Centralized 1		1	1.8E-10	1.8E-10	- -
Centralized 2		1	1.8E-10	1.8E-10	- -
Centralized 3	7	1	5.7E-10	4.6E-10	- -
Centralized 4	7	1	5.7E-10	4.6E-10	- -
Centralized 5	1	1	1.8E-10	1.7E-10	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered under the Alternative.
** Ten sites use existing facilities for Volume Reduction.

Table II-10.2–5. ORR—LLW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects

LLW Alternatives	Number of Sites		Treatment						Disposal		
			Offsite MEI			Noninvolved Worker MEI			Most Exposed Lifetime MEI		
	T	D	Dose (rem)	Radiation Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Radiation Genetic Effects Probability
No Action	10**	6	7.0E-04	1.2E-06	7.0E-08	6.8E-04	1.2E-06	6.8E-08	4.1E-05	7.0E-08	4.1E-09
Decentralized		16	3.6E-07	6.1E-10	3.6E-11	3.5E-07	5.9E-10	3.5E-11	5.0E-04	8.5E-07	5.0E-08
Regionalized-1		12	3.6E-07	6.1E-10	3.6E-11	3.5E-07	5.9E-10	3.5E-11	5.0E-04	8.5E-07	5.0E-08
Regionalized-2	11	12	9.2E-07	1.6E-09	9.2E-11	6.1E-07	1.0E-09	6.1E-11	2.3E-03	4.0E-06	2.3E-07
Regionalized-3		6	3.6E-07	6.1E-10	3.6E-11	3.5E-07	5.9E-10	3.5E-11	6.1E-02	1.0E-04	6.1E-06
Regionalized-4	7	6	1.1E-06	1.9E-09	1.1E-10	9.1E-07	1.6E-09	9.1E-11	1.4E-01	2.4E-04	1.4E-05
Regionalized-5	4	6	2.9E-03	4.9E-06	2.9E-07	1.2E-03	2.1E-06	1.2E-07	1.4E-01	2.4E-04	1.4E-05
Regionalized-6		2	3.7E-07	6.2E-10	3.7E-11	3.6E-07	6.2E-10	3.6E-11	- -	- -	- -
Regionalized-7		2	3.7E-07	6.2E-10	3.7E-11	3.6E-07	6.2E-10	3.6E-11	- -	- -	- -
Centralized-1		1	3.7E-07	6.2E-10	3.7E-11	3.6E-07	6.2E-10	3.6E-11	- -	- -	- -
Centralized-2		1	3.7E-07	6.2E-10	3.7E-11	3.6E-07	6.2E-10	3.6E-11	- -	- -	- -
Centralized-3	7	1	1.1E-06	1.9E-09	1.1E-10	9.1E-07	1.6E-09	9.1E-11	- -	- -	- -
Centralized-4	7	1	1.1E-06	1.9E-09	1.1E-10	9.1E-07	1.6E-09	9.1E-11	- -	- -	- -
Centralized-5	1	1	3.6E-07	6.1E-10	3.6E-11	3.5E-07	5.9E-10	3.5E-11	- -	- -	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered under the alternative.
** Ten sites use existing facilities for Volume Reduction.

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Table II-10.2–6. ORR—LLW—Emissions in Tons per Year of Criteria Air Pollutants

LLW Alternatives	Number of Sites		Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action	10**	6	49 (18/31)	54 (48/6)	0	4 (4/0)	5 (5/0)	9 (5/4)	213 (2/211)	46 (4/42)	0	1 (1/0)	0	26 (0/25)
Decentralized		16	154 (106/47)	287 (277/9)	0	22 (22/0)	26 (26/0)	32 (27/6)	112 (4/108)	30 (9/22)	0	2 (1/0)	0	14 (1/13)
Regionalized-1		12	154 (106/47)	287 (277/9)	0	22 (22/0)	26 (26/0)	32 (27/6)	112 (4/108)	30 (9/22)	0	2 (1/0)	0	14 (1/13)
Regionalized-2	11	12	241 (46/195)	159 (120/39)	0	10 (10/0)	11 (11/0)	35 (12/23)	184 (2/183)	40 (4/37)	0	1 (1/0)	0	22 (0/22)
Regionalized-3		6	281 (234/47)	620 (610/9)	0	49 (49/0)	58 (58/0)	64 (59/6)	134 (9/126)	48 (19/30)	0	4 (3/0)	0	17 (1/15)
Regionalized-4	7	6	312 (110/203)	327 (286/40)	0	23 (23/0)	27 (27/0)	52 (28/24)	290 (4/286)	70 (9/61)	0	3 (2/1)	0	35 (1/35)
Regionalized-5	4	6	351 (114/237)	344 (297/47)	0	24 (24/0)	28 (28/0)	57 (29/28)	332 (4/328)	81 (11/70)	0	4 (3/1)	0	40 (1/40)
Regionalized-6		2	75 (8/67)	33 (20/13)	0	2 (2/0)	2 (2/0)	10 (2/8)	54 (0/54)	16 (1/15)	0	0	0	7 (0/7)
Regionalzied-7		2	75 (8/67)	33 (20/13)	0	2 (2/0)	2 (2/0)	10 (2/8)	54 (0/54)	16 (1/15)	0	0	0	7 (0/7)
Centralized-1		1	75 (8/67)	33 (20/13)	0	2 (2/0)	2 (2/0)	10 (2/8)	54 (0/54)	16 (1/15)	0	0	0	7 (0/7)
Centralized-2		1	75 (8/67)	33 (20/13)	0	2 (2/0)	2 (2/0)	10 (2/8)	54 (0/54)	16 (1/15)	0	0	0	7 (0/7)
Centralized-3	7	1	219 (17/203)	84 (44/40)	0	4 (3/0)	4 (4/0)	29 (4/24)	240 (1/239)	54 (2/52)	0	1 (0/1)	0	29 (0/29)
Centralized-4	7	1	219 (17/203)	84 (44/40)	0	4 (3/0)	4 (4/0)	29 (4/24)	240 (1/239)	54 (2/52)	0	1 (0/1)	0	29 (0/29)
Centralized-5	1	1	203 (8/195)	59 (20/39)	0	2 (2/0)	2 (2/0)	25 (2/23)	54 (0/54)	16 (1/15)	0	0	0	7 (0/7)

Notes:
T = Treatment
D = Disposal
Emissions <1 ton per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions / worker vehicles emission)
(2) Values = total emissions (stationary-source emissions / mobile-source emission)
** Ten sites use existing facilities for Volume Reduction.

Table II-10.2–7. ORR—LLW—Percent of Standard/Guideline for Criteria Air Pollutants

LLW Alternatives	T	D	Construction: Percent of Tons/Year General Conformity Rule (1)					
			CO	NO2	Pb	PM10	SO2	VOC
No Action	10**	6	--	--	--	--	--	--
Decentralized		16	--	--	--	--	--	--
Regionalized-1		12	--	--	--	--	--	--
Regionalized-2	11	12	--	--	--	--	--	--
Regionalized-3		6	--	--	--	--	--	--
Regionalized-4	7	6	--	--	--	--	--	--
Regionalized-5	4	6	--	--	--	--	--	--
Regionalized-6		2	--	--	--	--	--	--
Regionalzied-7		2	--	--	--	--	--	--
Centralized-1		1	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--
Centralized-4	7	1	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--

LLW Alternatives	T	D	Operations & Maintenance: Percent of Tons/Year Standard or Guideline (3)						Percent of NAAQS Concentration (4)					
			CO (5)	NO2 (6)	Pb (5)	PM10 (7)	SO2 (5)	VOC (6)	CO	NO2	Pb	PM10	SO2	VOC
No Action	10**	6	2	9	0	4	0	1	--	--	--	--	--	--
Decentralized		16	4	21	0	10	0	2	--	--	--	--	--	--
Regionalized-1		12	4	21	0	10	0	2	--	--	--	--	--	--
Regionalized-2	11	12	2	9	0	4	0	1	0	0	0	0	0	0
Regionalized-3		6	9	47	0	21	0	3	--	--	--	--	--	--
Regionalized-4	7	6	4	22	0	12	0	2	0	0	0	0	0	0
Regionalized-5	4	6	4	27	0	18	0	2	0	0	0	0	0	0
Regionalized-6		2	0	2	0	1	0	0	--	--	--	--	--	--
Regionalzied-7		2	0	2	0	1	0	0	--	--	--	--	--	--
Centralized-1		1	0	2	0	1	0	0	--	--	--	--	--	--
Centralized-2		1	0	2	0	1	0	0	--	--	--	--	--	--
Centralized-3	7	1	1	4	0	3	0	0	0	0	0	0	0	0
Centralized-4	7	1	1	4	0	3	0	0	0	0	0	0	0	0
Centralized-5	1	1	0	2	0	1	0	0	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide. VOC = volatile organic compounds.
NAAQS = National Ambient Air Quality Standard.
(1) ORR is in an attainment area for all criteria pollutants, therefore the GCR do not apply.
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions for the minimum treatment (no incineration) alternatives, and the Centralized-5 Alternatives, are assumed to be negligible.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.
** Ten sites use existing facilities for Volume Reduction.

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Table II-10.2–8. ORR—LLW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

LLW Alternatives	Number of Sites		Operations & Maintenance											
	T	D	Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action	10**	6	0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Decentralized		16	0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-1		12	0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-2	11	12	0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-3		6	0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-4	7	6	0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-5	4	6	0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-6		2	0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-7		2	0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Centralized-1		1	0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Centralized-2		1	0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Centralized-3	7	1	0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Centralized-4	7	1	0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Centralized-5	1	1	0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

LLW Alternatives	Number of Sites		Operations & Maintenance									
	T	D	Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action	10**	6	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Decentralized		16	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-1		12	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-2	11	12	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-3		6	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-4	7	6	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-5	4	6	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-6		2	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-7		2	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Centralized-1		1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Centralized-2		1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Centralized-3	7	1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Centralized-4	7	1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Centralized-5	1	1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

Notes:
T= Treatment
D = Disposal
- - = Emissions of this hazardous or toxic air pollutant are assumed to be negligible.
Percentages <1% are shown as zeros.
** Ten sites use existing facilities for Volume Reduction.

Table II-10.2-9. ORR—LLW—Impacts on Water Resources Due to Increased Water Use

LLW Alternatives	Number of Sites		Construction			Operations			
	T	D	Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action	10**	6	13202	0.1	<0.1	13701	0.1	<0.1	<0.1
Decentralized		16	247613	1.4	<0.1	12392	0.1	<0.1	<0.1
Regionalized-1		12	247613	1.4	<0.1	12392	0.1	<0.1	<0.1
Regionalized-2	11	12	123499	0.7	<0.1	36399	0.2	<0.1	<0.1
Regionalized-3		6	539756	2.9	<0.1	20858	0.1	<0.1	<0.1
Regionalized-4	7	6	269232	1.5	<0.1	40283	0.2	<0.1	<0.1
Regionalized-5	4	6	282328	1.5	<0.1	47608	0.3	<0.1	<0.1
Regionalized-6		2	23982	0.1	<0.1	7328	<0.1	<0.1	<0.1
Regionalized-7		2	23982	0.1	<0.1	7328	<0.1	<0.1	<0.1
Centralized-1		1	23982	0.1	<0.1	7328	<0.1	<0.1	<0.1
Centralized-2		1	23982	0.1	<0.1	7328	<0.1	<0.1	<0.1
Centralized-3	7	1	56373	0.3	<0.1	33909	0.2	<0.1	<0.1
Centralized-4	7	1	56373	0.3	<0.1	33909	0.2	<0.1	<0.1
Centralized-5	1	1	23982	0.1	<0.1	7328	<0.1	<0.1	<0.1

Notes:
T = Treatment
D = Disposal
Water supplied by surface water in the Clinch River. Current water use = 18,300,000 gallons/day.
Wastewater discharged to the Clinch River. Average flow rate of the Clinch River = 3,003,000,000 gallons/day.
** Ten sites use existing facilities for Volume Reduction.
<0.1 indicates that the percentage is less than 0.1%.

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Table II-10.2–10. ORR—LLW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal

LLW Alternatives	Number of Sites T	Number of Sites D	Ac 225	Ac 227	Am 241	Am 242	Am 243	C 14	Cs 135	Cs 137	Cm 242	Cm 244	Cm 245	I 129	Pb 210	Np 237	Ni 59	Ni 63	Pd 107	Pu 238	Pu 239	Pu 240	Pu 241
No Action	10**	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Decentralized		16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	2	0
Regionalized-1		12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	2	0
Regionalized-2	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	40	8	0
Regionalized-3		6	0	0	0	0	0	0	0	0	0	0	0	0	0	40	0	0	0	0	4	1	0
Regionalized-4	7	6	0	0	0	0	0	0	0	0	0	0	0	0	0	90	0	0	0	0	9	3	0
Regionalized-5	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	90	0	0	0	0	9	3	0
Regionalized-6		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-1		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-4	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

LLW Alternatives	Number of Sites T	Number of Sites D	Po 210	K 40	Pa 231	Ra 223	Ra 226	Sm 151	Se 79	Sr 90	Tc 99	Th 227	Th 228	Th 229	Th 230	Th 232	Sn 126	U 233	U 234	U 235	U 236	U 238	Y 90	Zr 93
No Action	10**	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Decentralized		16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1		12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-2	11	12	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-3		6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-4	7	6	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-5	4	6	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-6		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-1		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-4	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
** Ten sites use existing facilities for Volume Reduction
-- = Disposal is not considered for this Alternative.

Table II-10.2–11. ORR—LLW—Socioeconomic Impacts for Treatment and Disposal

LLW Alternatives	Number of Sites		Effect of Implementation of Alternatives					
				Jobs		Income		
	T	D	Cost (Millions) (1)	Jobs	% Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action	10**	6	3721	3307	1.15	37.4	0.46	0.36
Decentralized		16	1826	2029	0.70	22.9	0.28	0.43
Regionalized-1		12	1826	2029	0.70	22.9	0.28	0.43
Regionalized-2	11	12	3631	4033	1.40	45.6	0.56	0.57
Regionalized-3		6	2533	2814	0.98	31.8	0.39	0.37
Regionalized-4	7	6	4112	4568	1.59	51.7	0.64	0.84
Regionalized-5		6	4712	5234	1.82	59.2	0.73	0.96
Regionalized-6		2	885	983	0.34	11.1	0.14	0.16
Regionalized-7		2	885	983	0.34	11.1	0.14	0.16
Centralized-1		1	885	983	0.34	11.1	0.14	0.16
Centralized-2		1	885	983	0.34	11.1	0.14	0.16
Centralized-3	7	1	3403	3780	1.31	42.7	0.53	0.69
Centralized-4	7	1	3403	3780	1.31	42.7	0.53	0.69
Centralized-5	1	1	885	983	0.34	11.1	0.14	0.16

Notes:
T = Treatment
D = Disposal
(1) In constant 1990 dollars.
(2) Compared to 1990 baseline.
** Ten sites use existing facilities for Volume Reduction.

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Table II-10.2–12. ORR—LLW—Infrastructure Impacts for Treatment and Disposal

LLW Alternatives	Number of Sites		Effect of Implementation of Alternatives									
			Land Use		Water		Waste Water		Power		Employment (FTE)	
	T	D	Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	% Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Peak Construction Employment	% of Current Employment (1)
No Action	10**	6	83.2	1.48	13701	0.03	13701	0.34	8.10	1.23	237	1
Decentralized		16	65.6	1.16	247613	0.62	12392	0.30	36.66	5.55	2076	10
Regionalized-1		12	65.6	1.16	247613	0.62	12392	0.30	36.66	5.55	784	4
Regionalized-2	11	12	45.7	0.81	123499	0.31	36399	0.89	15.90	2.41	1658	8
Regionalized-3		6	137.6	2.44	539756	1.34	20858	0.51	80.69	12.23	1012	5
Regionalized-4	7	6	80.1	1.42	269232	0.67	40283	0.98	37.86	5.74	1968	9
Regionalized-5	4	6	86.2	1.53	282328	0.70	47608	1.16	39.29	5.95	2233	10
Regionalized-6		2	11.6	0.21	23982	0.06	7328	0.18	2.86	0.43	518	2
Regionalized-7		2	11.6	0.21	23982	0.06	7328	0.18	2.86	0.43	518	2
Centralized-1		1	11.6	0.21	23982	0.06	7328	0.09	2.86	0.43	518	2
Centralized-2		1	11.6	0.21	23982	0.06	7328	0.18	2.86	0.43	518	2
Centralized-3	7	1	27.5	0.49	56373	0.14	33909	0.83	37.86	1.38	1571	7
Centralized-4	7	1	27.5	0.49	56373	0.14	33909	0.83	37.86	1.38	1571	7
Centralized-5	1	1	11.6	0.21	23982	0.06	7328	0.18	2.86	0.43	518	2

Notes:
T = Treatment
D = Disposal
GPD = Gallons per Day
MW = Megawatts Electric
FTE = Full Time Equivalent
(1) Based on 1991 Site Employment.
** Ten sites use existing facilities for Volume Reduction.

Table II-10.2-13. ORR—LLW—Cost

LLW Alternatives	Number of Sites		Total Cost (Millions) (1)	Cost by Life-Cycle Component (1)				Cost by Functional Area (1)		
	T	D		Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Treatment (Millions)	Storage (Millions)	Disposal (Millions)
No Action	10**	6	4210	36	1024	2949	200	979	0	3231
Decentralized		16	2066	162	465	1339	101	711	0	1355
Regionalized-1		12	2066	162	465	1339	101	711	0	1355
Regionalized-2	11	12	4108	278	716	3020	93	3773	0	334
Regionalized-3		6	2866	187	1132	1344	203	711	0	2155
Regionalized-4	7	6	4653	332	854	3346	122	3850	0	803
Regionalized-5	4	6	5331	367	974	3848	141	4528	0	803
Regionalized-6		2	1001	78	250	630	44	1001	0	0
Regionalized-7		2	1001	78	250	630	44	1001	0	0
Centralized-1		1	1001	78	250	630	44	1001	0	0
Centralized-2		1	1001	78	250	630	44	1001	0	0
Centralized-3	7	1	3850	273	663	2860	55	3850	0	0
Centralized-4	7	1	3850	273	663	2860	55	3850	0	0
Centralized-5	1	1	1001	78	250	630	44	1001	0	0

Notes:
** Ten sites use existing facilities for Volume Reduction
T = Treatment
D = Disposal
The Life Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum may not reflect the true total cost.
(1) In Current 1994 Dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

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10.3 ORR TRUW

Twelve tables immediately following portray the impacts of TRUW at ORR. These tables are presented as follows:

Impact Category

No.	Description	Table No.	Page No.
1.	ORR—TRUW—Treatment: Estimated Number of Fatalities	II-10.3-1	10-35
2.	ORR—TRUW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects	II-10.3-2	10-36
4.	ORR—TRUW—Treatment: MEI Probability of Cancer Fatality	II-10.3-3	10-37
5.	ORR—TRUW—Treatment: MEI Probability of Cancer Incidences and Genetic Effects	II-10.3-4	10-38
6.	ORR—TRUW—Treatment: Noncancer Health Risk From Chemical Exposure	II-10.3-5	10-39
7.	ORR—TRUW—Emissions in Tons per Year of Criteria Air Pollutants	II-10.3-6	10-40
8.	ORR—TRUW—Percent of Standard/Guideline for Criteria Air Pollutants	II-10.3-7	10-41
9.	ORR—TRUW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-10.3-8	10-42
10.	ORR—TRUW—Impacts on Water Resources Due to Increased Water Use	II-10.3-9	10-43
12.	ORR—TRUW—Socioeconomic Impacts for Treatment	II-10.3-10	10-44
13.	ORR—TRUW—Infrastructure Impacts for Treatment	II-10.3-11	10-45
14.	ORR—TRUW—Cost	II-10.3-12	10-46

Table II-10.3-1. ORR—TRUW—Treatment: Estimated Number of Fatalities

TRUW Alternatives	Treatment						
	Number of Sites		Treat STD	WM Worker		Offsite Population Radiation Exposure	Noninvolved Workers Radiation Exposure
	CH Treat	RH Treat		Radiation Exposure	Physical Hazards		
No Action **	16	5	WIPP WAC	3.6E-07	8.4E-03	6.6E-08	2.3E-09
Decentralized ***	16	5	WIPP WAC	2.7E-03	9.1E-02	8.0E-07	2.7E-08
Regionalized-1	5	2	Reduce Gas	2.8E-03	1.0E-01	8.3E-07	2.9E-08
Regionalized-2	5	2	LDR	9.0E-02	2.1E-01	4.6E-02	1.6E-03
Regionalized-3	3	2	LDR	9.0E-02	2.1E-01	4.6E-02	1.6E-03
Centralized	WIPP	2	LDR	9.0E-02	2.1E-01	4.6E-02	1.6E-03

Notes:
** For No Action Alternative, storage is indefinite; no disposal at WIPP is assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at 16 sites, then transfered to interim storage at 10 sites, then to WIPP.

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Table II-10.3–2. ORR—TRUW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

TRUW Alternatives	Number of Sites		Treat STD	Offsite Population				Noninvolved Workers				WM Workers			
	CH Treat	RH Treat		Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects
No Action**	16	5	WIPP WAC	1.3E-04	2.2E-07	7.8E-09	1.3E-08	4.6E-06	7.8E-09	2.6E-09	4.6E-10	9.0E-04	1.3E-06	8.4E-08	5.4E-08
Decentralized***	16	5	WIPP WAC	1.6E-03	2.7E-06	1.6E-07	1.6E-07	5.4E-05	9.2E-08	5.2E-08	5.4E-09	6.8E+00	9.5E-03	3.0E-06	4.1E-04
Regionalized-1	5	2	Reduce Gas	1.7E-03	2.8E-06	1.6E-07	1.7E-07	5.7E-05	9.7E-08	5.2E-08	5.7E-09	6.9E+00	9.6E-03	3.4E-06	4.1E-04
Regionalized-2	5	2	LDR	9.2E+01	1.6E-01	1.1E-07	9.2E-03	3.1E+00	5.3E-03	3.7E-08	3.1E-04	2.3E+02	3.2E-01	5.1E-06	1.4E-02
Regionalized-3	3	2	LDR	9.2E+01	1.6E-01	1.1E-07	9.2E-03	3.1E+00	5.3E-03	3.7E-08	3.1E-04	2.3E+02	3.2E-01	5.1E-06	1.4E-02
Centralized	WIPP	2	LDR	9.2E+01	1.6E-01	1.1E-07	9.2E-03	3.1E+00	5.3E-03	3.7E-08	3.1E-04	2.3E+02	3.2E-01	5.1E-06	1.4E-02

Notes:
** For No Action Alternative, storage is indefinite; no disposal at WIPP is assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
T = Treatment
D = Disposal

Table II-10.3-3. ORR—TRUW—Treatment: MEI Probability of Cancer Fatality

TRUW Alternatives	Number of Sites		Treat STD	Treatment	
	CH Treat	RH Treat		Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability
No Action**	16	5	WIPP WAC	2.1E-12	2.1E-12
Decentralized***	16	5	WIPP WAC	2.5E-11	2.5E-11
Regionalized-1	5	2	Reduce Gas	2.6E-11	2.6E-11
Regionalized-2	5	2	LDR	1.4E-06	1.4E-06
Regionalized-3	3	2	LDR	1.4E-06	1.4E-06
Centralized	WIPP	2	LDR	1.4E-06	1.4E-06

Notes:
MEI = Maximally Exposed Individual
** For No Action Alternative, storage is indefinite; no disposal of WIPP is assumed, for all other alternatives disposal at WIPP is assumed.
***In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then transferred to interim storage at 10 sites, then to WIPP.

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Table II-10.3–4. ORR—TRUW—Treatment: MEI Probability of Cancer Incidences and Genetic Effects

TRUW Alternatives	Number of Sites		Treat STD	Treatment							
				Offsite MEI				Noninvolved Worker MEI			
	CH Treat	RH Treat		Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability
No Action **	16	5	WIPP WAC	4.1E-09	7.0E-12	4.0E-13	4.1E-13	4.1E-09	7.0E-12	2.5E-12	4.1E-13
Decentralized ***	16	5	WIPP WAC	4.9E-08	8.4E-11	8.1E-12	4.9E-12	4.9E-08	8.3E-11	5.0E-11	4.9E-12
Regionalized-1	5	2	Reduce Gas	5.1E-08	8.7E-11	8.1E-12	5.1E-12	5.2E-08	8.8E-11	5.0E-11	5.2E-12
Regionalized-2	5	2	LDR	2.8E-03	4.8E-06	5.7E-12	2.8E-07	2.8E-03	4.8E-06	3.5E-11	2.8E-07
Regionalized-3	3	2	LDR	2.8E-03	4.8E-06	5.7E-12	2.8E-07	2.8E-03	4.8E-06	3.5E-11	2.8E-07
Centralized	WIPP	2	LDR	2.8E-03	4.8E-06	5.7E-12	2.8E-07	2.8E-03	4.8E-06	3.5E-11	2.8E-07

Notes:
** For No Action Alternative, storage is indefinite; no disposal at WIPP is assumed for all other alternatives, disposal of WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites then to WIPP.
MEI = Maximally Exposed Individual

Table II-10.3-5. ORR—TRUW—Treatment: Noncancer Health Risk From Chemical Exposure

TRUW Alternatives	Number of Sites		Treat STD	Treatment		
	CH Treat	RH Treat		Offsite MEI Hazard Index	Noninvolved Worker MEI Hazard Index	WM Worker Exposure Index
No Action**	16	5	WIPP WAC	3.3E-12	2.0E-11	3.0E-06
Decentralized***	16	5	WIPP WAC	1.3E-10	8.0E-10	3.0E-05
Regionalized-1	5	2	Reduce Gas	1.3E-10	8.1E-10	3.0E-05
Regionalized-2	5	2	LDR	1.9E-09	1.2E-08	3.0E-05
Regionalized-3	3	2	LDR	1.9E-09	1.2E-08	3.0E-05
Centralized	WIPP	2	LDR	1.9E-09	1.2E-08	3.0E-05

Notes:
MEI = Maximally Exposed Individual
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
Hazard Index = Sum of hazard quotient values for all noncarcinogenic chemicals. The Hazard Quotient is the chemical-specific ratio of media exposure concentrations to concentrations exposure concentrations to concentrations believed to have no appreciable adverse effects.
Exposure Index Ratio of exposure concentration to chemical-specific occupational threshold limits.

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Table II-10.3-6. ORR—TRUW—Emissions in Tons per Year of Criteria Air Pollutants

TRUW Alternatives	Number of Sites		Treat STD	Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
	CH Treat	RH Treat		CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action**	16	5	WIPP WAC	- -	- -	- -	- -	- -	- -	15 (0/15)	3 (0/3)	0	0	0	2 (0/2)
Decentralized***	16	5	WIPP WAC	34 (7/27)	24 (19/5)	0	1 (1/0)	2 (2/0)	5 (2/3)	23 (0/23)	5 (0/5)	0	0	0	3 (0/3)
Regionalized-1	5	2	Reduce Gas	27 (6/21)	20 (16/4)	0	1 (1/0)	2 (2/0)	5 (2/3)	19 (19/0)	4 (0/4)	0	0	0	3 (0/3)
Regionalized-2	5	2	LDR	43 (7/36)	26 (19/7)	0	1 (1/0)	2 (2/0)	6 (2/4)	24 (0/24)	5 (0/5)	0	0	0	3 (0/3)
Regionalized-3	3	2	LDR	43 (7/36)	26 (19/7)	0	1 (1/0)	2 (2/0)	6 (2/4)	24 (0/24)	5 (0/5)	0	0	0	3 (0/3)
Centralized	WIPP	2	LDR	43 (7/36)	26 (19/7)	0	1 (1/0)	2 (2/0)	6 (2/4)	24 (0/24)	5 (0/5)	0	0	0	3 (0/3)

Notes:
Emissions <1 ton per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions / worker vehicles emission)
(2) Values = total emissions (stationary-source emissions / mobile-source emission)
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

Table II-10.3-7. ORR—TRUW—Percent of Standard/Guideline for Criteria Air Pollutants

TRUW Alternatives	Number of Sites		Treat	Construction					
				Percent of Tons/Year General Conformity Rule (1)					
	CH Treat	RH Treat	STD	CO	NO2	Pb	PM10	SO2	VOC
No Action**	16	5	WIPP WAC	--	--	--	--	--	--
Decentralized***	16	5	WIPP WAC	--	--	--	--	--	--
Regionalized-1	5	2	Reduce Gas	--	--	--	--	--	--
Regionalized-2	5	2	LDR	--	--	--	--	--	--
Regionalized-3	3	2	LDR	--	--	--	--	--	--
Centralized	WIPP	2	LDR	--	--	--	--	--	--

TRUW Alternatives	Number of Sites		Treat	Operations & Maintenance											
				Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
	CH Treat	RH Treat	STD	CO (4)	NO2 (4)	Pb (4)	PM10 (4)	SO2 (4)	VOC (4)	CO	NO2	Pb	PM10	SO2	VOC
No Action**	16	5	WIPP WAC	0	0	0	0	0	0	--	--	--	--	--	--
Decentralized***	16	5	WIPP WAC	0	1	0	0	0	0	--	--	--	--	--	--
Regionalized-1	5	2	Reduce Gas	0	0	0	0	0	0	--	--	--	--	--	--
Regionalized-2	5	2	LDR	0	1	0	2	1	0	0	0	0	0	0	0
Regionalized-3	3	2	LDR	0	1	0	2	1	0	0	0	0	0	0	0
Centralized	WIPP	2	LDR	0	1	0	2	1	0	0	0	0	0	0	0

Notes:
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) ORR is in an attainment area for all criteria pollutants, therfore the GCR does not apply.
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions for all alternatives are assumed to be negligible.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

Table II-10.3-8. ORR—TRUW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

TRUW Alternatives	Number of Sites		Treat STD	Operations & Maintenance											
	CH Treat	RH Treat		Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action**	16	5	WIPP - WAC	0	--	--	--	0	0	--	--	--	--	--	--
Decentralized***	16	5	WIPP - WAC	0	--	--	--	0	0	--	--	--	--	--	--
Regionalized-1	5	2	Reduce Gas	0	--	--	--	0	0	--	--	--	--	--	--
Regionalized-2	5	2	LDR	3	--	--	--	0	0	--	--	--	--	--	--
Regionalized-3	3	2	LDR	3	--	--	--	0	0	--	--	--	--	--	--
Centralized	WIPP	2	LDR	3	--	--	--	0	0	--	--	--	--	--	--

TRUW Alternatives	Number of Sites		Treat STD	Operations & Maintenance									
	CH Treat	RH Treat		Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action**	16	5	WIPP - WAC	0	0	--	--	--	0	0	--	--	--
Decentralized***	16	5	WIPP - WAC	0	0	--	--	--	0	0	--	--	--
Regionalized-1	5	2	Reduce Gas	0	0	--	--	--	0	0	--	--	--
Regionalized-2	5	2	LDR	0	0	--	--	--	0	0	--	--	--
Regionalized-3	3	2	LDR	0	0	--	--	--	0	0	--	--	--
Centralized	WIPP	2	LDR	0	0	--	--	--	0	0	--	--	--

Notes:

** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.

*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

-- = Emissions of this hazardous or toxic air pollutant are assumed to be negligible.

Percentages <1% are shown as zeros. CH = contact handled. RH = remote handled.

Table II-10.3-9. ORR—TRUW—Impacts on Water Resources Due to Increased Water Use

TRUW Alternatives	Number of Sites		Treat STD	Construction			Operations			
	CH Treat	RH Treat		Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action**	16	5	WIPP WAC	- -	- -	- -	1425	<0.1	<0.1	<0.1
Decentralized***	16	5	WIPP WAC	12954	0.1	<0.1	3929	<0.1	<0.1	<0.1
Regionalized-1	5	2	Reduce Gas	11065	0.1	<0.1	3228	<0.1	<0.1	<0.1
Regionalized-2	5	2	LDR	14448	0.1	<0.1	3787	<0.1	<0.1	<0.1
Regionalized-3	3	2	LDR	14448	0.1	<0.1	3787	<0.1	<0.1	<0.1
Centralized	WIPP	2	LDR	14448	0.1	<0.1	3787	<0.1	<0.1	<0.1

Notes:
Water supplied by surface water in the Clinch River. Current water use = 18,300,000 gallons/day.
Wastewater discharged to the Clinch River. Average flow rate of the Clinch River = 3,003,000,000 gallons/day.
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
<0.1 indicates that the precentage are less than 0.1%.

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Table II-10.3-10. ORR—TRUW—Socioeconomic Impacts for Treatment

TRUW Alternatives	Number of Sites		Effect of Implementation of Alternatives						
					Jobs		Income		
	CH Treat	RH Treat	Treat STD	Cost (Millions) (1)	Annual Jobs	% Annual Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action**	16	5	WIPP WAC	215	191	0.07	2.2	0.03	0.05
Decentralized***	16	5	WIPP WAC	487	541	0.19	6.1	0.08	0.08
Regionalized-1	5	2	Reduce Gas	424	471	0.16	5.3	0.07	0.09
Regionalized-2	5	2	LDR	598	664	0.23	7.5	0.09	0.04
Regionalized-3	3	2	LDR	598	664	0.23	7.5	0.09	0.09
Centralized	WIPP	2	LDR	598	664	0.23	7.5	0.09	0.09

Notes:
(1) In current 1990 dollars.
(2) Compared to 1990 baseline.
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

Table II-10.3-11. ORR—TRUW—Infrastructure Impacts for Treatment

TRUW Alternatives	Number of Sites		Treat STD	Effect of Implementation of Alternatives									
				Land Use		Water		Waste Water		Power		Employment (FTE)	
	CH Treat	RH Treat		Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Peak Construction Employment	% of Current Employment (1)
No Action**	16	5	WIPP WAC	0	0.00	1425	0.00	1425	0.03	0.14	0.02	0	0.00
Decentralized***	16	5	WIPP WAC	6.6	0.12	12954	0.03	3929	0.10	0.69	0.10	276	1.30
Regionalized-1	5	2	Reduce Gas	5.9	0.11	11065	0.03	3228	0.08	0.65	0.10	258	1.20
Regionalized-2	5	2	LDR	6.3	0.11	14448	0.04	3787	0.09	0.57	0.09	412	1.90
Regionalized-3	3	2	LDR	6.3	0.11	14448	0.04	3787	0.09	0.57	0.09	412	1.90
Centralized	WIPP	2	LDR	6.3	0.11	14448	0.04	3787	0.09	0.57	0.09	412	1.90

Notes:
GPD = Gallons per Day
MW = Megawatts Electric
FTE = Full Time Equivalent
(1) Based on 1991 Site Employment.
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

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Table II-10.3-12. ORR—TRUW—Cost

TRUW Alternatives	Number of Sites		Treat STD (2)	Total Cost (Millions) (1)	Life-Cycle Component				Functional Area		
	CH Treat	RH Treat			Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Retrieval Characterization (Millions)	Treatment (Millions)	Storage (Millions)
No Action**	11	5	WIPP - WAC	243	0	0	207	37	0	217	27
Decentralized***	16	5	WIPP - WAC	551	33	151	286	81	100	415	28
Regionalized-1	5	2	Reduce Gas	480	45	120	247	68	109	353	19
Regionalized-2	5	2	LDR	677	64	207	335	72	109	554	14
Regionalized-3	3	2	LDR	677	64	207	335	72	109	554	14
Centralized	WIPP	2	LDR	677	64	207	335	72	109	554	14

Notes:
** For No Action Alternative, storage is indefinite; no disposal at WIPP to be assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
The Life Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum may not reflect the true total cost.
(1) In Current 1994 Dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.
(2) Treatment standard (STD) applied: treat to WIPP Waste Acceptance Criteria (WIPP WAC), treat for reduced gas generation (Reduce Gas), treat to Land Disposal Restrictions (LDR).

10.4 ORR HLW

ORR is not one of the sites considered to manage HLW. Therefore, Section 10.4 has been intentionally left blank.

10.5 ORR HW

Eleven tables immediately following portray the impacts of HW at ORR. These tables are presented as follows:

Impact Category

No.	Description	Table No.	Page No.
1.	ORR—HW—Treatment: Estimated Number of Fatalities	II-10.5–1	10–49
2.	ORR—HW—Treatment: Estimated Number of Cancer Incidences	II-10.5–2	10–50
3.	ORR—HW—Treatment: MEI Probability of Cancer Incidences	II-10.5–3	10–51
6.	ORR—HW—Treatment: Noncancer Health Risk From Chemical Exposure	II-10.5–4	10–52
7.	ORR—HW—Emissions in Tons per Year of Criteria Air Pollutants	II-10.5–5	10–53
8.	ORR—HW—Percent of Standard/Guideline for Criteria Air Pollutants	II-10.5–6	10–54
9.	ORR—HW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-10.5–7	10–55
10.	ORR—HW—Impacts on Water Resources Due to Increased Water Use	II-10.5–8	10–56
12.	ORR—HW—Socioeconomics Impacts for Treatment	II-10.5–9	10–57
13.	ORR—HW—Infrastructure Impacts for Treatment	II-10.5–10	10–58
14.	ORR—HW—Cost	II-10.5–11	10–59

Table II-10.5-1. ORR—HW—Treatment: Estimated Number of Fatalities

HW Alternatives	Number of Sites T	WM Worker Physical Hazards
No Action	2	5.6E-03
Decentralized	3	8.4E-03
Regionalized-1	5	2.0E-02
Regionalized-2	2	4.1E-02

Notes:
T = Treatment

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Table II-10.5-2. ORR—HW—Treatment: Estimated Number of Cancer Incidences

HW Alternatives	Number of Sites	Treatment		
	T	Offsite MEI Hazard Index	Noninvolved Worker MEI Hazard Index	WM Worker Exposure Index
No Action	2	2.6E-03	1.6E-02	4.3E+00
Decentralized	3	7.2E-03	4.4E-02	5.3E+00
Regionalized-1	5	2.5E-02	1.5E-01	6.1E+00
Regionalized-2	2	6.6E-02	4.1E-01	6.2E+00

Notes:
T = Treatment
MEI = Maximally Exposed Individual
Hazard Index = Sum of hazard quotient values for all noncarcinogenic chemicals. The Hazard Quotient is the chemical-specific ratio of media exposure concentrations to concentrations believed to have no appreciable adverse effects.
Exposure Index = Ratio of exposure concentration to chemical-specific occupational threshold limits.

Table II-10.5-3. ORR—HW—Treatment: MEI Probability of Cancer Incidences

HW Alternatives	Number of Sites	Treatment	
	T	Offsite MEI Cancer Incidence Probability	Noninvolved MEI Cancer Incidence Probability
No Action	2	3.9E-07	2.4E-06
Decentralized	3	5.4E-07	3.3E-06
Regionalized-1	5	1.8E-06	1.1E-05
Regionalized-2	2	5.0E-06	3.1E-05

Notes:
T = Treatment
MEI = Maximally Exposed Individual

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Table II-10.5-4. ORR—HW—Treatment: Noncancer Health Risk From Chemical Exposure

HW Alternatives	Number of Sites	Treatment		
	T	Offsite Population Chemical Cancer Incidence	Noninvolved Worker Chemical Cancer Incidence	WM Worker Chemical Cancer Incidence
No Action	2	7.4E-03	2.5E-03	7.6E-02
Decentralized	3	1.0E-02	3.5E-03	1.0E-01
Regionalized-1	5	3.6E-02	1.1E-02	4.2E-01
Regionalized-2	2	9.5E-02	3.2E-02	1.1E+00

Note:
T = Treatment

Table II-10.5-5. ORR—HW—Emissions in Tons per Year of Criteria Air Pollutants

HW Alternatives	Number of Sites T	Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
		CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action	2	- -	- -	- -	- -	- -	- -	0	0	0	0	1 (1/0)	0
Decentralized	3	3 (2/1)	5 (5/0)	0	0	0	1 (0/0)	0	0	0	0	1 (1/0)	0
Regionalized - 1	5	6 (4/2)	11 (10/0)	0	1 (1/0)	1 (1/0)	1 (1/0)	0	1 (0/0)	0	2 (2/0)	2 (2/0)	0
Regionalized - 2	2	8 (5/3)	13 (12/1)	0	1 (1/0)	1 (1/0)	1 (1/0)	0	1 (0/0)	0	2 (2/0)	2 (2/0)	0

Notes:
T = Treatment
Emissions <1 ton per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions / worker vehicles emission)
(2) Values = total emissions (stationary-source emissions / mobile-source emission)

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Table II-10.5–6. ORR—HW—Percent of Standard/Guideline for Criteria Air Pollutants

HW Alternatives	Number of Sites T	Construction: Percent of Tons/Year General Conformity Rule (1)					
		CO	NO2	Pb	PM10	SO2	VOC
No Action	2	--	--	--	--	--	--
Decentralized	3	--	--	--	--	--	--
Regionalized-1	5	--	--	--	--	--	--
Regionalized-2	2	--	--	--	--	--	--

HW Alternatives	Number of Sites T	Operations & Maintenance: Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
		CO (4)	NO2 (4)	Pb (4)	PM10 (4)	SO2 (4)	VOC (4)	CO	NO2	Pb	PM10	SO2	VOC
No Action	2	0	0	0	3 (3/0)	1 (1/0)	0	0	0	0	0	0	0
Decentralized	3	0	0	0	3 (3/0)	1(1/0)	0	0	0	0	0	0	0
Regionalized-1	5	0	1(1/0)	0	10 (10/0)	5 (5/0)	0	0	0	0	0	0	0
Regionalized-2	2	0	2 (2/0)	0	13 (13/0)	6 (6/0)	0	0	0	0	0	0	0

Notes:
T = Treatment
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) ORR is in an attainment area for all criteria pollutants, therefore the GCR does not apply.
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions only.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.

Table II-10.5–7. ORR—HW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

HW Alternatives	Number of Sites T	Operations & Maintenance											
		Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action	2	--	--	--	0	--	--	0	0	--	--	--	--
Decentralized	3	--	--	--	0	--	--	0	0	--	--	--	--
Regionalized - 1	5	--	--	--	0	--	--	0	0	--	--	--	--
Regionalized - 2	2	--	--	--	0	--	--	0	0	--	--	--	--

HW Alternatives	Number of Sites T	Operations & Maintenance									
		Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action	2	--	0	--	--	0	--	0	0	0	14
Decentralized	3	--	0	--	--	0	--	0	0	0	35
Regionalized - 1	5	--	0	--	--	0	--	0	0	0	120
Regionalized - 2	2	--	0	--	--	0	--	0	0	0	322

Notes:
T = Treatment
Percentages <1% are shown as zeros.
-- = Emissions of certain hazardous or toxic air pollutants, including radionuclides, from HW treatment facilities are assumed to be negligible.

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Table II-10.5-8. ORR—HW—Impacts on Water Resources Due to Increased Water Use

HW Alternatives	Number of Sites T	Construction Water Use GPD	Construction % Current Use	Construction % Stream Flow	Operations Water Use GPD	Operations % Current Use	Operations % Stream Flow	Operations Waste Water % Stream Flow
No Action	2	- -	- -	- -	168	<0.1	<0.1	<0.1
Decentralized	3	516	<0.1	<0.1	367	<0.1	<0.1	<0.1
Regionalized-1	5	1373	<0.1	<0.1	1088	<0.1	<0.1	<0.1
Regionalized-2	2	2438	<0.1	<0.1	2101	<0.1	<0.1	<0.1

Notes:
T = Treatment
Water supplied by surface water in the Clinch River. Current water use = 18,300,000 gallons/day.
Wastewater discharged to the Clinch River. Average flow rate of the Clinch River = 3,003,000,000 gallons/day.
- - = Under No Action construction is not considered.
<0.1 indicates that the percentage is less than 0.1%.

Table II-10.5-9. ORR—HW—Socioeconomics Impacts for Treatment

HW Alternatives	Number of Sites	Effect of Implementation of Alternatives					
			Jobs		Income		
	T	Cost (Millions) (1)	Annual Jobs	% Annual Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action	2	12	15	0.01	0.2	0.00	0.00
Decentralized	3	24	31	0.01	0.4	0.00	0.00
Regionalized 1	5	60	76	0.03	0.9	0.01	0.01
Regionalized 2	2	99	126	0.04	1.4	0.02	0.01

Notes:
T = Treatment
(1) In current 1990 dollars.
(2) Compared to 1990 baseline.

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Table II-10.5-10. ORR—HW—Infrastructure Impacts for Treatment

HW Alternatives	Number of Sites	Effect of Implementation of Alternatives									
		Land Use		Water		Waste Water		Power		Employment (FTE)	
	T	Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	% Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Construction Employment	% of Current Employment (1)
No Action	2	0	0.00	168	0.00	168	0.00	0.13	0.02	0	0
Decentralized	3	1	0.01	516	0.00	367	0.01	0.15	0.02	9	0
Regionalized-1	5	1	0.23	1373	0.01	1088	0.03	0.31	0.05	23	0
Regionalized-2	2	2	0.04	2438	0.01	2101	0.05	0.58	0.09	10	0

Notes:
T = Treatment
GPD = Gallons per Day
MW = Megawatts Electric
(1) Based on 1991 Site Employment.

Table II-10.5-11. ORR—HW—Cost

HW Alternatives	Number of Sites	Total Cost (Millions) (1)	Government Cost by Life-Cycle Component (1)				Cost by Functional Area (1)	
							Treatment & Disposal	
	T		Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Government (2) (Millions)	Commercial (Millions)
No Action	2	18	0	0	13	0	13	4
Decentralized	3	31	2	10	15	1	28	3
Regionalized-1	5	97	5	23	38	2	68	29
Regionalized-2	2	135	8	35	66	3	112	22

Notes:
T = Treatment
- - = Not considered for this site.
The Life Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum may not reflect the true total cost.
(1) In current 1994 Dollars; Total Cost = Sum of the Functional Areas.
(2) Government costs equal to the sum of the life-cycle components.

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11.0 PGDP

PGDP currently is custodian of significant volumes of LLMW, LLW, and TRUW. Each of the waste types is treated independently in the following sections.

11.1 PGDP LLMW

Fifteen tables immediately following portray the impacts of LLMW at PGDP. These tables are presented as follows:

Impact Category

No.	Description	Table No.	Page No.
1.	PGDP—LLMW—Treatment and Disposal: Estimated Number of Fatalities	II-11.1-1	11-2
2.	PGDP—LLMW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects	II-11.1-2	11-3
3.	PGDP—LLMW—Disposal: Estimated Number of Cancer Incidences	II-11.1-3	11-4
4.	PGDP—LLMW—Treatment and Disposal: MEI Probability of Cancer Fatality	II-11.1-4	11-5
5.	PGDP—LLMW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects	II-11.1-5	11-6
6.	PGDP—LLMW—Treatment and Disposal: Noncancer Health Risk from Chemical Exposure	II-11.1-6	11-7
7.	PGDP—LLMW—Emissions in Tons per Year of Criteria Air Pollutants	II-11.1-7	11-8
8.	PGDP—LLMW—Percent of Standard/Guideline for Criteria Air Pollutants	II-11.1-8	11-9
9.	PGDP—LLMW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-11.1-9	11-10
10.	PGDP—LLMW—Impacts on Water Resources Due to Increased Water Use	II-11.1-10	11-11
11.	PGDP—LLMW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal (Contact-Handled)	II-11.1-11	11-12
12.	PGDP—LLMW—Percent of Drinking Water Standards for Hazardous Constituents in Groundwater from Disposal (Contact-Handled)	II-11.1-12	11-13
13.	PGDP—LLMW—Socioeconomics Impacts for Treatment and Disposal	II-11.1-13	11-14
14.	PGDP—LLMW—Infrastructure Impacts for Treatment and Disposal	II-11.1-14	11-15
15.	PGDP—LLMW—Cost	II-11.1-15	11-16

Table II-11.1-1. PGDP—LLMW—Treatment and Disposal: Estimated Number of Fatalities

LLMW Alternatives	Number of Sites		Treatment				Disposal	
			WM Worker		Offsite Population	Noninvolved Workers	WM Worker	
	T	D	Radiation Exposure	Physical Hazards	Radiation Exposure	Radiation Exposure	Radiation Exposure	Physical Hazards
No Action	3	-	3.6E-04	1.7E-02	3.6E-03	2.8E-04	- -	- -
Decentralized	37	16	2.4E-04	4.7E-02	1.2E-04	9.5E-06	1.4E-04	2.9E-03
Regionalized-1	11	12	3.9E-04	4.7E-02	1.2E-04	9.5E-06	1.4E-04	2.9E-03
Regionalized-2	7	6	1.5E-04	1.3E-02	8.1E-07	6.4E-08	- -	- -
Regionalized-3	7	1	1.5E-04	1.3E-02	8.1E-07	6.4E-08	- -	- -
Regionalized-4	4	6	1.5E-04	1.3E-02	8.1E-07	6.4E-08	- -	- -
Centralized	1	1	1.5E-04	1.3E-02	8.1E-07	6.4E-08	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this Alternative.

Table II-11.1-2. PGDP—LLMW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

LLMW Alternatives	Number of Sites		Offsite Population				Noninvolved Workers				WM Worker			
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects
No Action	3	-	7.1E+00	1.2E-02	2.2E-06	7.1E-04	5.7E-01	9.6E-04	1.2E-06	5.7E-05	9.1E-01	1.3E-03	1.0E-06	5.5E-05
Decentralized	37	16	2.4E-01	4.1E-04	6.5E-08	2.4E-05	1.9E-02	3.2E-05	3.4E-08	1.9E-06	6.0E-01	8.4E-04	6.2E-06	3.6E-05
Regionalized-1	11	12	2.4E-01	4.1E-04	6.5E-08	2.4E-05	1.9E-02	3.2E-05	3.4E-08	1.9E-06	9.8E-01	1.4E-03	6.2E-06	5.9E-05
Regionalized-2	7	6	1.6E-03	2.7E-06	9.7E-09	1.6E-07	1.3E-04	2.2E-07	5.1E-09	1.3E-08	3.7E-01	5.2E-04	4.9E-07	2.2E-05
Regionalized-3	7	1	1.6E-03	2.7E-06	9.7E-09	1.6E-07	1.3E-04	2.2E-07	5.1E-09	1.3E-08	3.7E-01	5.2E-04	4.9E-07	2.2E-05
Regionalized-4	4	6	1.6E-03	2.7E-06	9.7E-09	1.6E-07	1.3E-04	2.2E-07	5.1E-09	1.3E-08	3.7E-01	5.2E-04	4.9E-07	2.2E-05
Centralized	1	1	1.6E-03	2.7E-06	9.7E-09	1.6E-07	1.3E-04	2.2E-07	5.1E-09	1.3E-08	3.7E-01	5.2E-04	4.9E-07	2.2E-05

Notes:
T = Treatment
D = Disposal

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Table II-11.1-3. PGDP—LLMW—Disposal: Estimated Number of Cancer Incidences

LLMW Alternatives	Number of Sites		WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	3	-	- -	- -	- -
Decentralized	37	16	3.4E-01	4.8E-04	2.1E-05
Regionalized-1	11	12	3.4E-01	4.8E-04	2.1E-05
Regionalized-2	7	6	- -	- -	- -
Regionalized-3	7	1	- -	- -	- -
Regionalized-4	4	6	- -	- -	- -
Centralized	1	1	- -	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this Alternative.

Table II-11.1–4. PGDP—LLMW—Treatment and Disposal: MEI Probability of Cancer Fatality

LLMW Alternatives	Number of Sites		Treatment		Disposal
	T	D	Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability	Hypothetical Farm Family Most Exposed Lifetime MEI Cancer Fatality Probability
No Action	3	-	4.0E-07	3.5E-07	- -
Decentralized	37	16	1.3E-08	1.2E-08	1.9E-06
Regionalized-1	11	12	1.3E-08	1.2E-08	1.9E-06
Regionalized-2	7	6	9.0E-11	7.9E-11	- -
Regionalized-3	7	1	9.0E-11	7.9E-11	- -
Regionalized-4	4	6	9.0E-11	7.9E-11	- -
Centralized	1	1	9.0E-11	7.9E-11	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered under the Alternative

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Table II-11.1-5. PGDP—LLMW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects

LLMW Alternatives	Number of Sites		Treatment								Disposal			
			Offsite Population MEI				Noninvolved Worker MEI				Most Exposed Farm Family Lifetime MEI			
	T	D	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability
No Action	3	-	7.9E-04	1.3E-06	3.1E-10	7.9E-08	6.9E-04	1.2E-06	1.8E-09	6.9E-08	- -	- -	- -	- -
Decentralized	37	16	2.7E-05	4.5E-08	9.0E-12	2.7E-09	2.3E-05	3.9E-08	5.2E-11	2.3E-09	3.9E-03	6.6E-06	2.7E-07	3.9E-07
Regionalized-1	11	12	2.7E-05	4.5E-08	9.0E-12	2.7E-09	2.3E-05	3.9E-08	5.2E-11	2.3E-09	3.9E-03	6.6E-06	2.7E-07	3.9E-07
Regionalized-2	7	6	1.8E-07	3.1E-10	1.3E-12	1.8E-11	1.6E-07	2.7E-10	7.8E-12	1.6E-11	- -	- -	- -	- -
Regionalized-3	7	1	1.8E-07	3.1E-10	1.3E-12	1.8E-11	1.6E-07	2.7E-10	7.8E-12	1.6E-11	- -	- -	- -	- -
Regionalized-4	4	6	1.8E-07	3.1E-10	1.3E-12	1.8E-11	1.6E-07	2.7E-10	7.8E-12	1.6E-11	- -	- -	- -	- -
Centralized	1	1	1.8E-07	3.1E-10	1.3E-12	1.8E-11	1.6E-07	2.7E-10	7.8E-12	1.6E-11	- -	- -	- -	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered for this site

Table II-11.1-6. PGDP—LLMW—Treatment and Disposal: Noncancer Health Risk from Chemical Exposure

LLMW Alternatives	Number of Sites		Treatment			Disposal
	T	D	Offsite MEI Hazard Index	Noninvolved Worker MEI Hazard Index	WM Worker Exposure Index	Hypothetical Farm Family Most Exposed Lifetime Hazard Index
No Action	3	-	1.1E-07	6.4E-07	5.1E-06	- -
Decentralized	37	16	4.1E-09	2.4E-08	2.9E-04	5.5E-03
Regionalized-1	11	12	4.1E-09	2.4E-08	2.9E-04	5.5E-03
Regionalized-2	7	6	5.0E-11	2.9E-10	5.1E-06	- -
Regionalized-3	7	1	5.0E-11	2.9E-10	5.1E-06	- -
Regionalized-4	4	6	5.0E-11	2.9E-10	5.1E-06	- -
Centralized	1	1	5.0E-11	2.9E-10	5.1E-06	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this alternative.
MEI = Maximally Exposed Individual
Hazard Index = Sum of hazard quotient values for all noncarcinogenic chemicals. The hazard quotient is the chemical-specific ratio of media exposure concentrations to concentrations believed to have no appreciable adverse effects.
Exposure Index = Ratio of Exposure concentration to chemical-specific occupational threshold limits.

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Table II-11.1-7. PGDP—LLMW—Emissions in Tons per Year of Criteria Air Pollutants

LLMW Alternatives	Number of Sites		Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	2 (0/2)	1 (1/0)	0	0	0	0	1 (0/1)	0	0	0	0	0
Decentralized	37	16	25 (1/24)	7 (2/5)	0	0	0	3 (0/3)	7 (0/7)	1 (0/1)	0	0	0	1(0/1)
Regionalized-1	11	12	19 (1/18)	6 (2/4)	0	0	0	2 (0/2)	6 (0/6)	1 (0/1)	0	0	0	1(0/1)
Regionalized-2	7	6	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)	2 (0/2)	0	0	0	0	0
Regionalized-3	7	1	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)	2 (0/2)	0	0	0	0	0
Regionalized-4	4	6	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)	2 (0/2)	0	0	0	0	0
Centralized	1	1	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)	2 (0/2)	0	0	0	0	0

Notes:
T = Treatment
D = Disposal
Emissions <1 tons per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions / worker vehicles emission).
(2) Values = total emissions (stationary-source emissions / mobile-source emission).

Table II-11.1-8. PGDP—LLMW—Percent of Standard/Guideline for Criteria Air Pollutants

LLMW Alternatives	Number of Sites		Construction					
			Percent of Tons/Year General Conformity Rule (1)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	--	1 (1/0)	--	--	--	0
Decentralized	37	16	--	7 (2/5)	--	--	--	6 (0/6)
Regionalized-1	11	12	--	6 (2/4)	--	--	--	4 (0/4)
Regionalized-2	7	6	--	1 (0/1)	--	--	--	1 (0/1)
Regionalized-3	7	1	--	1 (0/1)	--	--	--	1 (0/1)
Regionalized-4	4	6	--	1 (0/1)	--	--	--	1 (0/1)
Centralized	1	1	--	1 (0/1)	--	--	--	1 (0/1)

LLMW Alternatives	Number of Sites		Operations & Maintenance											
			Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
	T	D	CO (4)	NO2 (5)	Pb (4)	PM10 (4)	SO2 (4)	VOC (5)	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	0	0	0	0	0	0	--	--	--	--	--	--
Decentralized	37	16	0	1 (0/1)	0	1	0	2 (0/2)	0	0	0	0	0	0
Regionalized-1	11	12	0	1 (0/1)	0	1	0	1 (0/1)	0	0	0	0	0	0
Regionalized-2	7	6	0	0	0	0	0	0	--	--	--	--	--	--
Regionalized-3	7	1	0	0	0	0	0	0	--	--	--	--	--	--
Regionalized-4	4	6	0	0	0	0	0	0	--	--	--	--	--	--
Centralized	1	1	0	0	0	0	0	0	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) GCR de minimus levels are applied, since PSD regulations are not applicable to construction activities. Values = % of total emissions (% of equipment emissions / % of worker vehicles emission).
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions are assumed to be negligible for all but the Decentralized and Regionalized -1 Alternatives.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.
(5) Nonattainment area for ozone. Pollutant is an ozone precursor, therefore GCR de minimus levels are applied. Values = % of total emissions (% of stationary-source emissions / % of mobile-source emissions).

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Table II-11.1-9. PGDP—LLMW—Percent of Standards/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

LLMW Alternatives	Number of Sites		Operations & Maintenance											
	T	D	Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action	3	-	0	0	0	--	--	0	--	--	0	0	0	0
Decentralized	37	16	0	0	0	--	--	0	--	--	0	0	0	0
Regionalized-1	11	12	0	0	0	--	--	0			0	0	0	0
Regionalized-2	7	6	0	0	0	--	--	0	--	--	0	0	0	0
Regionalized-3	7	1	0	0	0	--	--	0	--	--	0	0	0	0
Regionalized-4	4	6	0	0	0	--	--	0	--	--	0	0	0	0
Centralized	1	1	0	0	0	--	--	0	--	--	0	0	0	0

LLMW Alternatives	Number of Sites		Operations & Maintenance									
	T	D	Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action	3	-	--	0	0	0	--	0	0	0	--	--
Decentralized	37	16	--	0	0	0	--	0	0	0	--	--
Regionalized-1	11	12	--	0	0	0	--	0	0	0	--	--
Regionalized-2	7	6	--	0	0	0	--	0	0	0	--	--
Regionalized-3	7	1	--	0	0	0	--	0	0	0	--	--
Regionalized-4	4	6	--	0	0	0	--	0	0	0	--	--
Centralized	1	1	--	0	0	0	--	0	0	0	--	--

Notes:
T = Treatment
D = Disposal
-- = Emissions of this hazardous or toxic air pollutant are assumed to be negligible.
Percentages <1% are shown as zeros.

Table II-11.1-10. PGDP—LLMW—Impacts on Water Resources Due to Increased Water Use

LLMW Alternatives	Number of Sites		Construction			Operations			
	T	D	Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action	3	-	711	<0.1	<0.1	298	<0.1	<0.1	<0.1
Decentralized	37	16	2963	<0.1	<0.1	1541	<0.1	<0.1	<0.1
Regionalized-1	11	12	2963	<0.1	<0.1	1541	<0.1	<0.1	<0.1
Regionalized-2	7	6	116	<0.1	<0.1	176	<0.1	<0.1	<0.1
Regionalized-3	7	1	116	<0.1	<0.1	176	<0.1	<0.1	<0.1
Regionalized-4	4	6	116	<0.1	<0.1	176	<0.1	<0.1	<0.1
Centralized	1	1	116	<0.1	<0.1	176	<0.1	<0.1	<0.1

Notes:
T = Treatment
D = Disposal
Water supplied by surface water in the Ohio River. Current water use = 15,000,000 gallons/day.
Wastewater discharged to the Ohio River.
Average flow rate of the Ohio River = 174,521,000,000 gallons/day.
<0.1 indicates that the percentage is less than 0.1%.

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Table II-11.1-11. PGDP—LLMW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal (Contact-Handled)

LLMW Alternatives	Number of Sites T	Number of Sites D	Ac 225	Ac 227	Am 241	Am 242	Am 243	C 14	Cs 135	Cs 137	Cm 242	Cm 244	Cm 245	I 129	Pb 210	Np 237	Ni 59	Ni 63	Pd 107	Pu 238	Pu 239	Pu 240	Pu 241
No Action	3	-	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-2	7	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	4	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

LLMW Alternatives	Number of Sites T	Number of Sites D	Po 210	K 40	Pa 231	Ra 223	Ra 226	Sm 151	Se 79	Sr 90	Tc 99	Th 227	Th 228	Th 229	Th 230	Th 232	Sn 126	U 233	U 234	U 235	U 236	U 238	Y 90	Zr 93
No Action	3	-	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1	11	12	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-2	7	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	4	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
- - = No disposal at this site for this alternative.

Table II-11.1-12. PGDP—LLMW—Percent of Drinking Water Standards for Hazardous Constituents in Groundwater from Disposal (Contact-Handled)

LLMW Alternatives	T	D	Acetone	Arsenic	Barium	Benzene	Cadmium	Carbon Tetrachloride	Chromium	Cyanide
No Action	3	-	--	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	2	0	1	0	0
Regionalized-1	11	12	0	0	0	2	0	1	0	0
Regionalized-2	7	6	--	--	--	--	--	--	--	--
Regionalized-3	7	1	--	--	--	--	--	--	--	--
Regionalized-4	4	6	--	--	--	--	--	--	--	--
Centralized	1	1	--	--	--	--	--	--	--	--

LLMW Alternatives	T	D	1,2-dichloro-ethane	Lead	Mercury	Methylene Chloride	Selenium	Silver	1,2,2-trichloro-1,1-trifluoroethane
No Action	3	-	--	--	--	--	--	--	--
Decentralized	37	16	3	0	0	4	1	0	0
Regionalized-1	11	12	3	0	0	4	1	0	0
Regionalized-2	7	6	--	--	--	--	--	--	--
Regionalized-3	7	1	--	--	--	--	--	--	--
Regionalized-4	4	6	--	--	--	--	--	--	--
Centralized	1	1	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
"--" = No disposal at this site for this alternative.

Table II-11.1-13. PGDP—LLMW—Socioeconomics Impacts for Treatment and Disposal

LLMW Alternatives	Number of Sites		Effect of Implementation of Alternatives					
				Jobs		Income		
	T	D	Cost (Millions) (1)	Annual Jobs	% Annual Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action	3	-	37	29	0.04	0.3	0.01	0.02
Decentralized	37	16	195	194	0.24	2.1	0.09	0.11
Regionalized-1	11	12	195	194	0.24	2.1	0.09	0.11
Regionalized-2	7	6	48	48	0.06	0.5	0.02	0.02
Regionalized-3	7	1	48	48	0.06	0.5	0.02	0.02
Regionalized-4	4	6	49	48	0.06	0.5	0.02	0.02
Centralized	1	1	48	48	0.06	0.5	0.02	0.02

Notes:
T = Treatment
D = Disposal
(1) In current 1990 dollars.
(2) Compared to 1990 baseline

Table II-11.1-14. PGDP—LLMW—Infrastructure Impacts for Treatment and Disposal

LLMW Alternatives	Number of Sites		Effect of Implementation of Alternatives									
			Land Use		Water		Waste Water		Power		Employment (FTE)	
	T	D	Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	% Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Peak Construction Employment	% of Current Employment (1)
No Action	49	-	0.66	0.025	711	0	298	0.02	0.27	0.01	14	1
Decentralized	49	16	2.33	0.087	2963	0.01	1541	0.09	0.45	0.01	185	11
Regionalized-1	11	12	2.33	0.087	2963	0.01	1541	0.09	0.45	0.01	137	8
Regionalized-2	7	6	0.27	0.01	116	0	176	0.01	0.25	0.01	39	2
Regionalized-3	7	1	0.27	0.01	116	0	176	0.01	0.25	0.01	39	2
Regionalized-4	4	6	0.27	0.01	116	0	176	0.01	0.25	0.01	39	2
Centralized	1	1	0.27	0.01	116	0	176	0.01	0.25	0.01	39	2

Notes:
(1) T is defined as Treatment, D is defined as Disposal

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Table II-11.1-15. PGDP—LLMW—Cost

LLMW Alternatives	Number of Sites		Total Cost (Millions) (1)	Cost by Life-Cycle Component (1)				Cost by Functional Area (1)		
	T	D		Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Treatment (Millions)	Storage (Millions)	Disposal (Millions)
No Action	3	-	41	3	7	21	11	19	23	0
Decentralized	37	16	221	32	90	76	22	179	0	42
Regionalized-1	11	12	221	32	90	76	22	179	0	42
Regionalized-2	7	6	55	8	18	20	10	55	0	0
Regionalized-3	7	1	55	8	18	20	10	55	0	0
Regionalized-4	4	6	55	8	18	20	10	55	0	0
Centralized	1	1	55	8	18	20	10	55	0	0

Notes:
T = Treatment
D = Disposal
The Life-Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum of these may not reflect the true total cost.
(1) In current 1994 dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

11.2 PGDP LLW

Thirteen tables immediately following portray the impacts of LLW at PGDP. These tables are presented as follows:

Impact Category

No.	Description	Table No.	Page No.
1.	PGDP—LLW—Treatment and Disposal: Estimated Number of Fatalities	II-11.2-1	11-18
2.	PGDP—LLW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects	II-11.2-2	11-19
3.	PGDP—LLW—Disposal: Estimated Number of Cancer Incidences and Genetic Effects	II-11.2-3	11-20
4.	PGDP—LLW—Treatment and Disposal: MEI Probability of Cancer Fatality	II-11.2-4	11-21
5.	PGDP—LLW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects	II-11.2-5	11-22
7.	PGDP—LLW—Emissions in Tons per Year of Criteria Air Pollutants	II-11.2-6	11-23
8.	PGDP—LLW—Percent of Standard/Guideline for Criteria Air Pollutants	II-11.2-7	11-24
9.	PGDP—LLW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-11.2-8	11-25
10.	PGDP—LLW—Impacts on Water Resources Due to Increased Water Use	II-11.2-9	11-26
11.	PGDP—LLW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal	II-11.2-10	11-27
12.	PGDP—LLW—Socioeconomic Impacts for Treatment and Disposal	II-11.2-11	11-28
13.	PGDP—LLW—Infrastructure Impacts for Treatment and Disposal	II-11.2-12	11-29
14.	PGDP—LLW—Cost	II-11.2-13	11-30

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Table II–11.2–1. PGDP—LLW—Treatment and Disposal: Estimated Number of Fatalities

LLW Alternatives	Number of Sites		Treatment				Disposal	
			WM Worker		Offsite Population	Noninvolved Workers	WM Worker	
	T	D	Radiation Exposure	Physical Hazards	Radiation Exposure	Radiation Exposure	Radiation Exposure	Physical Hazards
No Action	10**	6	2.2E-03	1.1E-01	2.0E-08	1.6E-09	- -	- -
Decentralized		16	1.5E-03	1.1E-01	3.2E-07	2.5E-08	3.1E-03	1.5E-01
Regionalized-1		12	1.5E-03	1.1E-01	3.2E-07	2.5E-08	3.0E-03	1.5E-01
Regionalized-2	11	12	1.7E-03	1.8E-01	1.9E-06	1.5E-07	2.8E-03	1.3E-01
Regionalized-3		6	1.5E-03	1.1E-01	2.1E-08	1.7E-09	- -	- -
Regionalized-4	7	6	1.5E-03	1.1E-01	2.1E-08	1.7E-09	- -	- -
Regionalized-5	4	6	1.5E-03	1.1E-01	2.1E-08	1.7E-09	- -	- -
Regionalized-6		2	1.5E-03	1.1E-01	2.1E-08	1.7E-09	- -	- -
Regionalized-7		2	1.5E-03	1.1E-01	2.1E-08	1.7E-09	- -	- -
Centralized-1		1	1.5E-03	1.1E-01	2.1E-08	1.7E-09	- -	- -
Centralized-2		1	1.5E-03	1.1E-01	2.1E-08	1.7E-09	- -	- -
Centralized-3	7	1	1.5E-03	1.1E-01	2.1E-08	1.7E-09	- -	- -
Centralized-4	7	1	1.5E-03	1.1E-01	2.1E-08	1.7E-09	- -	- -
Centralized-5	1	1	1.5E-03	1.1E-01	2.1E-08	1.7E-09	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered under the alternative
** Ten sites use existing facilities for Volume Reduction

Table II–11.2–2. PGDP—LLW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

LLW Alternatives	Number of Sites		Offsite Population			Noninvolved Worker			WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	10**	6	4.0E-05	6.9E-08	4.0E-09	3.2E-06	5.4E-09	3.2E-10	5.6E+00	7.8E-03	3.3E-04
Decentralized		16	6.4E-04	1.1E-06	6.4E-08	5.1E-05	8.6E-08	5.8E-09	3.7E+00	5.2E-03	2.2E-04
Regionalized-1		12	6.4E-04	1.1E-06	6.4E-08	5.1E-05	8.6E-08	5.8E-09	3.7E+00	5.2E-03	2.2E-04
Regionalized-2	11	12	3.8E-03	6.4E-06	3.8E-07	3.0E-04	5.1E-07	3.0E-08	4.1E+00	5.8E-03	2.5E-04
Regionalized-3		6	4.2E-05	7.2E-08	4.2E-09	3.3E-06	5.7E-09	3.3E-10	3.7E+00	5.2E-03	2.2E-04
Regionalized-4	7	6	4.2E-05	7.2E-08	4.2E-09	3.3E-06	5.7E-09	3.3E-10	3.7E+00	5.2E-03	2.2E-04
Regionalized-5	4	6	4.2E-05	7.2E-08	4.2E-09	3.3E-06	5.7E-09	3.3E-10	3.7E+00	5.2E-03	2.2E-04
Regionalized-6		2	4.2E-05	7.2E-08	4.2E-09	3.3E-06	5.7E-09	3.3E-10	3.7E+00	5.2E-03	2.2E-04
Regionalized-7		2	4.2E-05	7.2E-08	4.2E-09	3.3E-06	5.7E-09	3.3E-10	3.7E+00	5.2E-03	2.2E-04
Centralized-1		1	4.2E-05	7.2E-08	4.2E-09	3.3E-06	5.7E-09	3.3E-10	3.7E+00	5.2E-03	2.2E-04
Centralized-2		1	4.2E-05	7.2E-08	4.2E-09	3.3E-06	5.7E-09	3.3E-10	3.7E+00	5.2E-03	2.2E-04
Centralized-3	7	1	4.2E-05	7.2E-08	4.2E-09	3.3E-06	5.7E-09	3.3E-10	3.7E+00	5.2E-03	2.2E-04
Centralized-4	7	1	4.2E-05	7.2E-08	4.2E-09	3.3E-06	5.7E-09	3.3E-10	3.7E+00	5.2E-03	2.2E-04
Centralized-5	1	1	4.2E-05	7.2E-08	4.2E-09	3.3E-06	5.7E-09	3.3E-10	3.7E+00	5.2E-03	2.2E-04

Notes:
T = Treatment
D = Disposal
** Ten sites use existing facilities for Volume Reduction.

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Table II-11.2-3. PGDP—LLW—Disposal: Estimated Number of Cancer Incidences and Genetic Effects

LLW Alternatives	Number of Sites		WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	10**	6	- -	- -	- -
Decentralized		16	7.6E+00	1.1E-02	4.6E-04
Regionalized-1		12	7.6E+00	1.1E-02	4.6E-04
Regionalized-2	11	12	6.9E+00	9.7E-03	4.2E-04
Regionalized-3		6	- -	- -	- -
Regionalized-4	7	6	- -	- -	- -
Regionalized-5	4	6	- -	- -	- -
Regionalized-6		2	- -	- -	- -
Regionalized-7		2	- -	- -	- -
Centralized-1		1	- -	- -	- -
Centralized-2		1	- -	- -	- -
Centralized-3	7	1	- -	- -	- -
Centralized-4	7	1	- -	- -	- -
Centralized-5	1	1	- -	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered under the alternative.
** Ten sites use existing facilities for Volume Reduction.

Table II–11.2–4. PGDP—LLW—Treatment and Disposal: MEI Probability of Cancer Fatality

LLW Alternatives	Number of Sites		Treatment		Disposal
	T	D	Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability	Hypothetical Farm Family - Most Exposed Lifetime MEI Cancer Fatality Probability
No Action	10**	6	2.3E-12	2.0E-12	- -
Decentralized		16	3.6E-11	3.1E-11	9.3E-05
Regionalized-1		12	3.6E-11	3.1E-11	9.3E-05
Regionalized-2	11	12	2.1E-10	1.8E-10	1.2E-04
Regionalized-3		6	2.3E-12	2.0E-12	- -
Regionalized-4	7	6	2.4E-12	2.0E-12	- -
Regionalized-5	4	6	2.4E-12	2.0E-12	- -
Regionalized-6		2	2.3E-12	2.0E-12	- -
Regionalized-7		2	2.3E-12	2.0E-12	- -
Centralized-1		1	2.3E-12	2.0E-12	- -
Centralized-2		1	2.3E-12	2.0E-12	- -
Centralized-3	7	1	2.4E-12	2.1E-12	- -
Centralized-4	7	1	2.4E-12	2.1E-12	- -
Centralized-5	1	1	2.4E-12	2.1E-12	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered under the Alternative.
** Ten sites use existing facilities for Volume Reduction.

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Table II-11.2-5. PGDP—LLW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects

LLW Alternatives	Number of Sites		Treatment						Disposal		
			Offsite MEI			Noninvolved Worker MEI			Most Exposed Lifetime MEI		
	T	D	Dose (rem)	Radiation Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Radiation Genetic Effects Probability
No Action	10**	6	4.5E-09	7.6E-12	4.5E-13	3.9E-09	6.6E-12	3.9E-13	- -	- -	- -
Decentralized		16	7.2E-08	1.2E-10	7.2E-12	6.2E-08	1.1E-10	6.2E-12	1.9E-01	6.8E-05	1.9E-05
Regionalized-1		12	7.2E-08	1.2E-10	7.2E-12	6.2E-08	1.1E-10	6.2E-12	1.9E-01	6.8E-05	1.9E-05
Regionalized-2	11	12	4.2E-07	7.1E-10	4.2E-11	3.6E-07	6.2E-10	3.6E-11	2.5E-01	4.2E-04	2.5E-05
Regionalized-3		6	4.7E-09	8.0E-12	4.7E-13	4.1E-09	7.0E-12	4.1E-13	- -	- -	- -
Regionalized-4	7	6	4.7E-09	8.0E-12	4.7E-13	4.1E-09	7.0E-12	4.1E-13	- -	- -	- -
Regionalized-5	4	6	4.7E-09	8.0E-12	4.7E-13	4.1E-09	7.0E-12	4.1E-13	- -	- -	- -
Regionalized-6		2	4.7E-09	8.0E-12	4.7E-13	4.1E-09	7.0E-12	4.1E-13	- -	- -	- -
Regionalized-7		2	4.7E-09	8.0E-12	4.7E-13	4.1E-09	7.0E-12	4.1E-13	- -	- -	- -
Centralized-1		1	4.7E-09	8.0E-12	4.7E-13	4.1E-09	7.0E-12	4.1E-13	- -	- -	- -
Centralized-2		1	4.7E-09	8.0E-12	4.7E-13	4.1E-09	7.0E-12	4.1E-13	- -	- -	- -
Centralized-3	7	1	4.7E-09	8.0E-12	4.7E-13	4.1E-09	7.0E-12	4.1E-13	- -	- -	- -
Centralized-4	7	1	4.7E-09	8.0E-12	4.7E-13	4.1E-09	7.0E-12	4.1E-13	- -	- -	- -
Centralized-5	1	1	4.7E-09	8.0E-12	4.7E-13	4.1E-09	7.0E-12	4.1E-13	- -	- -	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered under the alternative.
** Ten sites use existing facilities for Volume Reduction.

Table II-11.2-6. PGDP—LLW—Emissions in Tons per Year of Criteria Air Pollutants

LLW Alternatives	Number of Sites		Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action	10**	6	15 (4/11)	13 (11/2)	0	1 (1/0)	1 (1/0)	2 (1/1)	8 (0/8)	2 (0/2)	0	0	0	1 (0/1)
Decentralized		16	49 (33/17)	89 (85/3)	0	7 (7/0)	8 (8/0)	10 (8/2)	35 (1/34)	10 (3/7)	0	0	0	4 (0/4)
Regionalized-1		12	49 (33/17)	89 (85/3)	0	7 (7/0)	8 (8/0)	10 (8/2)	35 (1/34)	10 (3/7)	0	0	0	4 (0/4)
Regionalized-2	11	12	64 (28/35)	81 (74/7)	0	6 (6/0)	7 (7/0)	11 (7/4)	43 (1/42)	11 (2/8)	0	1 (1/0)	0	5 (0/5)
Regionalized-3		6	18 (1/17)	7 (4/3)	0	0	0	2 (0/2)	14 (0/14)	3 (0/3)	0	0	0	2 (0/2)
Regionalized-4	7	6	18 (1/17)	7 (4/3)	0	0	0	2 (0/2)	14 (0/14)	3 (0/3)	0	0	0	2 (0/2)
Regionalized-5	4	6	18 (1/17)	7 (4/3)	0	0	0	2 (0/2)	14 (0/14)	3 (0/3)	0	0	0	2 (0/2)
Regionalized-6		2	18 (1/17)	7 (4/3)	0	0	0	2 (0/2)	14 (0/14)	3 (0/3)	0	0	0	2 (0/2)
Regionalzied-7		2	18 (1/17)	7 (4/3)	0	0	0	2 (0/2)	14 (0/14)	3 (0/3)	0	0	0	2 (0/2)
Centralized-1		1	18 (1/17)	7 (4/3)	0	0	0	2 (0/2)	14 (0/14)	3 (0/3)	0	0	0	2 (0/2)
Centralized-2		1	18 (1/17)	7 (4/3)	0	0	0	2 (0/2)	14 (0/14)	3 (0/3)	0	0	0	2 (0/2)
Centralized-3	7	1	18 (1/17)	7 (4/3)	0	0	0	2 (0/2)	14 (0/14)	3 (0/3)	0	0	0	2 (0/2)
Centralized-4	7	1	18 (1/17)	7 (4/3)	0	0	0	2 (0/2)	14 (0/14)	3 (0/3)	0	0	0	2 (0/2)
Centralized-5	1	1	18 (1/17)	7 (4/3)	0	0	0	2 (0/2)	14 (0/14)	3 (0/3)	0	0	0	2 (0/2)

Notes:
T = Treatment
D = Disposal
Emissions <1 ton per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions/worker vehicles emission)
(2) Values = total emissions (stationary-source emissions/mobile-source emission)
** Ten sites use existing facilities for Volume Reduction.

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Table II-11.2-7. PGDP—LLW—Percent of Standard/Guideline for Criteria Air Pollutants

LLW Alternatives	Number of Sites		Construction					
			Percent of Tons/Year General Conformity Rule (1)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC
No Action	10**	6	--	--	--	--	--	--
Decentralized		16	--	--	--	--	--	--
Regionalized-1		12	--	--	--	--	--	--
Regionalized-2	11	12	--	--	--	--	--	--
Regionalized-3		6	--	--	--	--	--	--
Regionalized-4	7	6	--	--	--	--	--	--
Regionalized-5	4	6	--	--	--	--	--	--
Regionalized-6		2	--	--	--	--	--	--
Regionalized-7		2	--	--	--	--	--	--
Centralized-1		1	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--
Centralized-4	7	1	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--

LLW Alternatives	Number of Sites		Operations & Maintenance											
			Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
	T	D	CO (4)	NO2 (4)	Pb (4)	PM10 (4)	SO2 (4)	VOC (4)	CO	NO2	Pb	PM10	SO2	VOC
No Action	10**	6	0	1	0	0	0	0	--	--	--	--	--	--
Decentralized		16	0	1	0	0	0	0	--	--	--	--	--	--
Regionalized-1		12	0	1	0	0	0	0	--	--	--	--	--	--
Regionalized-2	11	12	0	1	0	1	0	0	--	--	--	--	--	--
Regionalized-3		6	0	0	0	0	0	0	--	--	--	--	--	--
Regionalized-4	7	6	0	0	0	0	0	0	--	--	--	--	--	--
Regionalized-5	4	6	0	0	0	0	0	0	--	--	--	--	--	--
Regionalized-6		2	0	0	0	0	0	0	--	--	--	--	--	--
Regionalized-7		2	0	0	0	0	0	0	--	--	--	--	--	--
Centralized-1		1	0	0	0	0	0	0	--	--	--	--	--	--
Centralized-2		1	0	0	0	0	0	0	--	--	--	--	--	--
Centralized-3	7	1	0	0	0	0	0	0	--	--	--	--	--	--
Centralized-4	7	1	0	0	0	0	0	0	--	--	--	--	--	--
Centralized-5	1	1	0	0	0	0	0	0	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) Hanford is in an attainment area for all criteria pollutants, therefore the GCR doe not apply.
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions for all alternatives are assumed to be negligible.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.
** Ten sites use existing facilities for Volume Reduction.

Table II–11.2–8. PGDP—LLW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

LLW Alternatives	Number of Sites		Operations & Maintenance											
	T	D	Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action	10**	6	0	--	--	--	--	--	--	--	--	--	--	--
Decentralized		16	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-1		12	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-2	11	12	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-3		6	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	7	6	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-5	4	6	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-6		2	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-1		1	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-4	7	1	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	0	--	--	--	--	--	--	--	--	--	--	--

LLW Alternatives	Number of Sites		Operations & Maintenance									
	T	D	Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action	10**	6	--	--	--	--	--	--	--	--	--	--
Decentralized		16	--	--	--	--	--	--	--	--	--	--
Regionalized-1		12	--	--	--	--	--	--	--	--	--	--
Regionalized-2	11	12	--	--	--	--	--	--	--	--	--	--
Regionalized-3		6	--	--	--	--	--	--	--	--	--	--
Regionalized-4	7	6	--	--	--	--	--	--	--	--	--	--
Regionalized-5	4	6	--	--	--	--	--	--	--	--	--	--
Regionalized-6		2	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	--	--	--	--	--	--	--	--	--	--
Centralized-1		1	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--	--	--	--	--
Centralized-4	7	1	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--	--	--	--	--

Notes:
T= Treatment
D = Disposal
- - = Emissions of this hazardous or toxic air pollutant are assumed to be negligible.
Percentages <1% are shown as zeros.
** Ten sites use existing facilities for Volume Reduction.

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Table II-11.2-9. PGDP—LLW—Impacts on Water Resources Due to Increased Water Use

LLW Alternatives	Number of Sites		Construction			Operations			
	T	D	Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action	10**	6	2968	<0.1	<0.1	1682	<0.1	<0.1	<0.1
Decentralized		16	76679	0.5	<0.1	4569	<0.1	<0.1	<0.1
Regionalized-1		12	76679	0.5	<0.1	4569	<0.1	<0.1	<0.1
Regionalized-2	11	12	67852	0.5	<0.1	5847	<0.1	<0.1	<0.1
Regionalized-3		6	4926	<0.1	<0.1	1918	<0.1	<0.1	<0.1
Regionalized-4	7	6	4926	<0.1	<0.1	1918	<0.1	<0.1	<0.1
Regionalized-5	4	6	4926	<0.1	<0.1	1918	<0.1	<0.1	<0.1
Regionalized-6		2	4926	<0.1	<0.1	1918	<0.1	<0.1	<0.1
Regionalized-7		2	4926	<0.1	<0.1	1918	<0.1	<0.1	<0.1
Centralized-1		1	4926	<0.1	<0.1	1918	<0.1	<0.1	<0.1
Centralized-2		1	4926	<0.1	<0.1	1918	<0.1	<0.1	<0.1
Centralized-3	7	1	4926	<0.1	<0.1	1918	<0.1	<0.1	<0.1
Centralized-4	7	1	4926	<0.1	<0.1	1918	<0.1	<0.1	<0.1
Centralized-5	1	1	4926	<0.1	<0.1	1918	<0.1	<0.1	<0.1

Notes:
T = Treatment
D = Disposal
Water supplied by surface water in the Ohio River. Current water use = 15,000,000 gallons/day.
Wastewater discharged to the Ohio River. Average flow rate of the Ohio River = 174,521,000,000 gallons/day.
** Ten sites use existing facilities for Volume Reduction.
<0.1 indicates that the percentage is less than 0.1%.

Table II-11.2-10. PGDP—LLW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal

LLW Alternatives	Number of Sites T	Number of Sites D	Ac 225	Ac 227	Am 241	Am 242	Am 243	C 14	Cs 135	Cs 137	Cm 242	Cm 244	Cm 245	I 129	Pb 210	Np 237	Ni 59	Ni 63	Pd 107	Pu 238	Pu 239	Pu 240	Pu 241
No Action	10**	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized		16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1		12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-2	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-3		6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	7	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-5	4	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-6		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-1		1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-4	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

LLW Alternatives	Number of Sites T	Number of Sites D	Po 210	K 40	Pa 231	Ra 223	Ra 226	Sm 151	Se 79	Sr 90	Tc 99	Th 227	Th 228	Th 229	Th 230	Th 232	Sn 126	U 233	U 234	U 235	U 236	U 238	Y 90	Zr 93
No Action	10**	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized		16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1		12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-2	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-3		6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	7	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-5	4	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-6		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-1		1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-4	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
** Ten sites use existing facilities for Volume Reduction
-- = Disposal is not considered for this Alternative.

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Table II-11.2-11. PGDP—LLW—Socioeconomic Impacts for Treatment and Disposal

LLW Alternatives	Number of Sites		Effect of Implementation of Alternatives					
				Jobs		Income		
	T	D	Cost (Millions) (1)	Jobs	% Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action	10**	6	268	213	0.27	2.3	0.10	0.14
Decentralized		16	559	555	0.70	6.1	0.26	0.34
Regionalized-1		12	559	555	0.70	6.1	0.26	0.34
Regionalized-2	11	12	704	700	0.88	7.7	0.32	0.44
Regionalized-3		6	244	242	0.30	2.7	0.11	0.15
Regionalized-4	7	6	244	242	0.30	2.7	0.11	0.15
Regionalized-5		6	244	242	0.30	2.7	0.11	0.15
Regionalized-6		2	244	242	0.30	2.7	0.11	0.15
Regionalized-7		2	244	242	0.30	2.7	0.11	0.15
Centralized-1		1	244	242	0.30	2.7	0.11	0.15
Centralized-2		1	244	242	0.30	2.7	0.11	0.15
Centralized-3	7	1	244	242	0.30	2.7	0.11	0.15
Centralized-4	7	1	244	242	0.30	2.7	0.11	0.15
Centralized-5	1	1	244	242	0.30	2.7	0.11	0.15

Notes:
T = Treatment
D = Disposal
(1) In constant 1990 dollars.
(2) Compared to 1990 baseline.
** Ten sites use existing facilities for Volume Reduction.

Table II-11.2-12. PGDP—LLW—Infrastructure Impacts for Treatment and Disposal

LLW Alternatives	Number of Sites		Effect of Implementation of Alternatives									
			Land Use		Water		Waste Water		Power		Employment (FTE)	
	T	D	Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	% Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Peak Construction Employment	% of Current Employment (1)
No Action	10**	6	2.9	0.11	2968	0.01	1682	0.10	0.38	0.01	82	5
Decentralized		16	11.2	0.42	76679	0.23	4569	0.26	11.31	0.32	283	16
Regionalized-1		12	11.2	0.42	76679	0.23	4569	0.26	11.31	0.32	283	16
Regionalized-2	11	12	7.7	0.29	67852	0.26	5847	0.34	9.76	0.37	410	24
Regionalized-3		6	4.2	0.14	4926	0.02	1918	0.11	0.52	0.02	130	7
Regionalized-4	7	6	4.2	0.14	4926	0.02	1918	0.11	0.52	0.02	130	7
Regionalized-5	4	6	4.2	0.14	4926	0.02	1918	0.11	0.52	0.02	130	7
Regionalized-6		2	4.2	0.14	4926	0.02	1918	0.11	0.52	0.02	130	7
Regionalized-7		2	4.2	0.14	4926	0.02	1918	0.11	0.52	0.02	130	7
Centralized-1		1	4.2	0.14	4926	0.02	1918	0.11	0.52	0.02	130	7
Centralized-2		1	4.2	0.14	4926	0.02	1918	0.11	0.52	0.02	130	7
Centralized-3	7	1	4.2	0.14	4926	0.02	1918	0.11	0.52	0.02	130	7
Centralized-4	7	1	4.2	0.14	4926	0.02	1918	0.11	0.52	0.02	130	7
Centralized-5	1	1	4.2	0.14	4926	0.02	1918	0.11	0.52	0.02	130	7

Notes:
T = Treatment
D = Disposal
GPD = Gallons per Day
MW = Megawatts Electric
FTE = Full Time Equivalent
(1) Based on 1990 Site Employment.
** Ten sites use existing facilities for Volume Reduction.

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Table II-11.2-13. PGDP—LLW—Cost

LLW Alternatives	Number of Sites		Total Cost (Millions) (1)	Cost by Life-Cycle Component (1)				Cost by Functional Area (1)		
	T	D		Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Treatment (Millions)	Storage (Millions)	Disposal (Millions)
No Action	10**	6	303	14	39	238	12	303	0	0
Decentralized		12	632	47	134	388	63	286	0	346
Regionalized-1		12	632	47	134	388	63	286	0	346
Regionalized-2	11	12	797	79	183	470	65	485	0	312
Regionalized-3	7	6	276	22	60	174	20	276	0	0
Regionalized-4	7	6	276	22	60	174	20	276	0	0
Regionalized-5	4	6	276	22	60	174	20	276	0	0
Regionalized-6	7	6	276	22	60	174	20	276	0	0
Regionalized-7	7	6	276	22	60	174	20	276	0	0
Centralized-1	7	6	276	22	60	174	20	276	0	0
Centralized-2	7	6	276	22	60	174	20	276	0	0
Centralized-3	7	1	276	22	60	174	20	276	0	0
Centralized-4	7	1	276	22	60	174	20	276	0	0
Centralized-5	1	1	276	22	60	174	20	276	0	0

Notes:
** Ten sites use existing facilities for Volume Reduction
T = Treatment
D = Disposal
The Life Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum may not reflect the true total cost.
(1) In Current 1994 Dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

11.3 PGDP TRUW

Twelve tables immediately following portray the impacts of TRUW at PGDP. These tables are presented as follows:

Impact Category

No.	Description	Table No.	Page No.
1.	PGDP—TRUW—Treatment: Estimated Number of Fatalities	II-11.3-1	11-32
2.	PGDP—TRUW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects	II-11.3-2	11-33
4.	PGDP—TRUW—Treatment: MEI Probability of Cancer Fatality	II-11.3-3	11-34
5.	PGDP—TRUW—Treatment: MEI Probability of Cancer Incidences and Genetic Effects	II-11.3-4	11-35
6.	PGDP—TRUW—Treatment: Noncancer Health Risk From Chemical Exposure	II-11.3-5	11-36
7.	PGDP—TRUW—Emissions in Tons per Year of Criteria Air Pollutants	II-11.3-6	11-37
8.	PGDP—TRUW—Percent of Standard/Guideline for Criteria Air Pollutants	II-11.3-7	11-38
9.	PGDP—TRUW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-11.3-8	11-39
10.	PGDP—TRUW—Impacts on Water Resources Due to Increased Water Use	II-11.3-9	11-40
12.	PGDP—TRUW—Socioeconomic Impacts for Treatment	II-11.3-10	11-41
13.	PGDP—TRUW—Infrastructure Impacts for Treatment	II-11.3-11	11-42
14.	PGDP—TRUW—Cost	II-11.3-12	11-43

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Table II-11.3-1. PGDP—TRUW—Treatment: Estimated Number of Fatalities

TRUW Alternatives	Treatment						
	Number of Sites		Treat STD	WM Worker		Offsite Population	Noninvolved Workers
	CH Treat	RH Treat		Radiation Exposure	Physical Hazards	Radiation Exposure	Radiation Exposure
No Action **	16	5	WIPP WAC	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Decentralized ***	16	5	WIPP WAC	4.6E-07	1.3E-02	3.5E-09	2.7E-10
Regionalized-1	5	2	Reduce Gas	4.7E-07	2.5E-03	5.3E-09	4.1E-10
Regionalized-2	5	2	LDR	4.7E-07	2.5E-03	5.3E-09	4.1E-10
Regionalized-3	3	2	LDR	4.7E-07	2.5E-03	5.3E-09	4.1E-10
Centralized	WIPP	2	LDR	4.7E-07	2.5E-03	5.3E-09	4.1E-10

Notes:
** For No Action Alternative, storage is indefinite; no disposal at WIPP is assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at 16 sites, then transfered to interim storage at 10 sites, then to WIPP.

Table II-11.3-2. PGDP—TRUW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

TRUW Alternatives	Number of Sites		Treat STD	Offsite Population				Noninvolved Workers				WM Workers			
	CH Treat	RH Treat		Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects
No Action**	16	5	WIPP WAC	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Decentralized***	16	5	WIPP WAC	7.0E-06	1.2E-08	3.6E-13	7.0E-10	5.4E-07	9.2E-10	1.9E-13	5.4E-11	1.2E-03	1.6E-06	9.6E-13	6.9E-08
Regionalized-1	5	2	Reduce Gas	1.1E-05	1.8E-08	9.5E-13	1.1E-09	8.2E-07	1.4E-09	5.0E-13	8.2E-11	1.2E-03	1.7E-06	2.8E-12	7.1E-08
Regionalized-2	5	2	LDR	1.1E-05	1.8E-08	9.5E-13	1.1E-09	8.2E-07	1.4E-09	5.0E-13	8.2E-11	1.2E-03	1.7E-06	2.8E-12	7.1E-08
Regionalized-3	3	2	LDR	1.1E-05	1.8E-08	9.5E-13	1.1E-09	8.2E-07	1.4E-09	5.0E-13	8.2E-11	1.2E-03	1.7E-06	2.8E-12	7.1E-08
Centralized	WIPP	2	LDR	1.1E-05	1.8E-08	9.5E-13	1.1E-09	8.2E-07	1.4E-09	5.0E-13	8.2E-11	1.2E-03	1.7E-06	2.8E-12	7.1E-08

Notes:
** For No Action Alternative, storage is indefinite; no disposal at WIPP is assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
T = Treatment
D = Disposal

Table II-11.3-3. PGDP—TRUW—Treatment: MEI Probability of Cancer Fatality

TRUW Alternatives	Number of Sites		Treat STD	Treatment	
	CH Treat	RH Treat		Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability
No Action**	16	5	WIPP WAC	- -	- -
Decentralized***	16	5	WIPP WAC	3.9E-13	3.3E-13
Regionalized-1	5	2	Reduce Gas	5.9E-13	5.0E-13
Regionalized-2	5	2	LDR	5.9E-13	5.0E-13
Regionalized-3	3	2	LDR	5.9E-13	5.0E-13
Centralized	WIPP	2	LDR	5.9E-13	5.0E-13

Notes:
- - = Treatment is not considered under this alternative
MEI = Maximally Exposed Individual
** For No Action Alternative, storage is indefinite; no disposal of WIPP is assumed, for all other alternatives disposal at WIPP is assumed.
***In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then transferred to interim storage

Table II-11.3-4. PGDP—TRUW—Treatment: MEI Probability of Cancer Incidences and Genetic Effects

TRUW Alternatives	Number of Sites		Treat STD	Treatment	
	CH Treat	RH Treat		Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability
No Action**	16	5	WIPP WAC	- -	- -
Decentralized***	16	5	WIPP WAC	3.9E-13	3.3E-13
Regionalized-1	5	2	Reduce Gas	5.9E-13	5.0E-13
Regionalized-2	5	2	LDR	5.9E-13	5.0E-13
Regionalized-3	3	2	LDR	5.9E-13	5.0E-13
Centralized	WIPP	2	LDR	5.9E-13	5.0E-13

Notes:
- - = Treatment is not considered under this alternative
MEI = Maximally Exposed Individual
** For No Action Alternative, storage is indefinite; no disposal of WIPP is assumed, for all other alternatives disposal at WIPP is assumed.
***In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then transferred to interim storage

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Table II-11.3-5. PGDP—TRUW—Treatment: Noncancer Health Risk From Chemical Exposure

TRUW Alternatives	Number of Sites		Treat STD	Treatment		
	CH Treat	RH Treat		Offsite MEI Hazard Index	Noninvolved Worker MEI Hazard Index	WM Worker Exposure Index
No Action**	16	5	WIPP WAC	0.0E+00	0.0E+00	0.0E+00
Decentralized***	16	5	WIPP WAC	8.0E-14	5.0E-13	2.6E-10
Regionalized-1	5	2	Reduce Gas	2.0E-13	1.0E-12	1.6E-09
Regionalized-2	5	2	LDR	2.0E-13	1.0E-12	1.6E-09
Regionalized-3	3	2	LDR	2.0E-13	1.0E-12	1.6E-09
Centralized	WIPP	2	LDR	2.1E-13	1.2E-12	1.6E-09

Notes:
MEI = Maximally Exposed Individual
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
- - = Treatment is not considered under this alternative.
Hazard Index = Sum of hazard quotient values for all noncarcinogenic chemicals. The Hazard Quotient is the chemical-specific ratio of media exposure concentrations to concentrations exposure concentrations to concentrations believed to have no appreciable adverse effects.
Exposure Index Ratio of exposure concentration to chemical-specific occupational threshold

Table II-11.3-6. PGDP—TRUW—Emissions in Tons per Year of Criteria Air Pollutants

TRUW Alternatives	Number of Sites		Treat STD	Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
	CH Treat	RH Treat		CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action**	16	5	WIPP WAC	- -	- -	- -	- -	- -	- -	0	0	0	0	0	0
Decentralized***	16	5	WIPP WAC	2 (0/2)	1 (0/1)	0	0	0	0	1 (0/1)	0	0	0	0	0
Regionalized-1	5	2	Reduce Gas	2 (0/2)	1 (0/1)	0	0	0	0	1 (0/1)	0	0	0	0	0
Regionalized-2	5	2	LDR	3 (0/3)	2 (1/1)	0	0	0	0	1 (0/1)	0	0	0	0	0
Regionalized-3	3	2	LDR	3 (0/3)	2 (1/1)	0	0	0	0	1 (0/1)	0	0	0	0	0
Centralized	WIPP	2	LDR	3 (0/3)	2 (1/1)	0	0	0	0	1 (0/1)	0	0	0	0	0

Notes:
Emissions <1 ton per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions / worker vehicles emission)
(2) Values = total emissions (stationary-source emissions / mobile-source emission)
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

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Table II-11.3-7. PGDP—TRUW—Percent of Standard/Guideline for Criteria Air Pollutants

TRUW Alternatives	Number of Sites		Treat STD	Construction					
				Percent of Tons/Year General Conformity Rule (1)					
	CH Treat	RH Treat		CO	NO2	Pb	PM10	SO2	VOC
No Action	16	5	WIPP WAC	--	--	--	--	--	--
Decentralized	16	5	WIPP WAC	--	1 (1/0)	--	--	--	0
Regionalized-1	5	2	Reduce Gas	--	1 (1/0)	--	--	--	0
Regionalized-2	5	2	LDR	--	2 (1/1)	--	--	--	1 (0/1)
Regionalized-3	3	2	LDR	--	2 (1/1)	--	--	--	1 (0/1)
Centralized	WIPP	2	LDR	--	2 (1/1)	--	--	--	1 (0/1)

TRUW Alternatives	Number of Sites		Treat STD	Operations & Maintenance											
				Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
	CH Treat	RH Treat		CO (4)	NO2 (5)	Pb (4)	PM10 (4)	SO2 (4)	VOC (5)	CO	NO2	Pb	PM10	SO2	VOC
No Action	16	5	WIPP WAC	0	0	0	0	0	0	--	--	--	--	--	--
Decentralized	16	5	WIPP WAC	0	0	0	0	0	0	--	--	--	--	--	--
Regionalized-1	5	2	Reduce Gas	0	0	0	0	0	0	--	--	--	--	--	--
Regionalized-2	5	2	LDR	0	0	0	0	0	0	--	--	--	--	--	--
Regionalized-3	3	2	LDR	0	0	0	0	0	0	--	--	--	--	--	--
Centralized	WIPP	2	LDR	0	0	0	0	0	0	--	--	--	--	--	--

Notes:
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) GCR only applies to pollutants in nonattainment.
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions for all alternatives assumed to be negligible.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.
(5) Nonattainment area for ozone. Pollutant is an ozone precursor, therefore GCR de minimus levels are applied. Values = % of total emissions (% of stationary-source emissio % of mobile-source emissions).
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

Table II-11.3-8. PGDP—TRUW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

TRUW Alternatives	Number of Sites		Treat STD	Operations & Maintenance											
	CH Treat	RH Treat		Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action**	16	5	WIPP - WAC	0	--	--	--	0	0	--	--	--	--	--	--
Decentralized***	16	5	WIPP - WAC	0	--	--	--	0	0	--	--	--	--	--	--
Regionalized-1	5	2	Reduce Gas	0	--	--	--	0	0	--	--	--	--	--	--
Regionalized-2	5	2	LDR	0	--	--	--	0	0	--	--	--	--	--	--
Regionalized-3	3	2	LDR	0	--	--	--	0	0	--	--	--	--	--	--
Centralized	WIPP	2	LDR	0	--	--	--	0	0	--	--	--	--	--	--

TRUW Alternatives	Number of Sites		Treat STD	Operations & Maintenance									
	CH Treat	RH Treat		Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action**	16	5	WIPP - WAC	0	0	--	--	--	0	0	--	--	--
Decentralized***	16	5	WIPP - WAC	0	0	--	--	--	0	0	--	--	--
Regionalized-1	5	2	Reduce Gas	0	0	--	--	--	0	0	--	--	--
Regionalized-2	5	2	LDR	0	0	--	--	--	0	0	--	--	--
Regionalized-3	3	2	LDR	0	0	--	--	--	0	0	--	--	--
Centralized	WIPP	2	LDR	0	0	--	--	--	0	0	--	--	--

Notes:

** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.

*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

-- = Emissions of this hazardous or toxic air pollutant are assumed to be negligible.

Percentages <1% are shown as zeros. CH = contact handled. RH = remote handled.

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Table II-11.3-9. PGDP—TRUW—Impacts on Water Resources Due to Increased Water Use

TRUW Alternatives	Number of Sites		Treat STD	Construction			Operations			
	CH Treat	RH Treat		Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action**	16	5	WIPP WAC	- -	- -	- -	171	<0.1	<0.1	<0.1
Decentralized***	16	5	WIPP WAC	529	<0.1	<0.1	200	<0.1	<0.1	<0.1
Regionalized-1	5	2	Reduce Gas	529	<0.1	<0.1	200	<0.1	<0.1	<0.1
Regionalized-2	5	2	LDR	880	<0.1	<0.1	200	<0.1	<0.1	<0.1
Regionalized-3	3	2	LDR	880	<0.1	<0.1	200	<0.1	<0.1	<0.1
Centralized	WIPP	2	LDR	880	<0.1	<0.1	200	<0.1	<0.1	<0.1

Notes:
Water supplied by surface water in the Ohio River. Current water use = 15,000,000 gallons/day.
Wastewater discharged to the Ohio River. Average flow rate of the Ohio River = 174,521,000,000 gallons/day.
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
<0.1 indicates that the precentage is less than 0.1%.

Table II-11.3-10. PGDP—TRUW—Socioeconomic Impacts for Treatment

TRUW Alternatives	Number of Sites		Effect of Implementation of Alternatives						
					Jobs		Income		
	CH Treat	RH Treat	Treat STD	Cost (Millions) (1)	Annual Jobs	% Annual Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action**	16	5	WIPP WAC	29	23	0.03	0.2	0.01	0.01
Decentralized***	16	5	WIPP WAC	42	42	0.05	0.5	0.02	0.02
Regionalized-1	5	2	Reduce Gas	42	42	0.05	0.5	0.02	0.02
Regionalized-2	5	2	LDR	52	52	0.07	0.6	0.02	0.03
Regionalized-3	3	2	LDR	52	52	0.07	0.6	0.02	0.03
Centralized	WIPP	2	LDR	52	52	0.07	0.6	0.02	0.03

Notes:
(1) In current 1990 dollars.
(2) Compared to 1990 baseline.
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

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Table II-11.3-11. PGDP—TRUW—Infrastructure Impacts for Treatment

TRUW Alternatives	Number of Sites		Treat STD	Effect of Implementation of Alternatives									
				Land Use		Water		Waste Water		Power		Employment (FTE)	
	CH Treat	RH Treat		Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Peak Construction Employment	% of Current Employment (1)
No Action**	16	5	WIPP WAC	0	0.00	171	0.00	171	0.01	0.17	0.01	0	0.00
Decentralized***	16	5	WIPP WAC	0.6	0.02	529	0.00	200	0.01	0.18	0.01	24	1.30
Regionalized-1	5	2	Reduce Gas	0.6	0.02	529	0.00	200	0.01	0.26	0.01	24	1.30
Regionalized-2	5	2	LDR	0.6	0.03	880	0.00	200	0.01	0.25	0.01	35	2.00
Regionalized-3	3	2	LDR	0.6	0.03	880	0.00	200	0.01	0.25	0.01	35	2.00
Centralized	WIPP	2	LDR	0.6	0.03	880	0.00	200	0.01	0.25	0.01	35	2.00

Notes:
GPD = Gallons per Day
MW = Megawatts Electric
FTE = Full Time Equivalent
(1) Based on 1990 Site Employment.
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

Table II–11.3–12. PGDP—TRUW—Cost

TRUW Alternatives	Number of Sites		Treat STD (2)	Total Cost (Millions) (1)	Life-Cycle Component				Functional Area		
	CH Treat	RH Treat			Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Retrieval Characterization (Millions)	Treatment (Millions)	Storage (Millions)
No Action**	11	5	WIPP - WAC	32	0	0	28	4	0	32	0
Decentralized***	16	5	WIPP - WAC	48	5	10	28	5	0	48	0
Regionalized-1	5	2	Reduce Gas	48	5	10	28	5	0	48	0
Regionalized-2	5	2	LDR	59	5	19	30	5	0	59	0
Regionalized-3	3	2	LDR	59	5	19	30	5	0	59	0
Centralized	WIPP	2	LDR	59	5	19	30	5	0	59	0

Notes:
** For No Action Alternative, storage is indefinite; no disposal at WIPP to be assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
The Life Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum may not reflect the true total cost.
(1) In Current 1994 Dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.
(2) Treatment standard (STD) applied: treat to WIPP Waste Acceptance Criteria (WIPP WAC), treat for reduced gas generation (Reduce Gas), treat to Land Disposal Restrictions (LDR).

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12.0 Pantex Plant

Pantex currently is custodian of significant volumes of LLMW, LLW, and TRUW. Each of the waste types is treated independently in the following sections.

12.1 Pantex LLMW

Fifteen tables immediately following portray the impacts of LLMW at Pantex. These tables are presented as follows:

Impact Category

No.	Description	Table No.	Page No.
1.	Pantex—LLMW—Treatment and Disposal: Estimated Number of Fatalities	II-12.1-1	12-2
2.	Pantex—LLMW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects	II-12.1-2	12-3
3.	Pantex—LLMW—Disposal: Estimated Number of Cancer Incidences	II-12.1-3	12-4
4.	Pantex—LLMW—Treatment and Disposal: MEI Probability of Cancer Fatality	II-12.1-4	12-5
5.	Pantex—LLMW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects	II-12.1-5	12-6
6.	Pantex—LLMW—Treatment and Disposal: Noncancer Health Risk from Chemical Exposure	II-12.1-6	12-7
7.	Pantex—LLMW—Emissions in Tons per Year of Criteria Air Pollutants	II-12.1-7	12-8
8.	Pantex—LLMW—Percent of Standard/Guideline for Criteria Air Pollutants	II-12.1-8	12-9
9.	Pantex—LLMW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-12.1-9	12-10
10.	Pantex—LLMW—Impacts on Water Resources Due to Increased Water Use	II-12.1-10	12-11
11.	Pantex—LLMW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal (Contact-Handled)	II-12.1-11	12-12
12.	Pantex—LLMW—Percent of Drinking Water Standards for Hazardous Constituents in Groundwater from Disposal (Contact-Handled)	II-12.1-12	12-13
13.	Pantex—LLMW—Socioeconomics Impacts for Treatment and Disposal	II-12.1-13	12-14
14.	Pantex—LLMW—Infrastructure Impacts for Treatment and Disposal	II-12.1-14	12-15
15.	Pantex—LLMW—Cost	II-12.1-15	12-16

Table II-12.1-1. Pantex—LLMW—Treatment and Disposal: Estimated Number of Fatalities

LLMW Alternatives	Number of Sites		Treatment				Disposal	
			WM Worker		Offsite Population	Noninvolved Workers	WM Worker	
	T	D	Radiation Exposure	Physical Hazards	Radiation Exposure	Radiation Exposure	Radiation Exposure	Physical Hazards
No Action	3	-	4.1E-04	1.4E-02	2.2E-06	5.6E-07	- -	- -
Decentralized	37	16	3.4E-04	3.8E-02	3.5E-05	3.5E-06	3.0E-04	4.8E-03
Regionalized-1	11	12	3.4E-04	3.8E-02	3.5E-05	3.5E-06	3.0E-04	4.8E-03
Regionalized-2	7	6	1.7E-04	1.4E-02	2.3E-06	2.3E-07	- -	- -
Regionalized-3	7	1	1.7E-04	1.4E-02	2.3E-06	2.3E-07	- -	- -
Regionalized-4	4	6	1.7E-04	1.4E-02	2.3E-06	2.3E-07	- -	- -
Centralized	1	1	1.7E-04	1.4E-02	2.3E-06	2.3E-07	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this Alternative.

Table II-12.1-2. Pantex—LLMW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

LLMW Alternatives	Number of Sites		Offsite Population				Noninvolved Workers				WM Worker			
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects
No Action	3	-	4.4E-03	7.5E-06	1.4E-07	4.4E-07	1.1E-03	1.9E-06	1.6E-07	1.1E-07	1.0E+00	1.4E-03	1.2E-07	6.2E-05
Decentralized	37	16	6.9E-02	1.2E-04	3.5E-09	6.9E-06	6.9E-03	1.2E-05	4.0E-09	6.9E-07	8.4E-01	1.2E-03	8.2E-07	5.0E-05
Regionalized-1	11	12	6.9E-02	1.2E-04	3.5E-09	6.9E-06	6.9E-03	1.2E-05	4.0E-09	6.9E-07	8.4E-01	1.2E-03	8.2E-07	5.0E-05
Regionalized-2	7	6	4.7E-03	8.0E-06	3.6E-10	4.7E-07	4.7E-04	7.9E-07	4.1E-10	4.7E-08	4.2E-01	5.8E-04	5.5E-08	2.5E-05
Regionalized-3	7	1	4.7E-03	8.0E-06	3.6E-10	4.7E-07	4.7E-04	7.9E-07	4.1E-10	4.7E-08	4.2E-01	5.8E-04	5.5E-08	2.5E-05
Regionalized-4	4	6	4.7E-03	8.0E-06	3.6E-10	4.7E-07	4.7E-04	7.9E-07	4.1E-10	4.7E-08	4.2E-01	5.8E-04	5.5E-08	2.5E-05
Centralized	1	1	4.7E-03	8.0E-06	3.6E-10	4.7E-07	4.7E-04	7.9E-07	4.1E-10	4.7E-08	4.2E-01	5.8E-04	5.5E-08	2.5E-05

Notes:
T = Treatment
D = Disposal

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Table II-12.1-3. Pantex—LLMW—Disposal: Estimated Number of Cancer Incidences

LLMW Alternatives	Number of Sites		WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	3	-	- -	- -	- -
Decentralized	37	16	7.6E-01	1.1E-03	4.6E-05
Regionalized-1	11	12	7.6E-01	1.1E-03	4.6E-05
Regionalized-2	7	6	- -	- -	- -
Regionalized-3	7	1	- -	- -	- -
Regionalized-4	4	6	- -	- -	- -
Centralized	1	1	- -	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this Alternative.

Table II-12.1-4. Pantex—LLMW—Treatment and Disposal: MEI Probability of Cancer Fatality

LLMW Alternatives	Number of Sites		Treatment		Disposal
	T	D	Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability	Hypothetical Farm Family Most Exposed Lifetime MEI Cancer Fatality Probability
No Action	3	-	1.8E-10	1.0E-09	- -
Decentralized	37	16	2.9E-09	6.6E-09	6.7E-07
Regionalized-1	11	12	2.9E-09	6.6E-09	6.7E-07
Regionalized-2	7	6	2.0E-10	4.4E-10	- -
Regionalized-3	7	1	2.0E-10	4.4E-10	- -
Regionalized-4	4	6	2.0E-10	4.4E-10	- -
Centralized	1	1	2.0E-10	4.4E-10	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered under the Alternative

Table II-12.1-5. Pantex—LLMW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects

LLMW Alternatives	Number of Sites		Treatment								Disposal			
			Offsite Population MEI				Noninvolved Worker MEI				Most Exposed Farm Family Lifetime MEI			
	T	D	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability
No Action	3	-	3.7E-07	6.2E-10	1.2E-11	3.7E-11	2.1E-06	3.6E-09	2.7E-10	2.1E-10	- -	- -	- -	- -
Decentralized	37	16	5.9E-06	1.0E-08	2.9E-13	5.9E-10	1.3E-05	2.2E-08	6.8E-12	1.3E-09	1.3E-03	2.3E-06	1.2E-06	1.3E-07
Regionalized-1	11	12	5.9E-06	1.0E-08	2.9E-13	5.9E-10	1.3E-05	2.2E-08	6.8E-12	1.3E-09	1.3E-03	2.3E-06	1.23-06	1.3E-07
Regionalized-2	7	6	4.0E-07	6.8E-10	3.0E-14	4.0E-11	8.9E-07	1.5E-09	7.0E-13	8.9E-11	- -	- -	- -	- -
Regionalized-3	7	1	4.0E-07	6.8E-10	3.0E-14	4.0E-11	8.9E-07	1.5E-09	7.0E-13	8.9E-11	- -	- -	- -	- -
Regionalized-4	4	6	4.0E-07	6.8E-10	3.0E-14	4.0E-11	8.9E-07	1.5E-09	7.0E-13	8.9E-11	- -	- -	- -	- -
Centralized	1	1	4.0E-07	6.8E-10	3.0E-14	4.0E-11	8.9E-07	1.5E-09	7.0E-13	8.9E-11	- -	- -	- -	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered for this alternative.

Table II-12.1-6. Pantex—LLMW—Treatment and Disposal: Noncancer Health Risk from Chemical Exposure

LLMW Alternatives	Number of Sites		Treatment			Disposal
	T	D	Offsite MEI Hazard Index	Noninvolved Worker MEI Hazard Index	WM Worker Exposure Index	Hypothetical Farm Family Most Exposed Lifetime Hazard Index
No Action	3	-	1.7E-08	3.9E-07	1.3E-06	- -
Decentralized	37	16	1.3E-09	3.0E-08	4.2E-05	4.0E-03
Regionalized-1	11	12	1.3E-09	3.0E-08	4.2E-05	4.0E-03
Regionalized-2	7	6	7.5E-12	1.8E-10	1.3E-06	- -
Regionalized-3	7	1	7.5E-12	1.8E-10	1.3E-06	- -
Regionalized-4	4	6	7.5E-12	1.8E-10	1.3E-06	- -
Centralized	1	1	7.5E-12	1.8E-10	1.3E-06	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this alternative.
MEI = Maximally Exposed Individual
Hazard Index = Sum of hazard quotient values for all noncarcinogenic chemicals. The hazard quotient is the chemical-specific ratio of media exposure concentrations to concentrations believed to have no appreciable adverse effects.
Exposure Index = Ratio of Exposure concentration to chemical-specific occupational threshold limits.

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Table II-12.1-7. Pantex—LLMW—Emissions in Tons per Year of Criteria Air Pollutants

LLMW Alternatives	Number of Sites		Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	2 (0/1)	1 (1/0)	0	0	0	0	1 (0/1)	0	0	0	0	0
Decentralized	37	16	22 (2/20)	9 (5/4)	0	0	0	2 (0/2)	4 (0/4)	1 (0/1)	0	0	0	1 (0/1)
Regionalized-1	11	12	21 (2/19)	9 (5/4)	0	0	0	2 (0/2)	4 (0/4)	1 (0/1)	0	0	0	1 (0/1)
Regionalized-2	7	6	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)	2 (0/2)	0	0	0	0	0
Regionalized-3	7	1	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)	2 (0/2)	0	0	0	0	0
Regionalized-4	4	6	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)	2 (0/2)	0	0	0	0	0
Centralized	1	1	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)	2 (0/2)	0	0	0	0	0

Notes:
T = Treatment
D = Disposal
Emissions <1 tons per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions / worker vehicles emission).
(2) Values = total emissions (stationary-source emissions / mobile-source emission).

Table II-12.1-8. Pantex—LLMW—Percent of Standard/Guideline for Criteria Air Pollutants

LLMW Alternatives	Number of Sites		Construction					
			Percent of Tons/Year General Conformity Rule (1)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	--	--	--	--	--	--
Decentralized	37	16	--	--	--	--	--	--
Regionalized-1	11	12	--	--	--	--	--	--
Regionalized-2	7	6	--	--	--	--	--	--
Regionalized-3	7	1	--	--	--	--	--	--
Regionalized-4	4	6	--	--	--	--	--	--
Centralized	1	1	--	--	--	--	--	--

LLMW Alternatives	Number of Sites		Operations & Maintenance											
			Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
	T	D	CO (4)	NO2 (4)	Pb (4)	PM10 (4)	SO2 (4)	VOC (4)	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	0	1	0	0	0	0	--	--	--	--	--	--
Decentralized	37	16	0	1	0	1	0	0	0	0	0	0	0	0
Regionalized-1	11	12	0	1	0	1	0	0	0	0	0	0	0	0
Regionalized-2	7	6	0	0	0	0	0	0	--	--	--	--	--	--
Regionalized-3	7	1	0	0	0	0	0	0	--	--	--	--	--	--
Regionalized-4	4	6	0	0	0	0	0	0	--	--	--	--	--	--
Centralized	1	1	0	0	0	0	0	0	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) Pantex is in an attainment area for all criteria pollutants, therefore the GCR does not apply.
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions are assumed to be negligible for all but the Decentralized and Regionalized-1 Alternatives.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.

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Table II-12.1-9. Pantex—LLMW—Percent of Standards/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

LLMW Alternatives	Number of Sites		Operations & Maintenance											
	T	D	Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action	3	-	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Decentralized	37	16	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Regionalized-	11	12	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Regionalized-	7	6	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Regionalized-	7	1	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Regionalized-	4	6	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Centralized	1	1	0	0	0	- -	- -	0	- -	- -	0	0	0	0

LLMW Alternatives	Number of Sites		Operations & Maintenance									
	T	D	Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action	3	-	- -	0	0	0	- -	0	0	0	- -	- -
Decentralized	37	16	- -	0	0	0	- -	0	0	0	- -	- -
Regionalized-	11	12	- -	0	0	0	- -	0	0	0	- -	- -
Regionalized-	7	6	- -	0	0	0	- -	0	0	0	- -	- -
Regionalized-	7	1	- -	0	0	0	- -	0	0	0	- -	- -
Regionalized-	4	6	- -	0	0	0	- -	0	0	0	- -	- -
Centralized	1	1	- -	0	0	0	- -	0	0	0	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Emissions of this hazardous or toxic air pollutant are assumed to be negligible.
Percentages <1% are shown as zeros.

Table II-12.1-10. Pantex—LLMW—Impacts on Water Resources Due to Increased Water Use

LLMW Alternatives	Number of Sites		Construction			Operations			
	T	D	Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action	3	-	711	0.1	- -	305	0.1	- -	- -
Decentralized	37	16	4499	0.8	- -	1457	0.3	- -	- -
Regionalized-1	11	12	4499	0.8	- -	1457	0.3	- -	- -
Regionalized-2	7	6	116	<0.1	- -	387	0.1	- -	- -
Regionalized-3	7	1	116	<0.1	- -	387	0.1	- -	- -
Regionalized-4	4	6	116	<0.1	- -	387	0.1	- -	- -
Centralized	1	1	116	<0.1	- -	387	0.1	- -	- -

Notes:
T = Treatment
D = Disposal
Water supplied by groundwater in the Ogallala Aquifer. Current water use = 548,000 gallons/day.
Wastewater discharged to onsite playas.
- - = Stream Flow and Waste Water Stream Flow is not considered for this site.
<0.1 indicates that the percentage is less than 0.1%.

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Table II-12.1-11. Pantex—LLMW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal (Contact-Handled)

LLMW Alternatives	Number of Sites T	Number of Sites D	Ac 225	Ac 227	Am 241	Am 242	Am 243	C 14	Cs 135	Cs 137	Cm 242	Cm 244	Cm 245	I 129	Pb 210	Np 237	Ni 59	Ni 63	Pd 107	Pu 238	Pu 239	Pu 240	Pu 241
No Action	3	-	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Decentralized	37	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-2	7	6	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-3	7	1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-4	4	6	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Centralized	1	1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

LLMW Alternatives	Number of Sites T	Number of Sites D	Po 210	K 40	Pa 231	Ra 223	Ra 226	Sm 151	Se 79	Sr 90	Tc 99	Th 227	Th 228	Th 229	Th 230	Th 232	Sn 126	U 233	U 234	U 235	U 236	U 238	Y 90	Zr 93
No Action	3	-	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Decentralized	37	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-2	7	6	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-3	7	1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-4	4	6	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Centralized	1	1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

Notes:
T = Treatment
D = Disposal
- - = No disposal at this site for this alternative.

Table II-12.1-12. Pantex—LLMW—Percent of Drinking Water Standards for Hazardous Constituents in Groundwater from Disposal (Contact-Handled)

LLMW Alternatives	T	D	Acetone	Arsenic	Barium	Benzene	Cadmium	Carbon Tetrachloride	Chromium	Cyanide
No Action	3	-	--	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	1	0	2	0	0
Regionalized-1	11	12	0	0	0	1	0	2	0	0
Regionalized-2	7	6	--	--	--	--	--	--	--	--
Regionalized-3	7	1	--	--	--	--	--	--	--	--
Regionalized-4	4	6	--	--	--	--	--	--	--	--
Centralized	1	1	--	--	--	--	--	--	--	--

LLMW Alternatives	T	D	1,2-dichloro-ethane	Lead	Mercury	Methylene Chloride	Selenium	Silver	1,2,2-trichloro-1,1-trifluoroethane
No Action	3	-	--	--	--	--	--	--	--
Decentralized	37	16	8	0	0	30	0	0	0
Regionalized-1	11	12	8	0	0	30	0	0	0
Regionalized-2	7	6	--	--	--	--	--	--	--
Regionalized-3	7	1	--	--	--	--	--	--	--
Regionalized-4	4	6	--	--	--	--	--	--	--
Centralized	1	1	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
"--" = No disposal at this site for this alternative.

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Table II-12.1-13. Pantex—LLMW—Socioeconomics Impacts for Treatment and Disposal

LLMW Alternatives	Number of Sites		Effect of Implementation of Alternatives					
				Jobs		Income		
	T	D	Cost (Millions) (1)	Annual Jobs	% Annual Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action	3	-	33	28	0.03	0.3	0.01	0.02
Decentralized	37	16	169	175	0.17	1.9	0.06	0.07
Regionalized-1	11	12	169	175	0.17	1.9	0.06	0.07
Regionalized-2	7	6	60	62	0.06	0.7	0.02	0.02
Regionalized-3	7	1	60	62	0.06	0.7	0.02	0.02
Regionalized-4	4	6	60	62	0.06	0.7	0.02	0.02
Centralized	1	1	60	62	0.06	0.7	0.02	0.02

Notes:
T = Treatment
D = Disposal
(1) In current 1990 dollars.
(2) Compared to 1990 baseline

Table II-12.1-14. Pantex—LLMW—Infrastructure Impacts for Treatment and Disposal

LLMW Alternatives	Number of Sites		Effect of Implementation of Alternatives									
			Land Use		Water		Waste Water		Power		Employment (FTE)	
	T	D	Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	% Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Peak Construction Employment	% of Current Employment (1)
No Action	49	-	0.66	0.009	711	0.05	305	0.06	0.24	0.02	11	0.4
Decentralized	49	16	3.68	0.048	4499	0.3	1457	0.27	0.45	0.03	158	5
Regionalized-1	11	12	3.68	0.048	4499	0.3	1457	0.27	0.45	0.03	144	5
Regionalized-2	7	6	0.27	0.003	387	0.03	387	0.07	0.16	0.01	39	1
Regionalized-3	7	1	0.27	0.003	387	0.03	387	0.07	0.16	0.01	39	1
Regionalized-4	4	6	0.27	0.003	387	0.03	387	0.07	0.16	0.01	39	1
Centralized	1	1	0.27	0.003	387	0.03	387	0.07	0.16	0.01	39	1

Notes:
(1) T is defined as Treatment, D is defined as Disposal

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Table II-12.1-15. Pantex—LLMW—Cost

LLMW Alternatives	Number of Sites		Total Cost (Millions) (1)	Cost by Life-Cycle Component (1)				Cost by Functional Area (1)		
	T	D		Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Treatment (Millions)	Storage (Millions)	Disposal (Millions)
No Action	3	-	38	3	4	21	11	15	23	0
Decentralized	37	16	192	32	68	81	11	152	0	40
Regionalized-1	11	12	192	32	68	81	11	152	0	40
Regionalized-2	7	6	68	8	18	32	11	68	0	0
Regionalized-3	7	1	68	8	18	32	11	68	0	0
Regionalized-4	4	6	68	8	18	32	11	68	0	0
Centralized	1	1	68	8	18	32	11	68	0	0

Notes:
T = Treatment
D = Disposal
The Life-Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum of these may not reflect the true total cost.
(1) In current 1994 dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

12.2 Pantex LLW

Thirteen tables immediately following portray the impacts of LLW at Pantex. These tables are presented as follows:

Impact Category

No.	Description	Table No.	Page No.
1.	Pantex—LLW—Treatment and Disposal: Estimated Number of Fatalities	II-12.2-1	12-18
2.	Pantex—LLW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects	II-12.2-2	12-19
3.	Pantex—LLW—Disposal: Estimated Number of Cancer Incidences and Genetic Effects	II-12.2-3	12-20
4.	Pantex—LLW—Treatment and Disposal: MEI Probability of Cancer Fatality	II-12.2-4	12-21
5.	Pantex—LLW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects	II-12.2-5	12-22
7.	Pantex—LLW—Emissions in Tons per Year of Criteria Air Pollutants	II-12.2-6	12-23
8.	Pantex—LLW—Percent of Standard/Guideline for Criteria Air Pollutants	II-12.2-7	12-24
9.	Pantex—LLW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-12.2-8	12-25
10.	Pantex—LLW—Impacts on Water Resources Due to Increased Water Use	II-12.2-9	12-26
11.	Pantex—LLW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal	II-12.2-10	12-27
12.	Pantex—LLW—Socioeconomic Impacts for Treatment and Disposal	II-12.2-11	12-28
13.	Pantex—LLW—Infrastructure Impacts for Treatment and Disposal	II-12.2-12	12-29
14.	Pantex—LLW—Cost	II-12.2-13	12-30

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Table II-12.2-1. Pantex—LLW—Treatment and Disposal: Estimated Number of Fatalities

LLW Alternatives	Number of Sites		Treatment				Disposal	
			WM Worker		Offsite Population	Noninvolved Workers	WM Worker	
	T	D	Radiation Exposure	Physical Hazards	Radiation Exposure	Radiation Exposure	Radiation Exposure	Physical Hazards
No Action	10**	6	3.3E-03	1.7E-01	1.8E-07	2.3E-08	- -	- -
Decentralized		16	2.5E-03	9.5E-02	8.3E-08	8.8E-09	2.8E-03	1.4E-01
Regionalized-1		12	2.5E-03	9.5E-02	8.3E-08	8.8E-09	2.8E-03	1.4E-01
Regionalized-2	11	12	2.7E-03	2.5E-01	1.1E-07	1.6E-08	1.4E-03	6.2E-02
Regionalized-3		6	2.6E-03	1.4E-01	1.1E-07	1.6E-08	- -	- -
Regionalized-4	7	6	2.6E-03	1.4E-01	1.1E-07	1.6E-08	- -	- -
Regionalized-5	4	6	2.6E-03	1.4E-01	1.1E-07	1.6E-08	- -	- -
Regionalized-6		2	2.6E-03	1.4E-01	1.1E-07	1.6E-08	- -	- -
Regionalized-7		2	2.6E-03	1.4E-01	1.1E-07	1.6E-08	- -	- -
Centralized-1		1	2.6E-03	1.4E-01	1.1E-07	1.6E-08	- -	- -
Centralized-2		1	2.6E-03	1.4E-01	1.1E-07	1.6E-08	- -	- -
Centralized-3	7	1	2.6E-03	1.4E-01	1.1E-07	1.6E-08	- -	- -
Centralized-4	7	1	2.6E-03	1.4E-01	1.1E-07	1.6E-08	- -	
Centralized-5	1	1	2.6E-03	1.4E-01	1.1E-07	1.6E-08	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered under the alternative
** Ten sites use existing facilities for Volume Reduction

Table II-12.2–2. Pantex—LLW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

LLW Alternatives	Number of Sites		Offsite Population			Noninvolved Worker			WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	10**	6	3.7E-04	6.3E-07	3.7E-08	4.7E-05	7.9E-08	4.7E-09	8.3E+00	1.2E-02	5.0E-04
Decentralized		16	1.7E-04	2.8E-07	1.7E-08	1.8E-05	3.0E-08	1.8E-09	6.3E+00	8.9E-03	3.8E-04
Regionalized-1		12	1.7E-04	2.8E-07	1.7E-08	1.8E-05	3.0E-08	1.8E-09	6.3E+00	8.9E-03	3.8E-04
Regionalized-2	11	12	2.2E-04	3.7E-07	2.2E-08	3.2E-05	5.4E-08	3.2E-09	6.8E+00	9.5E-03	4.1E-04
Regionalized-3		6	2.2E-04	3.7E-07	2.2E-08	3.3E-05	5.6E-08	3.3E-09	6.4E+00	9.0E-03	3.9E-04
Regionalized-4	7	6	2.2E-04	3.7E-07	2.2E-08	3.3E-05	5.6E-08	3.3E-09	6.4E+00	9.0E-03	3.9E-04
Regionalized-5	4	6	2.2E-04	3.7E-07	2.2E-08	3.3E-05	5.6E-08	3.3E-09	6.4E+00	9.0E-03	3.9E-04
Regionalized-6		2	2.2E-04	3.7E-07	2.2E-08	3.3E-05	5.6E-08	3.3E-09	6.4E+00	9.0E-03	3.9E-04
Regionalized-7		2	2.2E-04	3.7E-07	2.2E-08	3.3E-05	5.6E-08	3.3E-09	6.4E+00	9.0E-03	3.9E-04
Centralized-1		1	2.2E-04	3.7E-07	2.2E-08	3.3E-05	5.6E-08	3.3E-09	6.4E+00	9.0E-03	3.9E-04
Centralized-2		1	2.2E-04	3.7E-07	2.2E-08	3.3E-05	5.6E-08	3.3E-09	6.4E+00	9.0E-03	3.9E-04
Centralized-3	7	1	2.2E-04	3.7E-07	2.2E-08	3.3E-05	5.6E-08	3.3E-09	6.4E+00	9.0E-03	3.9E-04
Centralized-4	7	1	2.2E-04	3.7E-07	2.2E-08	3.3E-05	5.6E-08	3.3E-09	6.4E+00	9.0E-03	3.9E-04
Centralized-5	1	1	2.2E-04	3.7E-07	2.2E-08	3.3E-05	5.6E-08	3.3E-09	6.4E+00	9.0E-03	3.9E-04

Notes:
T = Treatment
D = Disposal
** Ten sites use existing facilities for Volume Reduction.

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Table II-12.2-3. Pantex—LLW—Disposal: Estimated Number of Cancer Incidences and Genetic Effects

LLW Alternatives	Number of Sites		WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	10**	6	- -	- -	- -
Decentralized		16	7.0E+00	9.8E-03	4.2E-04
Regionalized-1		12	7.0E+00	9.8E-03	4.2E-04
Regionalized-2	11	12	3.4E+00	4.7E-03	2.0E-04
Regionalized-3		6	- -	- -	- -
Regionalized-4	7	6	- -	- -	- -
Regionalized-5	4	6	- -	- -	- -
Regionalized-6		2	- -	- -	- -
Regionalized-7		2	- -	- -	- -
Centralized-1		1	- -	- -	- -
Centralized-2		1	- -	- -	- -
Centralized-3	7	1	- -	- -	- -
Centralized-4	7	1	- -	- -	- -
Centralized-5	1	1	- -	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered under the alternative.
** Ten sites use existing facilities for Volume Reduction.

Table II-12.2–4. Pantex—LLW—Treatment and Disposal: MEI Probability of Cancer Fatality

LLW Alternatives	Number of Sites		Treatment		Disposal
	T	D	Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability	Hypothetical Farm Family - Most Exposed Lifetime MEI Cancer Fatality Probability
No Action	10**	6	1.6E-11	4.5E-11	- -
Decentralized		16	7.0E-12	1.7E-11	0.0E+00
Regionalized-1		12	7.0E-12	1.7E-11	0.0E+00
Regionalized-2	11	12	9.1E-12	3.1E-11	0.0E+00
Regionalized-3		6	9.2E-12	3.1E-11	- -
Regionalized-4	7	6	9.2E-12	3.1E-11	- -
Regionalized-5	4	6	9.2E-12	3.1E-11	- -
Regionalized-6		2	9.2E-12	3.1E-11	- -
Regionalized-7		2	9.2E-12	3.1E-11	- -
Centralized-1		1	9.2E-12	3.1E-11	- -
Centralized-2		1	9.2E-12	3.1E-11	- -
Centralized-3	7	1	9.2E-12	3.1E-11	- -
Centralized-4	7	1	9.2E-12	3.1E-11	- -
Centralized-5	1	1	9.2E-12	3.1E-11	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered under the Alternative.
** Ten sites use existing facilities for Volume Reduction.

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Table II-12.2–5. Pantex—LLW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects

LLW Alternatives	Number of Sites		Treatment						Disposal		
			Offsite MEI			Noninvolved Worker MEI			Most Exposed Lifetime MEI		
	T	D	Dose (rem)	Radiation Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Radiation Genetic Effects Probability
No Action	10**	6	3.1E-08	5.3E-11	3.1E-12	9.0E-08	1.5E-10	9.0E-12	- -	- -	- -
Decentralized		16	1.4E-08	2.4E-11	1.4E-12	3.4E-08	5.7E-11	3.4E-12	0.00E+00	0.00E+00	0.00E+00
Regionalized-1		12	1.4E-08	2.4E-11	1.4E-12	3.4E-08	5.7E-11	3.4E-12	0.00E+00	0.00E+00	0.00E+00
Regionalized-2	11	12	1.8E-08	3.1E-11	1.8E-12	6.1E-08	1.0E-10	6.1E-12	0.00E+00	0.00E+00	0.00E+00
Regionalized-3		6	1.8E-08	3.1E-11	1.8E-12	6.3E-08	1.1E-10	6.3E-12	- -	- -	- -
Regionalized-4	7	6	1.8E-08	3.1E-11	1.8E-12	6.3E-08	1.1E-10	6.3E-12	- -	- -	- -
Regionalized-5	4	6	1.8E-08	3.1E-11	1.8E-12	6.3E-08	1.1E-10	6.3E-12	- -	- -	- -
Regionalized-6		2	1.8E-08	3.1E-11	1.8E-12	6.3E-08	1.1E-10	6.3E-12	- -	- -	- -
Regionalized-7		2	1.8E-08	3.1E-11	1.8E-12	6.3E-08	1.1E-10	6.3E-12	- -	- -	- -
Centralized-1		1	1.8E-08	3.1E-11	1.8E-12	6.3E-08	1.1E-10	6.3E-12	- -	- -	- -
Centralized-2		1	1.8E-08	3.1E-11	1.8E-12	6.3E-08	1.1E-10	6.3E-12	- -	- -	- -
Centralized-3	7	1	1.8E-08	3.1E-11	1.8E-12	6.3E-08	1.1E-10	6.3E-12	- -	- -	- -
Centralized-4	7	1	1.8E-08	3.1E-11	1.8E-12	6.3E-08	1.1E-10	6.3E-12	- -	- -	- -
Centralized-5	1	1	1.8E-08	3.1E-11	1.8E-12	6.3E-08	1.1E-10	6.3E-12	- -	- -	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered under the alternative.
** Ten sites use existing facilities for Volume Reduction.

Table II-12.2–6. Pantex—LLW—Emissions in Tons per Year of Criteria Air Pollutants

LLW Alternatives	Number of Sites		Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action	10**	6	21 (6/14)	19 (16/3)	0	1 (1/0)	2 (2/0)	4 (2/2)	12 (0/12)	3 (0/3)	0	0	0	1 (0/1)
Decentralized		16	19 (6/13)	18 (15/3)	0	1 (1/0)	1 (1/0)	3 (1/2)	40 (0/40)	8 (0/8)	0	0	0	5 (0/5)
Regionalized-1		12	19 (6/13)	18 (15/3)	0	1 (1/0)	1 (1/0)	3 (1/2)	40 (0/40)	8 (0/8)	0	0	0	5 (0/5)
Regionalized-2	11	12	63 (7/56)	30 (18/11)	0	2 (1/0)	2 (2/0)	9 (2/7)	74 (0/74)	15 (0/15)	0	0	0	9 (0/9)
Regionalized-3		6	23 (2/20)	10 (6/4)	0	1 (0/0)	1 (1/0)	3 (1/2)	17 (0/17)	4 (0/4)	0	0	0	2 (0/2)
Regionalized-4	7	6	23 (2/20)	10 (6/4)	0	1 (0/0)	1 (1/0)	3 (1/2)	17 (0/17)	4 (0/4)	0	0	0	2 (0/2)
Regionalized-5	4	6	23 (2/20)	10 (6/4)	0	1 (0/0)	1 (1/0)	3 (1/2)	17 (0/17)	4 (0/4)	0	0	0	2 (0/2)
Regionalized-6		2	23 (2/20)	10 (6/4)	0	1 (0/0)	1 (1/0)	3 (1/2)	17 (0/17)	4 (0/4)	0	0	0	2 (0/2)
Regionalzied-7		2	23 (2/20)	10 (6/4)	0	1 (0/0)	1 (1/0)	3 (1/2)	17 (0/17)	4 (0/4)	0	0	0	2 (0/2)
Centralized-1		1	23 (2/20)	10 (6/4)	0	1 (0/0)	1 (1/0)	3 (1/2)	17 (0/17)	4 (0/4)	0	0	0	2 (0/2)
Centralized-2		1	23 (2/20)	10 (6/4)	0	1 (0/0)	1 (1/0)	3 (1/2)	17 (0/17)	4 (0/4)	0	0	0	2 (0/2)
Centralized-3	7	1	23 (2/20)	10 (6/4)	0	1 (0/0)	1 (1/0)	3 (1/2)	17 (0/17)	4 (0/4)	0	0	0	2 (0/2)
Centralized-4	7	1	23 (2/20)	10 (6/4)	0	1 (0/0)	1 (1/0)	3 (1/2)	17 (0/17)	4 (0/4)	0	0	0	2 (0/2)
Centralized-5	1	1	23 (2/20)	10 (6/4)	0	1 (0/0)	1 (1/0)	3 (1/2)	17 (0/17)	4 (0/4)	0	0	0	2 (0/2)

Notes:
T = Treatment
D = Disposal
Emissions <1 ton per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions/worker vehicles emission)
(2) Values = total emissions (stationary-source emissions/mobile-source emission)
** Ten sites use existing facilities for Volume Reduction.

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Table II-12.2-7. Pantex—LLW—Percent of Standard/Guideline for Criteria Air Pollutants

LLW Alternatives	Number of Sites		Construction					
			Percent of Tons/Year General Conformity Rule (1)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC
No Action	10**	6	--	13 (11/2)	--	--	--	5 (2/3)
Decentralized		16	--	88 (85/3)	--	--	--	20 (16/4)
Regionalized-1		12	--	88 (85/3)	--	--	--	20 (16/4)
Regionalized-2	11	12	--	81 (74/7)	--	--	--	22 (14/8)
Regionalized-3		6	--	7 (4/3)	--	--	--	5 (1/4)
Regionalized-4	7	6	--	7 (4/3)	--	--	--	5 (1/4)
Regionalized-5	4	6	--	7 (4/3)	--	--	--	5 (1/4)
Regionalized-6		2	--	7 (4/3)	--	--	--	5 (1/4)
Regionalzied-7		2	--	7 (4/3)	--	--	--	5 (1/4)
Centralized-1		1	--	7 (4/3)	--	--	--	5 (1/4)
Centralized-2		1	--	7 (4/3)	--	--	--	5 (1/4)
Centralized-3	7	1	--	7 (4/3)	--	--	--	5 (1/4)
Centralized-4	7	1	--	7 (4/3)	--	--	--	5 (1/4)
Centralized-5	1	1	--	7 (4/3)	--	--	--	5 (1/4)

LLW Alternatives	Number of Sites		Operations & Maintenance											
			Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
	T	D	CO (4)	NO2 (5)	Pb (4)	PM10 (4)	SO2 (4)	VOC (5)	CO	NO2	Pb	PM10	SO2	VOC
No Action	10**	6	0	2 (0/2)	0	0	0	2 (0/2)	--	--	--	--	--	--
Decentralized		16	1	10 (3/7)	0	3	0	8 (0/8)	--	--	--	--	--	--
Regionalized-1		12	1	10 (3/7)	0	3	0	8 (0/8)	--	--	--	--	--	--
Regionalized-2	11	12	1	11 (3/8)	0	4	0	10 (0/10)	0	0	0	0	0	0
Regionalized-3		6	0	3 (0/3)	0	0	0	4 (0/4)	--	--	--	--	--	--
Regionalized-4	7	6	0	3 (0/3)	0	0	0	4 (0/4)	--	--	--	--	--	--
Regionalized-5	4	6	0	3 (0/3)	0	0	0	4 (0/4)	--	--	--	--	--	--
Regionalized-6		2	0	3 (0/3)	0	0	0	4 (0/4)	--	--	--	--	--	--
Regionalzied-7		2	0	3 (0/3)	0	0	0	4 (0/4)	--	--	--	--	--	--
Centralized-1		1	0	3 (0/3)	0	0	0	4 (0/4)	--	--	--	--	--	--
Centralized-2		1	0	3 (0/3)	0	0	0	4 (0/4)	--	--	--	--	--	--
Centralized-3	7	1	0	3 (0/3)	0	0	0	4 (0/4)	--	--	--	--	--	--
Centralized-4	7	1	0	3 (0/3)	0	0	0	4 (0/4)	--	--	--	--	--	--
Centralized-5	1	1	0	3 (0/3)	0	0	0	4 (0/4)	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) GCR de minimus levels are applied, since PSD regulations are not applicable to construction activities. Values = % of total emissions (% of equipment emissions / % of worker vehicle emissions).
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions for all but the Regionalized-2 Alternative are assumed to be negligible.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.
(5) Nonattainment area for ozone. Pollutant is an ozone precursor, therefore GCR de minimus levels are applied. Values = % of total emissions (% of stationary-source emissions / % of mobile-source emissions).
** Ten sites use existing facilities for Volume Reduction.

Table II-12.2–8. Pantex—LLW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

LLW Alternatives	Number of Sites		Operations & Maintenance											
	T	D	Total Radio-nuclides	Acetone	Benzene	Bromo-ichlor ethan	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action	10**	6	0	--	--	--	--	--	--	--	--	--	--	--
Decentralized		16	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-1		12	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-2	11	12	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-3		6	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	7	6	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-5	4	6	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-6		2	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-1		1	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-4	7	1	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	0	--	--	--	--	--	--	--	--	--	--	--

LLW Alternatives	Number of Sites		Operations & Maintenance									
	T	D	Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action	10**	6	--	--	--	--	--	--	--	--	--	--
Decentralized		16	--	--	--	--	--	--	--	--	--	--
Regionalized-1		12	--	--	--	--	--	--	--	--	--	--
Regionalized-2	11	12	--	--	--	--	--	--	--	--	--	--
Regionalized-3		6	--	--	--	--	--	--	--	--	--	--
Regionalized-4	7	6	--	--	--	--	--	--	--	--	--	--
Regionalized-5	4	6	--	--	--	--	--	--	--	--	--	--
Regionalized-6		2	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	--	--	--	--	--	--	--	--	--	--
Centralized-1		1	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--	--	--	--	--
Centralized-4	7	1	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--	--	--	--	--

Notes:
T= Treatment
D = Disposal
- - = Emissions of this hazardous or toxic air pollutant are assumed to be negligible.
Percentages <1% are shown as zeros.
** Ten sites use existing facilities for Volume Reduction.

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Table II-12.2–9. Pantex—LLW—Impacts on Water Resources Due to Increased Water Use

LLW Alternatives	Number of Sites		Construction			Operations			
	T	D	Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action	10**	6	4405	0.8	- -	2033	0.4	- -	- -
Decentralized		16	14861	2.7	- -	5070	0.9	- -	- -
Regionalized-1		12	14861	2.7	- -	5070	0.9	- -	- -
Regionalized-2	11	12	20917	3.8	- -	10078	1.8	- -	- -
Regionalized-3		6	7366	1.3	- -	2115	0.4	- -	- -
Regionalized-4	7	6	7366	1.3	- -	2115	0.4	- -	- -
Regionalized-5	4	6	7366	1.3	- -	2115	0.4	- -	- -
Regionalized-6		2	7366	1.3	- -	2115	0.4	- -	- -
Regionalized-7		2	7366	1.3	- -	2115	0.4	- -	- -
Centralized-1		1	7366	1.3	- -	2115	0.4	- -	- -
Centralized-2		1	7366	1.3	- -	2115	0.4	- -	- -
Centralized-3	7	1	7366	1.3	- -	2115	0.4	- -	- -
Centralized-4	7	1	7366	1.3	- -	2115	0.4	- -	- -
Centralized-5	1	1	7366	1.3	- -	2115	0.4	- -	- -

Notes:
T = Treatment
D = Disposal
Water supplied by groundwater in the Ogallala Aquifer. Current water use = 548,000 gallons/day.
Wastewater discharged to onsite playas.
** Ten sites use existing facilities for Volume Reduction.
- - = Stream Flow is not considered for this site.

Table II-12.2–10. Pantex—LLW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal

LLW Alternatives	Number of Sites T	Number of Sites D	Ac 225	Ac 227	Am 241	Am 242	Am 243	C 14	Cs 135	Cs 137	Cm 242	Cm 244	Cm 245	I 129	Pb 210	Np 237	Ni 59	Ni 63	Pd 107	Pu 238	Pu 239	Pu 240	Pu 241
No Action	10**	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized		16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1		12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-2	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-3		6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	7	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-5	4	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-6		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-1		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-4	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

LLW Alternatives	Number of Sites T	Number of Sites D	Po 210	K 40	Pa 231	Ra 223	Ra 226	Sm 151	Se 79	Sr 90	Tc 99	Th 227	Th 228	Th 229	Th 230	Th 232	Sn 126	U 233	U 234	U 235	U 236	U 238	Y 90	Zr 93
No Action	10**	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized		16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1		12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-2	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-3		6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	7	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-5	4	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-6		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-1		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-4	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
** Ten sites use existing facilities for Volume Reduction
- - = Disposal is not considered for this Alternative.

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Table II-12.2–11. Pantex—LLW—Socioeconomic Impacts for Treatment and Disposal

LLW Alternatives	Number of Sites		Effect of Implementation of Alternatives					
				Jobs		Income		
	T	D	Cost (Millions) (1)	Jobs	% Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action	10**	6	365	302	0.29	3.2	0.10	0.13
Decentralized		16	614	635	0.61	6.8	0.21	0.30
Regionalized-1		12	614	635	0.61	6.8	0.21	0.30
Regionalized-2	11	12	1087	1123	1.08	12.1	0.37	0.56
Regionalized-3		6	294	304	0.29	3.3	0.10	0.13
Regionalized-4	7	6	294	304	0.29	3.3	0.10	0.13
Regionalized-5		6	294	304	0.29	3.3	0.10	0.13
Regionalized-6		2	294	304	0.29	3.3	0.10	0.13
Regionalized-7		2	294	304	0.29	3.3	0.10	0.13
Centralized-1		1	294	304	0.29	3.3	0.10	0.13
Centralized-2		1	294	304	0.29	3.3	0.10	0.13
Centralized-3	7	1	294	304	0.29	3.3	0.10	0.13
Centralized-4	7	1	294	304	0.29	3.3	0.10	0.13
Centralized-5	1	1	294	304	0.29	3.3	0.10	0.13

Notes:
T = Treatment
D = Disposal
(1) In constant 1990 dollars.
(2) Compared to 1990 baseline.
** Ten sites use existing facilities for Volume Reduction.

Table II-12.2–12. Pantex—LLW—Infrastructure Impacts for Treatment and Disposal

LLW Alternatives	Number of Sites		Effect of Implementation of Alternatives									
			Land Use		Water		Waste Water		Power		Employment (FTE)	
	T	D	Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	% Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Peak Construction Employment	% of Current Employment (1)
No Action	10**	6	2.0	0.03	4405	0.29	2033	0.38	0.78	0.05	111	4
Decentralized		16	22.6	0.29	14861	0.99	5070	0.93	1.80	0.12	258	9
Regionalized-1		12	22.6	0.29	14861	0.99	5070	0.93	1.80	0.12	258	9
Regionalized-2	11	12	21.9	0.28	20917	1.39	10078	1.85	3.38	0.22	506	18
Regionalized-3		6	3.3	0.04	7366	0.49	2115	0.39	0.83	0.05	159	6
Regionalized-4	7	6	3.3	0.04	7366	0.49	2115	0.39	0.83	0.05	159	6
Regionalized-5	4	6	3.3	0.04	7366	0.49	2115	0.39	0.83	0.05	159	6
Regionalized-6		2	3.3	0.04	7366	0.49	2115	0.39	0.83	0.05	159	6
Regionalized-7		2	3.3	0.04	7366	0.49	2115	0.39	0.83	0.05	159	6
Centralized-1		1	3.3	0.04	7366	0.49	2115	0.39	0.83	0.05	159	6
Centralized-2		1	3.3	0.04	7366	0.49	2115	0.39	0.83	0.05	159	6
Centralized-3	7	1	3.3	0.04	7366	0.49	2115	0.39	0.83	0.05	159	6
Centralized-4	7	1	3.3	0.04	7366	0.49	2115	0.39	0.83	0.05	159	6
Centralized-5	1	1	3.3	0.04	7366	0.49	2115	0.39	0.83	0.05	159	6

Notes:
T = Treatment
D = Disposal
GPD = Gallons per Day
MW = Megawatts Electric
FTE = Full Time Equivalent
(1) Based on 1991 Site Employment.
** Ten sites use existing facilities for Volume Reduction.

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Table II-12.2–13. Pantex—LLW—Cost

LLW Alternatives	Number of Sites		Total Cost (Millions) (1)	Cost by Life-Cycle Component (1)				Cost by Functional Area (1)		
	T	D		Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Treatment (Millions)	Storage (Millions)	Disposal (Millions)
No Action	10**	6	413	19	53	321	20	413	0	0
Decentralized		16	695	59	98	434	105	203	0	492
Regionalized-1		12	695	59	98	434	105	203	0	492
Regionalized-2	11	12	1230	110	199	815	106	1011	0	219
Regionalized-3		6	333	26	77	200	30	333	0	0
Regionalized-4		6	333	26	77	200	30	333	0	0
Regionalized-5		6	333	26	77	200	30	333	0	0
Regionalized-6		2	333	26	77	200	30	333	0	0
Regionalized-7		2	333	26	77	200	30	333	0	0
Centralized-1		1	333	26	77	200	30	333	0	0
Centralized-2		1	333	26	77	200	30	333	0	0
Centralized-3		6	333	26	77	200	30	333	0	0
Centralized-4		6	333	26	77	200	30	333	0	0
Centralized-5		6	333	26	77	200	30	333	0	0

Notes:
** Ten sites use existing facilities for Volume Reduction
T = Treatment
D = Disposal
The Life Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum may not reflect the true total cost.
(1) In Current 1994 Dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

13.0 Ports

Ports currently is custodian of significant volumes of LLMW, LLW, and TRUW. Each of the waste types is treated independently in the following sections.

13.1 Ports LLMW

Fifteen tables immediately following portray the impacts of LLMW at Ports. These tables are presented as follows:

Impact Category

No.	Description	Table No.	Page No.
1.	Ports—LLMW—Treatment and Disposal: Estimated Number of Fatalities	II-13.1-1	13-2
2.	Ports—LLMW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects	II-13.1-2	13-3
3.	Ports—LLMW—Disposal: Estimated Number of Cancer Incidences	II-13.1-3	13-4
4.	Ports—LLMW—Treatment and Disposal: MEI Probability of Cancer Fatality	II-13.1-4	13-5
5.	Ports—LLMW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects	II-13.1-5	13-6
6.	Ports—LLMW—Treatment and Disposal: Noncancer Health Risk from Chemical Exposure	II-13.1-6	13-7
7.	Ports—LLMW—Emissions in Tons per Year of Criteria Air Pollutants	II-13.1-7	13-8
8.	Ports—LLMW—Percent of Standard/Guideline for Criteria Air Pollutants	II-13.1-8	13-9
9.	Ports—LLMW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-13.1-9	13-10
10.	Ports—LLMW—Impacts on Water Resources Due to Increased Water Use	II-13.1-10	13-11
11.	Ports—LLMW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal (Contact-Handled)	II-13.1-11	13-12
12.	Ports—LLMW—Percent of Drinking Water Standards from Hazardous Constituents in Groundwater from Disposal (Contact-Handled)	II-13.1-12	13-13
13.	Ports—LLMW—Socioeconomics Impacts for Treatment and Disposal	II-13.1-13	13-14
14.	Ports—LLMW—Infrastructure Impacts for Treatment and Disposal	II-13.1-14	13-15
15.	Ports—LLMW—Cost	II-13.1-15	13-16

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Table II-13.1-1. Ports—LLMW—Treatment and Disposal: Estimated Number of Fatalities

LLMW Alternatives	Number of Sites		Treatment				Disposal	
			WM Worker		Offsite Population	Noninvolved Workers	WM Worker	
	T	D	Radiation Exposure	Physical Hazards	Radiation Exposure	Radiation Exposure	Radiation Exposure	Physical Hazards
No Action	3	-	1.6E-03	1.0E-01	6.4E-05	6.7E-06	- -	- -
Decentralized	37	16	1.4E-03	4.8E-01	2.7E-06	2.8E-07	3.6E-02	3.0E-02
Regionalized-1	11	12	5.9E-02	3.4E-01	4.9E-05	2.7E-06	5.8E-02	4.8E-02
Regionalized-2	7	6	7.7E-02	4.7E-01	1.1E-04	8.0E-06	- -	- -
Regionalized-3	7	1	7.7E-02	4.7E-01	1.1E-04	8.0E-06	- -	- -
Regionalized-4	4	6	8.3E-04	1.2E-01	1.8E-08	1.9E-09	- -	- -
Centralized	1	1	8.3E-04	1.2E-01	1.8E-08	1.9E-09	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this Alternative.

Table II-13.1-2. Ports—LLMW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

LLMW Alternatives	Number of Sites		Offsite Population				Noninvolved Workers				WM Worker			
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects
No Action	3	-	1.3E-01	2.2E-04	1.2E-04	1.3E-05	1.3E-02	2.3E-05	6.7E-05	1.3E-06	4.1E+00	5.7E-03	1.1E-05	2.4E-04
Decentralized	37	16	5.4E-03	9.1E-06	2.3E-06	5.4E-07	5.7E-04	9.6E-07	1.3E-06	5.7E-08	3.6E+00	5.0E-03	5.9E-04	2.1E-04
Regionalized-1	11	12	9.7E-02	1.7E-04	2.3E-06	9.7E-06	5.4E-03	9.1E-06	1.3E-06	5.4E-07	1.5E+02	2.1E-01	5.8E-04	8.9E-03
Regionalized-2	7	6	2.1E-01	3.6E-04	3.7E-06	2.1E-05	1.6E-02	2.7E-05	2.1E-06	1.6E-06	1.9E+02	2.7E-01	1.0E-03	1.1E-02
Regionalized-3	7	1	2.1E-01	3.6E-04	3.7E-06	2.1E-05	1.6E-02	2.7E-05	2.1E-06	1.6E-06	1.9E+02	2.7E-01	1.0E-03	1.1E-02
Regionalized-4	4	6	3.6E-05	6.1E-08	4.9E-08	3.6E-09	3.7E-06	6.4E-09	2.8E-08	3.7E-10	2.1E+00	2.9E-03	8.1E-06	1.2E-04
Centralized	1	1	3.6E-05	6.1E-08	4.9E-08	3.6E-09	3.7E-06	6.4E-09	2.8E-08	3.7E-10	2.1E+00	2.9E-03	8.1E-06	1.2E-04

Notes:
T = Treatment
D = Disposal

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Table II-13.1-3. Ports—LLMW—Disposal: Estimated Number of Cancer Incidences

LLMW Alternatives	Number of Sites		WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	3	-	- -	- -	- -
Decentralized	37	16	9.0E+01	1.3E-01	5.4E-03
Regionalized-1	11	12	1.5E+02	2.0E-01	8.7E-03
Regionalized-2	7	6	- -	- -	- -
Regionalized-3	7	1	- -	- -	- -
Regionalized-4	4	6	- -	- -	- -
Centralized	1	1	- -	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this Alternative.

Table II-13.1–4. Ports—LLMW—Treatment and Disposal: MEI Probability of Cancer Fatality

LLMW Alternatives	Number of Sites		Treatment		Disposal
	T	D	Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability	Hypothetical Farm Family Most Exposed Lifetime MEI Cancer Fatality Probability
No Action	3	-	8.0E-09	3.8E-09	- -
Decentralized	37	16	3.4E-10	1.6E-10	7.7E-06
Regionalized-1	11	12	6.0E-09	1.5E-09	2.1E-05
Regionalized-2	7	6	1.3E-08	4.5E-09	- -
Regionalized-3	7	1	1.3E-08	4.5E-09	- -
Regionalized-4	4	6	2.2E-12	1.1E-12	- -
Centralized	1	1	2.2E-12	1.1E-12	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered under the Alternative

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Table II-13.1-5. Ports—LLMW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects

LLMW Alternatives	Number of Sites		Treatment								Disposal			
			Offsite MEI				Noninvolved Worker MEI				Most Exposed Farm Family MEI			
	T	D	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (person-rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability
No Action	3	-	1.6E-05	2.7E-08	2.0E-08	1.6E-09	7.5E-06	1.3E-08	3.8E-08	7.5E-10	--	--	--	--
Decentralized	37	16	6.8E-07	1.2E-09	3.9E-10	6.8E-11	3.2E-07	5.4E-10	7.4E-10	3.2E-11	1.3E-02	2.2E-05	1.6E-05	1.3E-06
Regionalized-1	11	12	1.2E-05	2.0E-08	3.8E-10	1.2E-09	3.0E-06	5.2E-09	7.4E-10	3.0E-10	3.5E-02	6.0E-05	2.8E-05	3.5E-06
Regionalized-2	7	6	2.6E-05	4.5E-08	6.1E-10	2.6E-09	9.1E-06	1.5E-08	1.2E-09	9.1E-10	--	--	--	--
Regionalized-3	7	1	2.6E-05	4.5E-08	6.1E-10	2.6E-09	9.1E-06	1.5E-08	1.2E-09	9.1E-10	--	--	--	--
Regionalized-4	4	6	4.5E-09	7.6E-12	8.2E-12	4.5E-13	2.1E-09	3.6E-12	1.6E-11	2.1E-13	--	--	--	--
Centralized	1	1	4.5E-09	7.6E-12	8.2E-12	4.5E-13	2.1E-09	3.6E-12	1.6E-11	2.1E-13	--	--	--	--

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
-- = Disposal is not considered for this alternative.

Table II-13.1-6. Ports—LLMW—Treatment and Disposal: Noncancer Health Risk from Chemical Exposure

LLMW Alternatives	Number of Sites		Treatment			Disposal
	T	D	Offsite MEI Hazard Index	Noninvolved Worker MEI Hazard Index	WM Worker Exposure Index	Hypothetical Farm Family Most Exposed Lifetime Hazard Index
No Action	3	-	2.3E-05	4.5E-05	3.0E-05	- -
Decentralized	37	16	7.5E-07	1.4E-06	2.0E-03	1.4E+00
Regionalized-1	11	12	7.6E-07	1.5E-06	2.0E-03	2.1E+00
Regionalized-2	7	6	1.1E-06	2.1E-06	3.2E-03	- -
Regionalized-3	7	1	1.1E-06	2.1E-06	3.2E-03	- -
Regionalized-4	4	6	1.0E-08	1.9E-08	3.6E-05	- -
Centralized	1	1	1.0E-08	1.9E-08	3.6E-05	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this alternative.
MEI = Maximally Exposed Individual
Hazard Index = Sum of hazard quotient values for all noncarcinogenic chemicals. The hazard quotient is the chemical-specific ratio of media exposure concentrations to concentrations believed to have no appreciable adverse effects.
Exposure Index = Ratio of Exposure concentration to chemical-specific occupational threshold limits.

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Table II-13.1-7. Ports—LLMW—Emissions in Tons per Year of Criteria Air Pollutants

LLMW Alternatives	Number of Sites		Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	8 (1/7)	3 (2/1)	0	0	0	1 (0/1)	8 (1/7)	2 (1/1)	0	0	0	1 (0/1)
Decentralized	37	16	65 (5/60)	24 (12/12)	0	0	0	8 (1/7)	45 (1/44)	13 (4/9)	0	2 (2/0)	0	5 (0/5)
Regionalized-1	11	12	67 (5/62)	26 (14/12)	0	1 (1/0)	1 (1/0)	8 (1/7)	45 (1/44)	13 (4/9)	0	2 (2/0)	0	5 (0/5)
Regionalized-2	7	6	63 (4/59)	22 (10/12)	0	1 (1/0)	1 (1/0)	8 (1/7)	38 (0/38)	13 (5/8)	0	4 (4/0)	0	5 (0/5)
Regionalized-3	7	1	63 (4/59)	22 (10/12)	0	1 (1/0)	1 (1/0)	8 (1/7)	38 (0/38)	13 (5/8)	0	4 (4/0)	0	5 (0/5)
Regionalized-4	4	6	16 (1/15)	5 (2/3)	0	0	0	2 (0/2)	12 (0/12)	2 (0/2)	0	0	0	1 (0/1)
Centralized	1	1	16 (1/15)	5 (2/3)	0	0	0	2 (0/2)	12 (0/12)	2 (0/2)	0	0	0	1 (0/1)

Notes:
T = Treatment
D = Disposal
Emissions <1 tons per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions / worker vehicles emission).
(2) Values = total emissions (stationary-source emissions / mobile-source emission).

Table II-13.1-8. Ports—LLMW—Percent of Standard/Guideline for Criteria Air Pollutants

LLMW Alternatives	Number of Sites		Construction					
			Percent of Tons/Year General Conformity Rule (1)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	--	--	--	--	--	--
Decentralized	37	16	--	--	--	--	--	--
Regionalized-1	11	12	--	--	--	--	--	--
Regionalized-2	7	6	--	--	--	--	--	--
Regionalized-3	7	1	--	--	--	--	--	--
Regionalized-4	4	6	--	--	--	--	--	--
Centralized	1	1	--	--	--	--	--	--

LLMW Alternatives	Number of Sites		Operations & Maintenance											
			Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
	T	D	CO (4)	NO2 (4)	Pb (4)	PM10 (4)	SO2 (4)	VOC (4)	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	1	3	0	1	0	0	--	--	--	--	--	--
Decentralized	37	16	1	9	0	13	0	0	0	0	0	1	6	0
Regionalized-1	11	12	1	11	0	15	0	0	0	0	0	1	6	0
Regionalized-2	7	6	0	13	0	25	1	0	0	0	0	2	12	0
Regionalized-3	7	1	0	13	0	25	1	0	0	0	0	2	12	0
Regionalized-4	4	6	0	0	0	0	0	0	--	--	--	--	--	--
Centralized	1	1	0	0	0	0	0	0	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) Ports is in an attainment area for all criteria pollutants, therefore the GCR does not apply.
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions are assumed to be negligible for the No Action, Regionalized-4, and Centralized Alternatives.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.

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Table II-13.1-9. Ports—LLMW—Percent of Standards/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

LLMW Alternatives	Number of Sites		Operations & Maintenance											
	T	D	Total Radio-nuclides	Acetone	Benzene	Brome-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action	3	-	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Decentralize	37	16	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Regionalized	11	12	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Regionalized	7	6	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Regionalized	7	1	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Regionalized	4	6	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Centralized	1	1	0	0	0	- -	- -	0	- -	- -	0	0	0	0

LLMW Alternatives	Number of Sites		Operations & Maintenance									
	T	D	Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action	3	-	- -	0	0	0	- -	0	0	0	- -	- -
Decentralize	37	16	- -	0	0	0	- -	0	0	0	- -	- -
Regionalized	11	12	- -	0	0	0	- -	0	0	0	- -	- -
Regionalized	7	6	- -	0	0	0	- -	0	0	0	- -	- -
Regionalized	7	1	- -	0	0	0	- -	0	0	0	- -	- -
Regionalized	4	6	- -	0	0	0	- -	0	0	0	- -	- -
Centralized	1	1	- -	0	0	0	- -	0	0	0	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Emissions of this hazardous or toxic air pollutant are assumed to be negligible.
Percentages <1% are shown as zeros.

Table II-13.1-10. Ports—LLMW—Impacts on Water Resources Due to Increased Water Use

LLMW Alternatives	Number of Sites		Construction			Operations			
	T	D	Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action	3	-	2190	<0.1	- -	1893	<0.1	- -	<0.1
Decentralized	37	16	18018	0.1	- -	6727	<0.1	- -	<0.1
Regionalized-1	11	12	19863	0.1	- -	6787	<0.1	- -	<0.1
Regionalized-2	7	6	16024	0.1	- -	6709	<0.1	- -	<0.1
Regionalized-3	7	1	16024	0.1	- -	6709	<0.1	- -	<0.1
Regionalized-4	4	6	3664	<0.1	- -	1888	<0.1	- -	<0.1
Centralized	1	1	3664	<0.1	- -	1888	<0.1	- -	<0.1

Notes:
T = Treatment
D = Disposal
Water supplied by groundwater in the Alluvial Aquifer. Current water use = 14,000,000 gallons/day.
Wastewater discharged to the Scioto River. Average flow rate of the Scioto River = 3,036,000,000 gallons/day.
- - = Stream Flow is not considered for this site.
<0.1 indicates that the percentage is less than 0.1%.

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Table II-13.1–11. Ports—LLMW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal (Contact-Handled)

LLMW Alternatives	Number of Sites		Ac 225	Ac 227	Am 241	Am 242	Am 243	C 14	Cs 135	Cs 137	Cm 242	Cm 244	Cm 245	I 129	Pb 210	Np 237	Ni 59	Ni 63	Pd 107	Pu 238	Pu 239	Pu 240	Pu 241
	T	D																					
No Action	3	-	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Regionalized-2	7	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	4	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

LLMW Alternatives	Number of Sites		Po 210	K 40	Pa 231	Ra 223	Ra 226	Sm 151	Se 79	Sr 90	Tc 99	Th 227	Th 228	Th 229	Th 230	Th 232	Sn 126	U 233	U 234	U 235	U 236	U 238	Y 90	Zr 93
	T	D																						
No Action	3	-	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1	11	12	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-2	7	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	4	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
"--" = No disposal at this site for this alternative.

Table II-13.1-12. Ports—LLMW—Percent of Drinking Water Standards for Hazardous Constituents in Groundwater from Disposal (Contact-Handled)

LLMW Alternatives	T	D	Acetone	Arsenic	Barium	Benzene	Cadmium	Carbon Tetrachloride	Chromium	Cyanide
No Action	3	-	--	--	--	--	--	--	--	--
Decentralized	37	16	0	20	0	200	0	90	0	1
Regionalized-1	11	12	0	30	0	300	0	100	0	1
Regionalized-2	7	6	--	--	--	--	--	--	--	--
Regionalized-3	7	1	--	--	--	--	--	--	--	--
Regionalized-4	4	6	--	--	--	--	--	--	--	--
Centralized	1	1	--	--	--	--	--	--	--	--

LLMW Alternatives	T	D	1,2-dichloro-ethane	Lead	Mercury	Methylene Chloride	Selenium	Silver	1,2,2-trichloro-1,1-trifluoroethane
No Action	3	-	--	--	--	--	--	--	--
Decentralized	37	16	800	0	0	1000	100	3	0
Regionalized-1	11	12	1000	0	0	2000	200	4	0
Regionalized-2	7	6	--	--	--	--	--	--	--
Regionalized-3	7	1	--	--	--	--	--	--	--
Regionalized-4	4	6	--	--	--	--	--	--	--
Centralized	1	1	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
"--" = No disposal at this site for this alternative.

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Table II-13.1-13. Ports—LLMW—Socioeconomics Impacts for Treatment and Disposal

LLMW Alternatives	Number of Sites		Effect of Implementation of Alternatives					
				Jobs		Income		
	T	D	Cost (Millions) (1)	Annual Jobs	% Annual Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action	3	-	186	153	0.20	1.6	0.06	0.09
Decentralized	37	16	726	751	0.96	8.0	0.31	0.35
Regionalized-1	11	12	741	765	0.98	8.2	0.31	0.36
Regionalized-2	7	6	662	685	0.88	7.3	0.28	0.32
Regionalized-3	7	1	662	685	0.88	7.3	0.28	0.30
Regionalized-4	4	6	211	218	0.28	2.3	0.09	0.09
Centralized	1	1	211	218	0.28	2.3	0.09	0.09

Notes:
T = Treatment
D = Disposal
(1) In current 1990 dollars.
(2) Compared to 1990 baseline

Table II-13.1-14. Ports—LLMW—Infrastructure Impacts for Treatment and Disposal

LLMW Alternatives	Number of Sites		Effect of Implementation of Alternatives									
			Land Use		Water		Waste Water		Power		Employment (FTE)	
	T	D	Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	% Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Construction Employment	% of Current Employment
No Action	3	-	1.3	0.04	2190	0.01	1893	0.16	0.81	0.04	55	2
Decentralized	37	16	10.6	0.33	18018	0.05	6727	0.56	1.62	0.08	467	20
Regionalized 1	11	12	12.2	0.38	19863	0.05	6787	0.57	1.84	0.10	484	20
Regionalized 2	7	6	10.3	0.32	16024	0.04	6709	0.56	1.31	0.07	457	19
Regionalized 3	7	1	10.3	0.32	16024	0.04	6709	0.56	1.31	0.07	451	19
Regionalized 4	4	6	2.6	0.08	3664	0.01	1888	0.16	0.37	0.02	113	5
Centralized	1	1	2.6	0.08	3664	0.01	1888	0.16	0.37	0.02	116	5

Notes:
T = Treatment
D = Disposal
GPD = Gallons per Day
MW = Megawatts
(1) Based on 1991 Site Employment

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Table II-13.1-15. Ports—LLMW—Cost

LLMW Alternatives	Number of Sites		Total Cost (Millions) (1)	Cost by Life-Cycle Component (1)				Cost by Functional Area (1)		
	T	D		Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Treatment (Millions)	Storage (Millions)	Disposal (Millions)
No Action	3	-	210	8	28	154	19	95	115	0
Decentralized	37	16	822	76	236	465	45	685	0	137
Regionalized-1	11	12	838	82	240	468	48	672	0	166
Regionalized-2	7	6	749	80	224	411	34	749	0	0
Regionalized-3	7	1	749	80	224	411	34	749	0	0
Regionalized-4	4	6	240	18	58	153	10	240	0	0
Centralized	1	1	240	18	58	153	10	240	0	0

Notes:
T = Treatment
D = Disposal
The Life-Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum of these may not reflect the true total cost.
(1) In current 1994 dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

13.2 Ports LLW

Thirteen tables immediately following portray the impacts of LLW at Ports. These tables are presented as follows:

Impact Category

No.	Description	Table No.	Page No.
1.	Ports—LLW—Treatment and Disposal: Estimated Number of Fatalities	II-13.2-1	13-18
2.	Ports—LLW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects	II-13.2-2	13-19
3.	Ports—LLW—Disposal: Estimated Number of Cancer Incidences and Genetic Effects	II-13.2-3	13-20
4.	Ports—LLW—Treatment and Disposal: MEI Probability of Cancer Fatality	II-13.2-4	13-21
5.	Ports—LLW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects	II-13.2-5	13-22
7.	Ports—LLW—Emissions in Tons per Year of Criteria Air Pollutants	II-13.2-6	13-23
8.	Ports—LLW—Percent of Standard/Guideline for Criteria Air Pollutants	II-13.2-7	13-24
9.	Ports—LLW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-13.2-8	13-25
10.	Ports—LLW—Impacts on Water Resources Due to Increased Water Use	II-13.2-9	13-26
11.	Ports—LLW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal	II-13.2-10	13-27
12.	Ports—LLW—Socioeconomic Impacts for Treatment and Disposal	II-13.2-11	13-28
13.	Ports—LLW—Infrastructure Impacts for Treatment and Disposal	II-13.2-12	13-29
14.	Ports—LLW—Cost	II-13.2-13	13-30

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Table II-13.2–1. Ports—LLW—Treatment and Disposal: Estimated Number of Fatalities

LLW Alternatives	Number of Sites		Treatment				Disposal	
			WM Worker		Offsite Population	Noninvolved Workers	WM Worker	
	T	D	Radiation Exposure	Physical Hazards	Radiation Exposure	Radiation Exposure	Radiation Exposure	Physical Hazards
No Action	10**	6	5.6E-03	2.4E-01	1.7E-09	1.8E-10	- -	- -
Decentralized		16	4.6E-03	1.5E-01	2.4E-10	2.6E-11	1.3E-02	4.3E-01
Regionalized-1		12	4.6E-03	1.5E-01	2.4E-10	2.6E-11	3.1E-02	4.9E-01
Regionalized-2	11	12	2.8E-02	7.1E-01	5.3E-05	5.4E-06	2.7E-02	2.9E-01
Regionalized-3		6	4.6E-03	2.3E-01	1.8E-09	1.8E-10	- -	- -
Regionalized-4	7	6	3.7E-02	7.2E-01	1.9E-02	5.9E-04	- -	- -
Regionalized-5	4	6	4.6E-03	2.3E-01	1.8E-09	1.8E-10	- -	- -
Regionalized-6		2	4.6E-03	2.3E-01	1.8E-09	1.8E-10	- -	- -
Regionalized-7		2	4.6E-03	2.3E-01	1.8E-09	1.8E-10	- -	- -
Centralized-1		1	4.6E-03	2.3E-01	1.8E-09	1.8E-10	- -	- -
Centralized-2		1	4.6E-03	2.3E-01	1.8E-09	1.8E-10	- -	- -
Centralized-3	7	1	3.7E-02	7.2E-01	1.9E-02	5.9E-04	- -	- -
Centralized-4	7	1	3.7E-02	7.2E-01	1.9E-02	5.9E-04	- -	- -
Centralized-5	1	1	4.6E-03	2.3E-01	1.8E-09	1.8E-10	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered under the alternative
** Ten sites use existing facilities for Volume Reduction

Table II-13.2–2. Ports—LLW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

LLW Alternatives	Number of Sites		Offsite Population			Noninvolved Worker			WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	10**	6	3.3E-06	5.7E-09	3.3E-10	3.5E-07	6.0E-10	3.5E-11	1.4E+01	2.0E-02	8.4E-04
Decentralized		16	4.9E-07	8.3E-10	4.9E-11	5.1E-08	8.7E-11	5.1E-12	1.1E+01	1.6E-02	6.8E-04
Regionalized-1		12	4.9E-07	8.3E-10	4.9E-11	5.1E-08	8.7E-11	5.1E-12	1.1E+01	1.6E-02	6.8E-04
Regionalized-2	11	12	1.1E-01	1.8E-04	1.1E-05	1.1E-02	1.8E-05	1.1E-06	6.9E+01	9.6E-02	4.1E-03
Regionalized-3		6	3.5E-06	6.0E-09	3.5E-10	3.7E-07	6.3E-10	3.7E-11	1.1E+01	1.6E-02	6.8E-04
Regionalized-4	7	6	3.8E+01	6.4E-02	3.8E-03	1.2E+00	2.0E-03	1.2E-04	9.2E+01	1.3E-01	5.5E-03
Regionalized-5	4	6	3.5E-06	5.9E-09	3.5E-10	3.7E-07	6.2E-10	3.7E-11	1.1E+01	1.6E-02	6.8E-04
Regionalized-6		2	3.5E-06	6.0E-09	3.5E-10	3.7E-07	6.3E-10	3.7E-11	1.1E+01	1.6E-02	6.8E-04
Regionalized-7		2	3.5E-06	6.0E-09	3.5E-10	3.7E-07	6.3E-10	3.7E-11	1.1E+01	1.6E-02	6.8E-04
Centralized-1		1	3.5E-06	6.0E-09	3.5E-10	3.7E-07	6.3E-10	3.7E-11	1.1E+01	1.6E-02	6.8E-04
Centralized-2		1	3.5E-06	6.0E-09	3.5E-10	3.7E-07	6.3E-10	3.7E-11	1.1E+01	1.6E-02	6.8E-04
Centralized-3	7	1	3.8E+01	6.4E-02	3.8E-03	1.2E+00	2.0E-03	1.2E-04	9.2E+01	1.3E-01	5.5E-03
Centralized-4	7	1	3.8E+01	6.4E-02	3.8E-03	1.2E+00	2.0E-03	1.2E-04	9.2E+01	1.3E-01	5.5E-03
Centralized-5	1	1	3.5E-06	6.0E-09	3.5E-10	3.7E-07	6.2E-10	3.7E-11	1.1E+01	1.6E-02	6.8E-04

Notes:
T = Treatment
D = Disposal
** Ten sites use existing facilities for Volume Reduction.

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Table II-13.2–3. Ports—LLW—Disposal: Estimated Number of Cancer Incidences and Genetic Effects

LLW Alternatives	Number of Sites		WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	10**	6	- -	- -	- -
Decentralized		16	3.3E+01	4.6E-02	2.0E-03
Regionalized-1		12	7.8E+01	1.1E-01	4.7E-03
Regionalized-2	11	12	6.6E+01	9.3E-02	4.0E-03
Regionalized-3		6	- -	- -	- -
Regionalized-4	7	6	- -	- -	- -
Regionalized-5	4	6	- -	- -	- -
Regionalized-6		2	- -	- -	- -
Regionalized-7		2	- -	- -	- -
Centralized-1		1	- -	- -	- -
Centralized-2		1	- -	- -	- -
Centralized-3	7	1	- -	- -	- -
Centralized-4	7	1	- -	- -	- -
Centralized-5	1	1	- -	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered under the alternative.
** Ten sites use existing facilities for Volume Reduction.

Table II-13.2–4. Ports—LLW—Treatment and Disposal: MEI Probability of Cancer Fatality

LLW Alternatives	Number of Sites		Treatment		Disposal
	T	D	Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability	Hypothetical Farm Family - Most Exposed Lifetime MEI Cancer Fatality Probability
No Action	10**	6	2.1E-13	9.9E-14	- -
Decentralized		16	3.1E-04	1.4E-14	6.1E-08
Regionalized-1		12	3.1E-04	1.4E-14	5.0E-07
Regionalized-2	11	12	6.6E-09	3.1E-09	8.8E-07
Regionalized-3		6	2.2E-13	1.0E-13	- -
Regionalized-4	7	6	2.3E-06	3.4E-07	- -
Regionalized-5	4	6	2.2E-13	1.0E-13	- -
Regionalized-6		2	2.2E-13	1.0E-13	- -
Regionalized-7		2	2.2E-13	1.0E-13	- -
Centralized-1		1	2.2E-13	1.0E-13	- -
Centralized-2		1	2.2E-13	1.0E-13	- -
Centralized-3	7	1	2.3E-06	3.4E-07	- -
Centralized-4	7	1	2.3E-06	3.4E-07	- -
Centralized-5	1	1	2.2E-13	1.0E-13	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered under the Alternative.
** Ten sites use existing facilities for Volume Reduction.

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Table II-13.2–5. Ports—LLW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects

LLW Alternatives	Number of Sites		Treatment						Disposal		
			Offsite MEI			Noninvolved Worker MEI			Most Exposed Lifetime MEI		
	T	D	Dose (rem)	Radiation Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Radiation Genetic Effects Probability
No Action	10**	6	4.2E-10	7.2E-13	4.2E-14	2.0E-10	3.4E-13	2.0E-14	- -	- -	- -
Decentralized		16	6.2E-11	1.1E-13	0.0E+00	2.9E-11	4.9E-14	0.0E+00	1.2E-04	2.1E-07	1.2E-08
Regionalized-1		12	6.2E-11	1.1E-13	0.0E+00	2.9E-11	4.9E-14	0.0E+00	1.0E-03	1.7E-06	1.0E-07
Regionalized-2	11	12	1.3E-05	2.2E-08	1.3E-09	6.1E-06	1.0E-08	6.1E-10	1.7E-03	2.9E-06	1.7E-07
Regionalized-3		6	4.4E-10	7.5E-13	4.4E-14	2.1E-10	3.5E-13	2.1E-14	- -	- -	- -
Regionalized-4	7	6	4.6E-03	7.9E-06	4.6E-07	6.8E-04	1.2E-06	6.8E-08	- -	- -	- -
Regionalized-5	4	6	4.4E-10	7.5E-13	4.4E-14	2.1E-10	3.5E-13	2.1E-14	- -	- -	- -
Regionalized-6		2	4.4E-10	7.5E-13	4.4E-14	2.1E-10	3.5E-13	2.1E-14	- -	- -	- -
Regionalized-7		2	4.4E-10	7.5E-13	4.4E-14	2.1E-10	3.5E-13	2.1E-14	- -	- -	- -
Centralized-1		1	4.4E-10	7.5E-13	4.4E-14	2.1E-10	3.5E-13	2.1E-14	- -	- -	- -
Centralized-2		1	4.4E-10	7.5E-13	4.4E-14	2.1E-10	3.5E-13	2.1E-14	- -	- -	- -
Centralized-3	7	1	4.6E-03	7.9E-06	4.6E-07	6.8E-04	1.2E-06	6.8E-08	- -	- -	- -
Centralized-4	7	1	4.6E-03	7.9E-06	4.6E-07	6.8E-04	1.2E-06	6.8E-08	- -	- -	- -
Centralized-5	1	1	4.4E-10	7.5E-13	4.4E-14	2.1E-10	3.5E-13	2.1E-14	- -	- -	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered under the alternative.
** Ten sites use existing facilities for Volume Reduction.

Table II-13.2–6. Ports—LLW—Emissions in Tons per Year of Criteria Air Pollutants

LLW Alternatives	Number of Sites		Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action	10**	6	32 (11/21)	32 (28/4)	0	2 (2/0)	3 (3/0)	6 (3/3)	17 (1/16)	6 (2/4)	0	0	0	2 (0/2)
Decentralized		16	174 (124/50)	335 (325/10)	0	26 (26/0)	31 (31/0)	37 (31/6)	43 (2/41)	15 (5/10)	0	1 (1/0)	0	5 (0/5)
Regionalized-1		12	219 (169/50)	451 (441/10)	0	35 (35/0)	42 (42/0)	49 (43/6)	32 (3/29)	13 (6/7)	0	1 (1/0)	0	4 (0/4)
Regionalized-2	11	12	245 (155/90)	422 (404/18)	0	32 (32/0)	38 (38/0)	50 (39/11)	86 (3/83)	24 (6/18)	0	2 (2/0)	0	10 (0/10)
Regionalized-3		6	17 (6/11)	16 (14/2)	0	1 (1/0)	1 (1/0)	2 (1/1)	12 (0/12)	5 (0/5)	0	0	0	2 (0/2)
Regionalized-4	7	6	89 (27/62)	83 (71/12)	0	6 (6/0)	7 (7/0)	14 (7/7)	58 (0/58)	17 (2/15)	0	1 (1/0)	0	7 (0/7)
Regionalized-5	4	6	17 (6/11)	16 (14/2)	0	1 (1/0)	1 (1/0)	2 (1/1)	12 (0/12)	5 (0/5)	0	0	0	2 (0/2)
Regionalized-6		2	17 (6/11)	16 (14/2)	0	1 (1/0)	1 (1/0)	2 (1/1)	12 (0/12)	5 (0/5)	0	0	0	2 (0/2)
Regionalzied-7		2	17 (6/11)	16 (14/2)	0	1 (1/0)	1 (1/0)	2 (1/1)	12 (0/12)	5 (0/5)	0	0	0	2 (0/2)
Centralized-1		1	17 (6/11)	16 (14/2)	0	1 (1/0)	1 (1/0)	2 (1/1)	12 (0/12)	5 (0/5)	0	0	0	2 (0/2)
Centralized-2		1	17 (6/11)	16 (14/2)	0	1 (1/0)	1 (1/0)	2 (1/1)	12 (0/12)	5 (0/5)	0	0	0	2 (0/2)
Centralized-3	7	1	89 (27/62)	83 (71/12)	0	6 (6/0)	7 (7/0)	14 (7/7)	58 (0/58)	17 (2/15)	0	1	0	7 (0/7)
Centralized-4	7	1	89 (27/62)	83 (71/12)	0	6 (6/0)	7 (7/0)	14 (7/7)	58 (0/58)	17 (2/15)	0	1	0	7 (0/7)
Centralized-5	1	1	17 (6/11)	16 (14/2)	0	1 (1/0)	1 (1/0)	2 (1/1)	12 (0/12)	5 (0/5)	0	0	0	2 (0/2)

Notes:
T = Treatment
D = Disposal
Emissions <1 ton per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions/worker vehicles emission)
(2) Values = total emissions (stationary-source emissions/mobile-source emission)
** Ten sites use existing facilities for Volume Reduction.

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Table II-13.2-7. Ports—LLW—Percent of Standard/Guideline for Criteria Air Pollutants

LLW Alternatives	Number of Sites		Construction					
			Percent of Tons/Year General Conformity Rule (1)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC
No Action	10**	6	–	–	–	–	–	–
Decentralized		16	–	–	–	–	–	–
Regionalized-1		12	–	–	–	–	–	–
Regionalized-2	11	12	–	–	–	–	–	–
Regionalized-3		6	–	–	–	–	–	–
Regionalized-4	7	6	–	–	–	–	–	–
Regionalized-5	4	6	–	–	–	–	–	–
Regionalized-6		2	–	–	–	–	–	–
Regionalized-7		2	–	–	–	–	–	–
Centralized-1		1	–	–	–	–	–	–
Centralized-2		1	–	–	–	–	–	–
Centralized-3	7	1	–	–	–	–	–	–
Centralized-4	7	1	–	–	–	–	–	–
Centralized-5	1	1	–	–	–	–	–	–

LLW Alternatives	Number of Sites		Operations & Maintenance											
			Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
	T	D	CO (4)	NO2 (4)	Pb (4)	PM10 (4)	SO2 (4)	VOC (4)	CO	NO2	Pb	PM10	SO2	VOC
No Action	10**	6	1	4	0	2	0	0	–	–	–	–	–	–
Decentralized		16	2	11	0	5	0	1	–	–	–	–	–	–
Regionalized-1		12	3	16	0	7	0	1	–	–	–	–	–	–
Regionalized-2	11	12	3	16	0	10	0	1	0	0	0	0	0	0
Regionalized-3		6	0	0	0	0	0	0	–	–	–	–	–	–
Regionalized-4	7	6	0	4	0	6	0	0	0	0	0	1	0	0
Regionalized-5	4	6	0	0	0	0	0	0	–	–	–	–	–	–
Regionalized-6		2	0	0	0	0	0	0	–	–	–	–	–	–
Regionalized-7		2	0	0	0	0	0	0	–	–	–	–	–	–
Centralized-1-		1	0	0	0	0	0	0	–	–	–	–	–	–
Centralized-2		1	0	0	0	0	0	0	–	–	–	–	–	–
Centralized-3	7	1	0	4	0	6	0	0	0	0	0	1	0	0
Centralized-4	7	1	0	4	0	6	0	0	0	0	0	1	0	0
Centralized-5	1	1	0	0	0	0	0	0	–	–	–	–	–	–

Notes:
T = Treatment
D = Disposal
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) Ports is in an attainment area for all criteria pollutants, therefore the GCR do not apply.
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions for all but the Regionalized-2 and -4, and Centralized-3 and -4 Alternatives are assumed to be negligible.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.
** Ten sites use existing facilities for Volume Reduction.

Table II-13.2–8. Ports—LLW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

LLW Alternatives	Number of Sites		Operations & Maintenance											
	T	D	Total Radio-nuclides	Acetone	Benzene	Bromo-ichloro ethan	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action	10**	6	0	--	--	--	--	--	--	--	--	--	--	--
Decentralized		16	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-1		12	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-2	11	12	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-3		6	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	7	6	5	--	--	--	--	--	--	--	--	--	--	--
Regionalized-5	4	6	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-6		2	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-1		1	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	5	--	--	--	--	--	--	--	--	--	--	--
Centralized-4	7	1	5	--	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	0	--	--	--	--	--	--	--	--	--	--	--

LLW Alternatives	Number of Sites		Operations & Maintenance									
	T	D	Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action	10**	6	--	--	--	--	--	--	--	--	--	--
Decentralized		16	--	--	--	--	--	--	--	--	--	--
Regionalized-1		12	--	--	--	--	--	--	--	--	--	--
Regionalized-2	11	12	--	--	--	--	--	--	--	--	--	--
Regionalized-3		6	--	--	--	--	--	--	--	--	--	--
Regionalized-4	7	6	--	--	--	--	--	--	--	--	--	--
Regionalized-5	4	6	--	--	--	--	--	--	--	--	--	--
Regionalized-6		2	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	--	--	--	--	--	--	--	--	--	--
Centralized-1		1	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--	--	--	--	--
Centralized-4	7	1	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--	--	--	--	--

Notes:
T= Treatment
D = Disposal
- - = Emissions of this hazardous or toxic air pollutant are assumed to be negligible.
Percentages <1% are shown as zeros.
** Ten sites use existing facilities for Volume Reduction.

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Table II-13.2-9. Ports—LLW—Impacts on Water Resources Due to Increased Water Use

LLW Alternatives	Number of Sites		Construction			Operations			
	T	D	Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action	10**	6	8079	0.1	- -	22144	0.2	- -	<0.1
Decentralized		16	130210	0.9	- -	4659	<0.1	- -	<0.1
Regionalized-1		12	178908	1.3	- -	4780	<0.1	- -	<0.1
Regionalized-2	11	12	157092	1.1	- -	11265	0.1	- -	<0.1
Regionalized-3		6	3997	<0.1	- -	1094	<0.1	- -	<0.1
Regionalized-4	7	6	20383	0.1	- -	7814	0.1	- -	<0.1
Regionalized-5	4	6	3997	<0.1	- -	1094	<0.1	- -	<0.1
Regionalized-6		2	3997	<0.1	- -	1094	<0.1	- -	<0.1
Regionalized-7		2	3997	<0.1	- -	1094	<0.1	- -	<0.1
Centralized-1		1	3997	<0.1	- -	1094	<0.1	- -	<0.1
Centralized-2		1	3997	<0.1	- -	1094	<0.1	- -	<0.1
Centralized-3	7	1	20383	0.1	- -	7814	0.1	- -	<0.1
Centralized-4	7	1	20383	0.1	- -	7814	0.1	- -	<0.1
Centralized-5	1	1	3997	<0.1	- -	1094	<0.1	- -	<0.1

Notes:
T = Treatment
D = Disposal
Water supplied by groundwater in the Alluvial Aquifer. Current water use = 14,000,000 gallons/day.
Wastewater discharged to the Scioto River. Average flow rate of the Scioto River = 3,036,000,000 gallons/day.
** Ten sites use existing facilities for Volume Reduction.
- - = Stream Flow is not considered for this site.
<0.1 indicates that the percentage is less than 0.1%.

Table II-13.2-10. Ports—LLW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal

LLW Alternatives	Number of Sites T	Number of Sites D	Ac 225	Ac 227	Am 241	Am 242	Am 243	C 14	Cs 135	Cs 137	Cm 242	Cm 244	Cm 245	I 129	Pb 210	Np 237	Ni 59	Ni 63	Pd 107	Pu 238	Pu 239	Pu 240	Pu 241
No Action	10**	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized		16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1		12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-2	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-3		6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	7	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-5	4	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-6		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-1		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-4	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

LLW Alternatives	Number of Sites T	Number of Sites D	Po 210	K 40	Pa 231	Ra 223	Ra 226	Sm 151	Se 79	Sr 90	Tc 99	Th 227	Th 228	Th 229	Th 230	Th 232	Sn 126	U 233	U 234	U 235	U 236	U 238	Y 90	Zr 93
No Action	10**	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized		16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1		12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-2	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-3		6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	7	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-5	4	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-6		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-1		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-4	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
** Ten sites use existing facilities for Volume Reduction
-- = Disposal is not considered for this Alternative.

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Table II-13.2–11. Ports—LLW—Socioeconomic Impacts for Treatment and Disposal

LLW Alternatives	Number of Sites		Effect of Implementation of Alternatives					
				Jobs		Income		
	T	D	Cost (Millions) (1)	Jobs	% Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action	10**	6	474	392	0.50	4.2	0.16	0.20
Decentralized		16	1079	1115	1.43	11.9	0.46	0.24
Regionalized-1		12	1228	1269	1.63	13.5	0.52	0.23
Regionalized-2	11	12	1269	1312	1.69	14.0	0.54	0.62
Regionalized-3		6	149	154	0.20	1.6	0.06	0.08
Regionalized-4	7	6	860	888	1.14	9.5	0.37	0.42
Regionalized-5		6	149	154	0.20	1.6	0.06	0.08
Regionalized-6		2	149	154	0.20	1.6	0.06	0.08
Regionalized-7		2	149	154	0.20	1.6	0.06	0.08
Centralized-1		1	149	154	0.20	1.6	0.06	0.08
Centralized-2		1	149	154	0.20	1.6	0.06	0.08
Centralized-3	7	1	860	888	1.14	9.5	0.37	0.42
Centralized-4	7	1	860	888	1.14	9.5	0.37	0.42
Centralized-5	1	1	149	154	0.20	1.6	0.06	0.08

Notes:
T = Treatment
D = Disposal
(1) In constant 1990 dollars.
(2) Compared to 1990 baseline.
** Ten sites use existing facilities for Volume Reduction.

Table II-13.2–12. Ports—LLW—Infrastructure Impacts for Treatment and Disposal

LLW Alternatives	Number of Sites		Effect of Implementation of Alternatives									
			Land Use		Water		Waste Water		Power		Employment (FTE)	
	T	D	Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	% Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Peak Construction Employment	% of Current Employment (1)
No Action	10**	6	23.0	0.72	22144	0.06	22144	1.85	5.31	0.28	164	7
Decentralized		16	16.6	0.52	130210	0.35	4659	0.39	19.48	1.01	387	16
Regionalized-1		12	43.5	0.36	178908	0.48	4780	0.40	26.84	1.39	387	16
Regionalized-2	11	12	44.7	0.36	157092	0.42	11265	0.94	23.02	1.19	696	29
Regionalized-3		6	2.0	0.06	3997	0.01	1094	0.09	0.44	0.02	85	4
Regionalized-4	7	6	10.1	0.32	20383	0.06	7814	0.66	2.82	0.15	483	20
Regionalized-5	4	6	2.0	0.06	3997	0.01	1094	0.09	0.44	0.02	85	4
Regionalized-6		2	2.0	0.06	3997	0.01	1094	0.09	0.44	0.02	85	4
Regionalized-7		2	2.0	0.06	3997	0.01	1094	0.09	0.44	0.02	85	4
Centralized-1		1	2.0	0.06	3997	0.01	1094	0.09	0.44	0.02	85	4
Centralized-2		1	2.0	0.06	3997	0.01	1094	0.09	0.44	0.02	85	4
Centralized-3	7	1	10.1	0.32	20383	0.06	7814	0.66	2.82	0.15	482	20
Centralized-4	7	1	10.1	0.32	20383	0.06	7814	0.66	2.82	0.15	482	20
Centralized-5	1	1	2.0	0.06	3997	0.01	1094	0.09	0.44	0.02	85	4

Notes:
T = Treatment
D = Disposal
GPD = Gallons per Day
MW = Megawatts Electric
FTE = Full Time Equivalent
(1) Based on 1990 Site Employment.
** Ten sites use existing facilities for Volume Reduction.

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Table II-13.2–13. Ports—LLW—Cost

LLW Alternatives	T	D	Total Cost (Millions) (1)	Cost by Life-Cycle Component (1)				Cost by Functional Area (1)		
				Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Treatment (Millions)	Storage (Millions)	Disposal (Millions)
No Action	10**	6	536	26	79	403	28	536	0	0
Decentralized		16	1221	77	491	513	141	169	0	1052
Regionalized-1		12	1389	119	533	555	183	169	0	1221
Regionalized-2	11	12	1436	130	307	873	125	914	0	522
Regionalized-3		6	169	15	38	106	11	169	0	0
Regionalized-4	7	6	973	98	204	610	60	973	0	0
Regionalized-5	4	6	169	15	38	106	11	169	0	0
Regionalized-6		2	169	15	38	106	11	169	0	0
Regionalized-7		2	169	15	38	106	11	169	0	0
Centralized-1		1	169	15	38	106	11	169	0	0
Centralized-2		1	169	15	38	106	11	169	0	0
Centralized-3	7	1	973	98	204	610	60	973	0	0
Centralized-4	7	1	973	98	204	610	60	973	0	0
Centralized-5	1	1	169	15	38	106	11	169	0	0

Notes:
** Ten sites use existing facilities for Volume Reduction
T = Treatment
D = Disposal
The Life Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum may not reflect the true total cost.
In Current 1994 Dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

14.0 RFETS

RFETS currently is custodian of significant volumes of LLMW, LLW, and TRUW. Each of the waste types is treated independently in the following sections.

14.1 RFETS LLMW

Fifteen tables immediately following portray the impacts of LLMW at RFETS. These tables are presented as follows:

Impact Category

No.	Description	Table No.	Page No.
1.	RFETS—LLMW—Treatment and Disposal: Estimated Number of Fatalities	II-14.1-1	14-2
2.	RFETS—LLMW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects	II-14.1-2	14-3
3.	RFETS—LLMW—Disposal: Estimated Number of Cancer Incidences	II-14.1-3	14-4
4.	RFETS—LLMW—Treatment and Disposal: MEI Probability of Cancer Fatality	II-14.1-4	14-5
5.	RFETS—LLMW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects	II-14.1-5	14-6
6.	RFETS—LLMW—Treatment and Disposal: Noncancer Health Risk from Chemical Exposure	II-14.1-6	14-7
7.	RFETS—LLMW—Emissions in Tons per Year of Criteria Air Pollutants	II-14.1-7	14-8
8.	RFETS—LLMW—Percent of Standard/Guideline for Criteria Air Pollutants	II-14.1-8	14-9
9.	RFETS—LLMW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-14.1-9	14-10
10.	RFETS—LLMW—Impacts on Water Resources Due to Increased Water Use	II-14.1-10	14-11
11.	RFETS—LLMW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal (Contact-Handled)	II-14.1-11	14-12
12.	RFETS—LLMW—Percent of Drinking Water Standards from Hazardous Constituents in Groundwater from Disposal (Contact-Handled)	II-14.1-12	14-13
13.	RFETS—LLMW—Socioeconomics Impacts for Treatment and Disposal	II-14.1-13	14-14
14.	RFETS—LLMW—Infrastructure Impacts for Treatment and Disposal	II-14.1-14	14-15
15.	RFETS—LLMW—Cost	II-14.1-15	14-16

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Table II-14.1-1. RFETS—LLMW—Treatment and Disposal: Estimated Number of Fatalities

LLMW Alternatives	Number of Sites		Treatment				Disposal	
			WM Worker		Offsite Population	Noninvolved Workers	WM Worker	
	T	D	Radiation Exposure	Physical Hazards	Radiation Exposure	Radiation Exposure	Radiation Exposure	Physical Hazards
No Action	3	-	2.2E-03	2.1E-01	2.6E-02	1.4E-03	- -	- -
Decentralized	37	16	1.0E-03	6.2E-01	8.8E-05	4.5E-06	2.3E-03	6.9E-02
Regionalized-1	11	12	1.0E-03	6.2E-01	8.8E-05	4.5E-06	2.3E-03	6.9E-02
Regionalized-2	7	6	1.2E-03	6.2E-01	8.9E-05	4.5E-06	- -	- -
Regionalized-3	7	1	1.2E-03	6.2E-01	8.9E-05	4.5E-06	- -	- -
Regionalized-4	4	6	9.9E-04	2.1E-01	6.3E-06	3.2E-07	- -	- -
Centralized	1	1	9.9E-04	2.1E-01	6.3E-06	3.2E-07	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this Alternative.

Table II-14.1-2. RFETS—LLMW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

LLMW Alternatives	Number of Sites		Offsite Population				Noninvolved Workers				WM Worker			
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects
No Action	3	-	5.3E+01	9.0E-02	2.0E-03	5.3E-03	2.7E+00	4.6E-03	4.0E-04	2.7E-04	5.5E+00	7.7E-03	6.0E-05	3.3E-04
Decentralized	37	16	1.8E-01	3.0E-04	5.0E-05	1.8E-05	9.0E-03	1.5E-05	1.0E-05	9.0E-07	2.5E+00	3.6E-03	5.6E-04	1.5E-04
Regionalized-1	11	12	1.8E-01	3.0E-04	5.0E-05	1.8E-05	9.0E-03	1.5E-05	1.0E-05	9.0E-07	2.5E+00	3.6E-03	5.6E-04	1.5E-04
Regionalized-2	7	6	1.8E-01	3.0E-04	2.6E-05	1.8E-05	9.1E-03	1.5E-05	5.3E-06	9.1E-07	2.9E+00	4.1E-03	5.6E-04	1.7E-04
Regionalized-3	7	1	1.8E-01	3.0E-04	2.6E-05	1.8E-05	9.1E-03	1.5E-05	5.3E-06	9.1E-07	2.9E+00	4.1E-03	5.6E-04	1.7E-04
Regionalized-4	4	6	1.3E-02	2.1E-05	2.4E-06	1.3E-06	6.4E-04	1.1E-06	4.8E-07	6.4E-08	2.5E+00	3.5E-03	2.5E-05	1.5E-04
Centralized	1	1	1.3E-02	2.1E-05	2.4E-06	1.3E-06	6.4E-04	1.1E-06	4.8E-07	6.4E-08	2.5E+00	3.5E-03	2.5E-05	1.5E-04

Notes:
T = Treatment
D = Disposal

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Table II-14.1-3. RFETS—LLMW—Disposal: Estimated Number of Cancer Incidences

LLMW Alternatives	Number of Sites		WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	3	-	- -	- -	- -
Decentralized	37	16	5.8E+00	8.2E-03	3.5E-04
Regionalized-1	11	12	5.8E+00	8.2E-03	3.5E-04
Regionalized-2	7	6	- -	- -	- -
Regionalized-3	7	1	- -	- -	- -
Regionalized-4	4	6	- -	- -	- -
Centralized	1	1	- -	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this Alternative.

Table II-14.1-4. RFETS—LLMW—Treatment and Disposal: MEI Probability of Cancer Fatality

LLMW Alternatives	Number of Sites		Treatment		Disposal
	T	D	Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability	Hypothetical Farm Family Most Exposed Lifetime MEI Cancer Fatality Probability
No Action	37	-	3.6E-07	8.1E-07	- -
Decentralized	49	16	1.2E-09	2.7E-09	3.9E-07
Regionalized-1	11	12	1.2E-09	2.7E-09	3.9E-07
Regionalized-2	7	6	1.2E-09	2.7E-09	- -
Regionalized-3	7	1	1.2E-09	2.7E-09	- -
Regionalized-4	4	6	8.5E-11	1.9E-10	- -
Centralized	1	1	8.5E-11	1.9E-10	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered under the Alternative

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Table II-14.1-5. RFETS—LLMW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects

LLMW Alternatives	Number of Sites		Treatment								Disposal			
			Offsite Population MEI				Noninvolved Worker MEI				Most Exposed Farm Family Lifetime MEI			
	T	D	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability
No Action	3	-	7.2E-04	1.2E-06	1.6E-08	7.2E-08	1.6E-03	2.7E-06	2.1E-07	1.6E-07	- -	- -	- -	- -
Decentralized	37	16	2.4E-06	4.0E-09	4.0E-10	2.4E-10	5.4E-06	9.1E-09	5.1E-09	5.4E-10	7.8E-04	1.3E-06	2.8E-04	7.7E-08
Regionalized-1	11	12	2.4E-06	4.0E-09	4.0E-10	2.4E-10	5.4E-06	9.1E-09	5.1E-09	5.4E-10	7.8E-04	1.3E-06	2.8E-04	7.7E-08
Regionalized-2	7	6	2.4E-06	4.1E-09	2.1E-10	2.4E-10	5.4E-06	9.2E-09	2.7E-09	5.4E-10	- -	- -	- -	- -
Regionalized-3	7	1	2.4E-06	4.1E-09	2.1E-10	2.4E-10	5.4E-06	9.2E-09	2.7E-09	5.4E-10	- -	- -	- -	- -
Regionalized-4	4	6	1.7E-07	2.9E-10	1.9E-11	1.7E-11	3.8E-07	6.5E-10	2.4E-10	3.8E-11	- -	- -	- -	- -
Centralized	1	1	1.7E-07	2.9E-10	1.9E-11	1.7E-11	3.8E-07	6.5E-10	2.4E-10	3.8E-11	- -	- -	- -	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered for this alternative.

Table II-14.1-6. RFETS—LLMW—Treatment and Disposal: Noncancer Health Risk from Chemical Exposure

LLMW Alternatives	Number of Sites		Treatment			Disposal
	T	D	Offsite MEI Hazard Index	Noninvolved Worker MEI Hazard Index	WM Worker Exposure Index	Hypothetical Farm Family Most Exposed Lifetime Hazard Index
No Action	3	-	1.8E-06	2.3E-05	2.7E-05	- -
Decentralized	37	16	1.2E-07	1.5E-06	3.4E-04	3.0E+00
Regionalized-1	11	12	1.2E-07	1.5E-06	3.4E-04	3.0E+00
Regionalized-2	7	6	7.4E-08	9.5E-07	3.4E-04	- -
Regionalized-3	7	1	7.4E-08	9.5E-07	3.4E-04	- -
Regionalized-4	4	6	4.0E-09	5.1E-08	2.7E-05	- -
Centralized	1	1	4.0E-09	5.1E-08	2.7E-05	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this alternative.
MEI = Maximally Exposed Individual
Hazard Index = Sum of hazard quotient values for all noncarcinogenic chemicals. The hazard quotient is the chemical-specific ratio of media exposure concentrations to concentrations believed to have no appreciable adverse effects.
Exposure Index = Ratio of Exposure concentration to chemical-specific occupational threshold limits.

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Table II-14.1-7. RFETS—LLMW—Emissions in Tons per Year of Criteria Air Pollutants

LLMW Alternatives	Number of Sites		Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	95 (31/64)	94 (81/13)	0	6 (6/0)	8 (8/0)	16 (8/8)	23 (1/22)	6 (2/4)	0	0	0	3 (0/3)
Decentralized	37	16	169 (33/136)	114 (87/27)	0	7 (7/0)	8 (8/0)	25 (8/16)	82 (2/80)	25 (9/16)	0	5 (5/0)	0	10 (0/10)
Regionalized-1	11	12	169 (33/136)	114 (87/27)	0	7 (7/0)	8 (8/0)	25 (8/16)	82 (2/80)	25 (9/16)	0	5 (5/0)	0	10 (0/10)
Regionalized-2	7	6	107 (5/102)	32 (12/20)	0	1 (1/0)	1 (1/0)	13 (1/12)	53 (1/52)	17 (6/11)	0	5 (5/0)	0	6 (0/6)
Regionalized-3	7	1	107 (5/102)	32 (12/20)	0	1 (1/0)	1 (1/0)	13 (1/12)	53 (1/52)	17 (6/11)	0	5 (5/0)	0	6 (0/6)
Regionalized-4	4	6	47 (2/45)	16 (7/9)	0	1 (1/0)	1 (1/0)	6 (1/5)	24 (0/24)	5 (0/5)	0	0	0	3 (0/3)
Centralized	1	1	47 (2/45)	16 (7/9)	0	1 (1/0)	1 (1/0)	6 (1/5)	24 (0/24)	5 (0/5)	0	0	0	3 (0/3)

Notes:
T = Treatment
D = Disposal
Emissions <1 tons per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions / worker vehicles emission).
(2) Values = total emissions (stationary-source emissions / mobile-source emission).

Table II-14.1-8. RFETS—LLMW—Percent of Standard/Guideline for Criteria Air Pollutants

LLMW Alternatives	Number of Sites		Construction					
			Percent of Tons/Year General Conformity Rule (1)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	95 (31/64)	94 (81/13)	--	7 (7/0)	--	31 (16/15)
Decentralized	37	16	169 (33/136)	114 (87/27)	--	7 (7/0)	--	50 (17/33)
Regionalized-1	11	12	169 (33/136)	114 (87/27)	--	7 (7/0)	--	50 (17/33)
Regionalized-2	7	6	107 (5/102)	32 (12/20)	--	1 (1/0)	--	27 (2/25)
Regionalized-3	7	1	107 (5/102)	32 (12/20)	--	1 (1/0)	--	27 (2/25)
Regionalized-4	4	6	48 (3/45)	16 (7/9)	--	1 (1/0)	--	12 (1/11)
Centralized	1	1	48 (3/45)	16 (7/9)	--	1 (1/0)	--	12 (1/11)

LLMW Alternatives	Number of Sites		Operations & Maintenance											
			Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
	T	D	CO (6)	NO2 (5)	Pb (4)	PM10 (6)	SO2 (4)	VOC (5)	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	23 (1/22)	7 (3/4)	0	0	0	6 (1/5)	--	--	--	--	--	--
Decentralized	37	16	81 (1/80)	25 (9/16)	0	5 (5/0)	1	20 (1/19)	0	0	0	0	5	0
Regionalized-1	11	12	81 (1/80)	25 (9/16)	0	5 (5/0)	1	20 (1/19)	0	0	0	0	5	0
Regionalized-2	7	6	53 (1/52)	17 (6/11)	0	5 (5/0)	1	13 (0/13)	0	0	0	0	5	0
Regionalized-3	7	1	53 (1/52)	17 (6/11)	0	5 (5/0)	1	13 (0/13)	0	0	0	0	5	0
Regionalized-4	4	6	24 (0/24)	5 (0/5)	0	0	0	6 (0/6)	--	--	--	--	--	--
Centralized	1	1	24 (0/24)	5 (0/5)	0	0	0	6 (0/6)	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) GCR de minimus levels are applied, since PSD regulations are not applicable to construction activities. Values = % of total emissions (% of equipment emissions / % of worker vehicles emission).
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions are assumed to be negligible for the No Action, Regionalized-4, and Centralized Alternatives.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.
(5) Nonattainment area for ozone. Pollutant is an ozone precursor, therefore GCR de minimus levels are applied. Values = % of total emissions (% of stationary-source emissions / % of mobile-source emissions).
(6) Nonattainment area for this pollutant, therefore GCR de minimus levels are applied. Values = % of total emissions (% of stationary-source emission / % of transportation emission).

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Table II-14.1-9. RFETS—LLMW—Percent of Standards/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

LLMW Alternatives	Number of Sites		Operations & Maintenance											
	T	D	Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action	3	-	0	0	0	--	--	0	--	--	0	0	0	0
Decentralized	37	16	0	0	0	--	--	0	--	--	0	0	0	0
Regionalized-1	11	12	0	0	0	--	--	0	--	--	0	0	0	0
Regionalized-2	7	6	0	0	0	--	--	0	--	--	0	0	0	0
Regionalized-3	7	1	0	0	0	--	--	0	--	--	0	0	0	0
Regionalized-4	4	6	0	0	0	--	--	0	--	--	0	0	0	0
Centralized	1	1	0	0	0	--	--	0	--	--	0	0	0	0

LLMW Alternatives	Number of Sites		Operations & Maintenance									
	T	D	Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action	3	-	--	0	0	0	--	0	0	0	--	--
Decentralized	37	16	--	0	0	0	--	0	0	0	--	--
Regionalized-1	11	12	--	0	0	0	--	0	0	0	--	--
Regionalized-2	7	6	--	0	0	0	--	0	0	0	--	--
Regionalized-3	7	1	--	0	0	0	--	0	0	0	--	--
Regionalized-4	4	6	--	0	0	0	--	0	0	0	--	--
Centralized	1	1	--	0	0	0	--	0	0	0	--	--

Notes:
T = Treatment
D = Disposal
-- = Emissions of this hazardous or toxic air pollutant are assumed to be negligible.
Percentages <1% are shown as zeros.

Table II-14.1–10. RFETS—LLMW—Impacts on Water Resources Due to Increased Water Use

LLMW Alternatives	Number of Sites		Construction			Operations			
	T	D	Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action	3	-	75070	27.6	- -	5199	1.9	- -	<0.1
Decentralized	37	16	89025	32.7	- -	11099	4.1	- -	<0.1
Regionalized-1	11	12	89025	32.7	- -	11099	4.1	- -	<0.1
Regionalized-2	7	6	20720	7.6	- -	9238	3.4	- -	<0.1
Regionalized-3	7	1	20720	7.6	- -	9238	3.4	- -	<0.1
Regionalized-4	4	6	7271	2.7	- -	3478	1.3	- -	<0.1
Centralized	1	1	7271	2.7	- -	3478	1.3	- -	<0.1

Notes:
T = Treatment
D = Disposal
Water supplied by municipal water from the Denver Water Board.
Current water use = 272,000 gallons/day
Wastewater discharged to Walnut Creek. Average flow rate of Walnut Creek = 142,000,000 gallons/day.
- - = Stream Flow is not considered for this site.
<0.1 indicates that the percentage is less than 0.1%.

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Table II-14.1-11. RFETS—LLMW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal (Contact-Handled)

LLMW Alternatives	Number of Sites T	Number of Sites D	Ac 225	Ac 227	Am 241	Am 242	Am 243	C 14	Cs 135	Cs 137	Cm 242	Cm 244	Cm 245	I 129	Pb 210	Np 237	Ni 59	Ni 63	Pd 107	Pu 238	Pu 239	Pu 240	Pu 241
No Action	3	-	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-2	7	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	4	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

LLMW Alternatives	Number of Sites T	Number of Sites D	Po 210	K 40	Pa 231	Ra 223	Ra 226	Sm 151	Se 79	Sr 90	Tc 99	Th 227	Th 228	Th 229	Th 230	Th 232	Sn 126	U 233	U 234	U 235	U 236	U 238	Y 90	Zr 93
No Action	3	-	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-2	7	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	4	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
- - = No disposal at this site for this alternative.

Table II-12.1-12. RFETS—LLMW—Percent of Drinking Water Standards for Hazardous Constituents in Groundwater from Disposal (Contact-Handled)

LLMW Alternatives	T	D	Acetone	Arsenic	Barium	Benzene	Cadmium	Carbon Tetrachloride	Chromium	Cyanide
No Action	3	-	--	--	--	--	--	--	--	--
Decentralized	37	16	0	30	0	200	0	1000	0	0
Regionalized-1	11	12	0	30	0	200	0	1000	0	0
Regionalized-2	7	6	--	--	--	--	--	--	--	--
Regionalized-3	7	1	--	--	--	--	--	--	--	--
Regionalized-4	4	6	--	--	--	--	--	--	--	--
Centralized	1	1	--	--	--	--	--	--	--	--

LLMW Alternatives	T	D	1,2-dichloro-ethane	Lead	Mercury	Methylene Chloride	Selenium	Silver	1,2,2-trichloro-1,1-trifluoroethane
No Action	3	-	--	--	--	--	--	--	--
Decentralized	37	16	2000	0	0	4000	100	6	0
Regionalized-1	11	12	2000	0	0	4000	100	6	0
Regionalized-2	7	6	--	--	--	--	--	--	--
Regionalized-3	7	1	--	--	--	--	--	--	--
Regionalized-4	4	6	--	--	--	--	--	--	--
Centralized	1	1	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
"--" = No disposal at this site for this alternative.

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Table II-14.1-13. RFETS—LLMW—Socioeconomics Impacts for Treatment and Disposal

LLMW Alternatives	Number of Sites		Effect of Implementation of Alternatives					
				Jobs		Income		
	T	D	Cost (Millions) (1)	Annual Jobs	% Annual Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action	3	-	912	765	0.06	8.6	0.02	0.04
Decentralized	37	16	1614	1693	0.14	19.0	0.05	0.07
Regionalized-1	11	12	1614	1693	0.14	19.0	0.05	0.07
Regionalized-2	7	6	1091	1144	0.10	12.9	0.03	0.05
Regionalized-3	7	1	1091	1144	0.10	12.9	0.03	0.05
Regionalized-4	4	6	554	581	0.05	6.5	0.02	0.02
Centralized	1	1	554	581	0.05	6.5	0.02	0.02

Notes:
T = Treatment
D = Disposal
(1) In current 1990 dollars.
(2) Compared to 1990 baseline

Table II-14.1-14. RFETS—LLMW—Infrastructure Impacts for Treatment and Disposal

LLMW Alternatives	Number of Sites		Effect of Implementation of Alternatives									
			Land Use		Water		Waste Water		Power		Employment (FTE)	
	T	D	Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	% Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Construction Employment	% of Current Employment
No Action	3	-	25.9	0.45	75070	7.51	5199	1.04	10.75	31.17	497	7
Decentralized	37	16	32.9	0.57	89025	8.90	11099	2.22	11.49	33.31	1055	14
Regionalized 1	11	12	32.9	0.57	89025	8.90	11099	2.22	11.49	33.31	1055	14
Regionalized 2	7	6	13.1	0.23	20720	2.07	9238	1.85	1.60	4.65	778	11
Regionalized 3	7	1	13.1	0.23	20720	2.07	9238	1.85	1.60	4.65	778	11
Regionalized 4	4	6	6.2	0.11	7271	0.73	3478	0.70	0.86	2.50	347	5
Centralized	1	1	6.2	0.11	7271	0.73	3478	0.70	0.86	2.50	347	5

Notes:
T = Treatment
D = Disposal
GPD = Gallons per Day
MW = Megawatts
(1) Based on 1991 Site Employment

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Table II-14.1-15. RFETS—LLMW—Cost

LLMW Alternatives	Number of Sites		Total Cost (Millions) (1)	Cost by Life-Cycle Component (1)				Cost by Functional Area (1)		
	T	D		Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Treatment (Millions)	Storage (Millions)	Disposal (Millions)
No Action	3	-	1032	56	271	467	238	537	494	0
Decentralized	37	16	1826	117	587	808	314	1234	0	591
Regionalized-1	11	12	1826	117	587	808	314	1234	0	591
Regionalized-2	7	6	1236	99	434	661	42	1236	0	0
Regionalized-3	7	1	1236	99	434	661	42	1236	0	0
Regionalized-4	4	6	627	43	190	368	26	627	0	0
Centralized	1	1	627	43	190	368	26	627	0	0

Notes:
T = Treatment
D = Disposal
The Life-Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum of these may not reflect the true total cost.
(1) In current 1994 dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

14.2 RFETS LLW

Thirteen tables immediately following portray the impacts of LLW at RFETS. These tables are presented as follows:

Impact Category

No.	Description	Table No.	Page No.
1.	RFETS—LLW—Treatment and Disposal: Estimated Number of Fatalities	II-14.2-1	14-18
2.	RFETS—LLW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects	II-14.2-2	14-19
3.	RFETS—LLW—Disposal: Estimated Number of Cancer Incidences and Genetic Effects	II-14.2-3	14-20
4.	RFETS—LLW—Treatment and Disposal: MEI Probability of Cancer Fatality	II-14.2-4	14-21
5.	RFETS—LLW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects	II-14.2-5	14-22
7.	RFETS—LLW—Emissions in Tons per Year of Criteria Air Pollutants	II-14.2-6	14-23
8.	RFETS—LLW—Percent of Standard/Guideline for Criteria Air Pollutants	II-14.2-7	14-24
9.	RFETS—LLW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-14.2-8	14-25
10.	RFETS—LLW—Impacts on Water Resources Due to Increased Water Use	II-14.2-9	14-26
11.	RFETS—LLW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal	II-14.2-10	14-27
12.	RFETS—LLW—Socioeconomic Impacts for Treatment and Disposal	II-14.2-11	14-28
13.	RFETS—LLW—Infrastructure Impacts for Treatment and Disposal	II-14.2-12	14-29
14.	RFETS—LLW—Cost	II-14.2-13	14-30

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Table II-14.2–1. RFETS—LLW—Treatment and Disposal: Estimated Number of Fatalities

LLW Alternatives	Number of Sites		Treatment				Disposal	
			WM Worker		Offsite Population	Noninvolved Workers	WM Worker	
	T	D	Radiation Exposure	Physical Hazards	Radiation Exposure	Radiation Exposure	Radiation Exposure	Physical Hazards
No Action	10**	6	1.9E-03	1.2E-01	1.2E-07	6.2E-09	- -	- -
Decentralized		16	1.1E-03	7.0E-02	3.6E-07	1.8E-08	2.8E-03	1.4E-01
Regionalized-1		12	1.1E-03	7.0E-02	3.6E-07	1.8E-08	2.8E-03	1.4E-01
Regionalized-2	11	12	1.1E-03	2.2E-01	1.9E-04	9.5E-06	1.6E-03	6.6E-02
Regionalized-3		6	1.2E-03	8.0E-02	4.0E-07	2.0E-08	- -	- -
Regionalized-4	7	6	1.1E-03	2.2E-01	1.9E-04	9.5E-06	- -	- -
Regionalized-5	4	6	1.2E-03	7.9E-02	4.0E-07	2.0E-08	- -	- -
Regionalized-6		2	1.2E-03	8.0E-02	4.0E-07	2.0E-08	- -	- -
Regionalized-7		2	1.2E-03	8.0E-02	4.0E-07	2.0E-08	- -	- -
Centralized-1		1	1.2E-03	8.0E-02	4.0E-07	2.0E-08	- -	- -
Centralized-2		1	1.2E-03	8.0E-02	4.0E-07	2.0E-08	- -	- -
Centralized-3	7	1	1.1E-03	2.2E-01	1.9E-04	9.5E-06	- -	- -
Centralized-4	7	1	1.1E-03	2.2E-01	1.9E-04	9.5E-06	- -	- -
Centralized-5	1	1	1.2E-03	7.9E-02	4.0E-07	2.0E-08	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered under the alternative
** Ten sites use existing facilities for Volume Reduction

Table II-14.2–2. RFETS—LLW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

LLW Alternatives	Number of Sites		Offsite Population			Noninvolved Worker			WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	10**	6	2.4E-04	4.1E-07	2.4E-08	1.2E-05	2.1E-08	1.2E-09	4.6E+00	6.5E-03	2.8E-04
Decentralized		16	7.1E-04	1.2E-06	7.1E-08	3.7E-05	6.2E-08	3.7E-09	2.9E+00	4.0E-03	1.7E-04
Regionalized-1		12	7.1E-04	1.2E-06	7.1E-08	3.7E-05	6.2E-08	3.7E-09	2.9E+00	4.0E-03	1.7E-04
Regionalized-2	11	12	3.7E-01	6.3E-04	3.7E-05	1.9E-02	3.2E-05	1.9E-06	2.9E+00	4.0E-03	1.7E-04
Regionalized-3		6	8.0E-04	1.4E-06	8.0E-08	4.1E-05	6.9E-08	4.1E-09	2.9E+00	4.0E-03	1.7E-04
Regionalized-4	7	6	3.7E-01	6.3E-04	3.7E-05	1.9E-02	3.2E-05	1.9E-06	2.9E+00	4.0E-03	1.7E-04
Regionalized-5	4	6	8.0E-04	1.4E-06	8.0E-08	4.1E-05	6.9E-08	4.1E-09	2.9E+00	4.0E-03	1.7E-04
Regionalized-6		2	8.0E-04	1.4E-06	8.0E-08	4.1E-05	6.9E-08	4.1E-09	2.9E+00	4.0E-03	1.7E-04
Regionalized-7		2	8.0E-04	1.4E-06	8.0E-08	4.1E-05	6.9E-08	4.1E-09	2.9E+00	4.0E-03	1.7E-04
Centralized-1		1	8.0E-04	1.4E-06	8.0E-08	4.1E-05	6.9E-08	4.1E-09	2.9E+00	4.0E-03	1.7E-04
Centralized-2		1	8.0E-04	1.4E-06	8.0E-08	4.1E-05	6.9E-08	4.1E-09	2.9E+00	4.0E-03	1.7E-04
Centralized-3	7	1	3.7E-01	6.3E-04	3.7E-05	1.9E-02	3.2E-05	1.9E-06	2.9E+00	4.0E-03	1.7E-04
Centralized-4	7	1	3.7E-01	6.3E-04	3.7E-05	1.9E-02	3.2E-05	1.9E-06	2.9E+00	4.0E-03	1.7E-04
Centralized-5	1	1	8.0E-04	1.4E-06	8.0E-08	4.1E-05	6.9E-08	4.1E-09	2.9E+00	4.0E-03	1.7E-04

Notes:
T = Treatment
D = Disposal
** Ten sites use existing facilities for Volume Reduction.

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Table II-14.2–3. RFETS—LLW—Disposal: Estimated Number of Cancer Incidences and Genetic Effects

LLW Alternatives	Number of Sites		WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	10**	6	- -	- -	- -
Decentralized		16	7.1E+00	9.9E-03	4.3E-04
Regionalized-1		12	7.1E+00	9.9E-03	4.3E-04
Regionalized-2	11	12	4.0E+00	5.6E-03	2.4E-04
Regionalized-3		6	- -	- -	- -
Regionalized-4	7	6	- -	- -	- -
Regionalized-5	4	6	- -	- -	- -
Regionalized-6		2	- -	- -	- -
Regionalized-7		2	- -	- -	- -
Centralized-1		1	- -	- -	- -
Centralized-2		1	- -	- -	- -
Centralized-3	7	1	- -	- -	- -
Centralized-4	7	1	- -	- -	- -
Centralized-5	1	1	- -	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered under the alternative.
** Ten sites use existing facilities for Volume Reduction.

Table II-14.2–4. RFETS—LLW—Treatment and Disposal: MEI Probability of Cancer Fatality

LLW Alternatives	Number of Sites		Treatment		Disposal
	T	D	Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability	Hypothetical Farm Family - Most Exposed Lifetime MEI Cancer Fatality Probability
No Action	10**	6	1.6E-12	3.7E-12	- -
Decentralized		16	4.9E-12	1.1E-11	2.7E-08
Regionalized-1		12	4.9E-12	1.1E-11	2.7E-08
Regionalized-2	11	12	2.5E-09	5.7E-09	8.1E-08
Regionalized-3		6	5.4E-12	1.2E-11	- -
Regionalized-4	7	6	2.5E-09	5.7E-09	- -
Regionalized-5	4	6	5.4E-12	1.2E-11	- -
Regionalized-6		2	5.4E-12	1.2E-11	- -
Regionalized-7		2	5.4E-12	1.2E-11	- -
Centralized-1		1	5.4E-12	1.2E-11	- -
Centralized-2		1	5.4E-12	1.2E-11	- -
Centralized-3	7	1	2.5E-09	5.7E-09	- -
Centralized-4	7	1	2.5E-09	5.7E-09	- -
Centralized-5	1	1	5.4E-12	1.2E-11	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered under the Alternative.
** Ten sites use existing facilities for Volume Reduction.

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Table II-14.2–5. RFETS—LLW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects

LLW Alternatives	Number of Sites		Treatment						Disposal		
			Offsite MEI			Noninvolved Worker MEI			Most Exposed Lifetime MEI		
	T	D	Dose (rem)	Radiation Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Radiation Genetic Effects Probability
No Action	10**	6	3.3E-09	5.6E-12	3.3E-13	7.4E-09	1.3E-11	7.4E-13	- -	- -	- -
Decentralized		16	9.7E-09	1.7E-11	9.7E-13	2.2E-08	3.7E-11	2.2E-12	5.4E-05	9.2E-08	5.4E-09
Regionalized-1		12	9.7E-09	1.7E-11	9.7E-13	2.2E-08	3.7E-11	2.2E-12	5.4E-05	9.2E-08	5.4E-09
Regionalized-2	11	12	5.1E-06	8.6E-09	5.1E-10	1.1E-05	1.9E-08	1.1E-09	1.6E-04	2.8E-07	1.6E-08
Regionalized-3		6	1.1E-08	1.8E-11	1.1E-12	2.4E-08	4.2E-11	2.5E-12	- -	- -	- -
Regionalized-4	7	6	5.1E-06	8.6E-09	5.1E-10	1.1E-05	1.9E-08	1.1E-09	- -	- -	- -
Regionalized-5	4	6	1.1E-08	1.8E-11	1.1E-12	2.5E-08	4.2E-11	2.5E-12	- -	- -	- -
Regionalized-6		2	1.1E-08	1.8E-11	1.1E-12	2.5E-08	4.2E-11	2.5E-12	- -	- -	- -
Regionalized-7		2	1.1E-08	1.8E-11	1.1E-12	2.5E-08	4.2E-11	2.5E-12	- -	- -	- -
Centralized-1		1	1.1E-08	1.8E-11	1.1E-12	2.5E-08	4.2E-11	2.5E-12	- -	- -	- -
Centralized-2		1	1.1E-08	1.8E-11	1.1E-12	2.5E-08	4.2E-11	2.5E-12	- -	- -	- -
Centralized-3	7	1	5.1E-06	8.6E-09	5.1E-10	1.1E-05	1.9E-08	1.1E-09	- -	- -	- -
Centralized-4	7	1	5.1E-06	8.6E-09	5.1E-10	1.1E-05	1.9E-08	1.1E-09	- -	- -	- -
Centralized-5	1	1	1.1E-08	1.8E-11	1.1E-12	2.5E-08	4.2E-11	2.5E-12	- -	- -	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered under the alternative.
** Ten sites use existing facilities for Volume Reduction.

Table II-14.2-6. RFETS—LLW—Emissions in Tons per Year of Criteria Air Pollutants

LLW Alternatives	Number of Sites		Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action	10**	6	12 (4/8)	12 (10/2)	0	1 (1/0)	1 (1/0)	2 (1/1)	8 (0/7)	2 (0/2)	0	0	0	1 (0/1)
Decentralized		16	29 (16/12)	45 (43/2)	0	3 (3/0)	4 (4/0)	6 (4/1)	39 (0/39)	8 (0/8)	0	0	0	5 (0/5)
Regionalized-1		12	29 (16/12)	45 (43/2)	0	3 (3/0)	4 (4/0)	6 (4/1)	39 (0/39)	8 (0/8)	0	0	0	5 (0/5)
Regionalized-2	11	12	38 (28/10)	76 (74/2)	0	6 (6/0)	7 (7/0)	8 (7/1)	56 (0/55)	13 (2/11)	0	1 (1/0)	0	7 (0/7)
Regionalized-3		6	15 (1/14)	6 (3/3)	0	0	0	2 (0/2)	11 (0/11)	2 (0/2)	0	0	0	1 (0/1)
Regionalized-4	7	6	26 (21/5)	55 (54/1)	0	4 (4/0)	5 (5/0)	6 (5/1)	33 (0/33)	8 (1/7)	0	1 (1/0)	0	4 (0/4)
Regionalized-5	4	6	15 (1/14)	6 (3/3)	0	0	0	2 (0/2)	11 (0/11)	2 (0/2)	0	0	0	1 (0/1)
Regionalized-6		2	15 (1/14)	6 (3/3)	0	0	0	2 (0/2)	11 (0/11)	2 (0/2)	0	0	0	1 (0/1)
Regionalzied-7		2	15 (1/14)	6 (3/3)	0	0	0	2 (0/2)	11 (0/11)	2 (0/2)	0	0	0	1 (0/1)
Centralized-1		1	15 (1/14)	6 (3/3)	0	0	0	2 (0/2)	11 (0/11)	2 (0/2)	0	0	0	1 (0/1)
Centralized-2		1	15 (1/14)	6 (3/3)	0	0	0	2 (0/2)	11 (0/11)	2 (0/2)	0	0	0	1 (0/1)
Centralized-3	7	1	26 (21/5)	55 (54/1)	0	4 (4/0)	5 (5/0)	6 (5/1)	33 (0/33)	8 (1/7)	0	1 (1/0)	0	4 (0/4)
Centralized-4	7	1	26 (21/5)	55 (54/1)	0	4 (4/0)	5 (5/0)	6 (5/1)	33 (0/33)	8 (1/7)	0	1 (1/0)	0	4 (0/4)
Centralized-5	1	1	15 (1/14)	6 (3/3)	0	0	0	2 (0/2)	11 (0/11)	2 (0/2)	0	0	0	1 (0/1)

Notes:
T = Treatment
D = Disposal
Emissions <1 ton per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions/worker vehicles emission)
(2) Values = total emissions (stationary-source emissions/mobile-source emission)
** Ten sites use existing facilities for Volume Reduction.

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Table II-14.2-7. RFETS—LLW—Percent of Standard/Guideline for Criteria Air Pollutants

LLW Alternatives	Number of Sites		Construction					
			Percent of Tons/Year General Conformity Rule (1)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC
No Action	10**	6	12 (4/8)	12 (10/2)	--	1 (1/0)	--	4 (2/2)
Decentralized		16	28 (16/12)	45 (43/2)	--	3 (3/0)	--	11 (8/3)
Regionalized-1		12	28 (16/12)	45 (43/2)	--	3 (3/0)	--	11 (8/3)
Regionalized-2	11	12	38 (28/10)	76 (74/2)	--	6 (6/0)	--	16 (14/2)
Regionalized-3		6	15 (1/14)	6 (3/3)	--	0	--	4 (1/3)
Regionalized-4	7	6	26 (21/5)	55 (54/1)	--	4 (4/0)	--	11 (10/1)
Regionalized-5	4	6	15 (1/14)	6 (3/3)	--	0	--	4 (1/3)
Regionalized-6		2	15 (1/14)	6 (3/3)	--	0	--	4 (1/3)
Regionalized-7		2	15 (1/14)	6 (3/3)	--	0	--	4 (1/3)
Centralized-1		1	15 (1/14)	6 (3/3)	--	0	--	4 (1/3)
Centralized-2		1	15 (1/14)	6 (3/3)	--	0	--	4 (1/3)
Centralized-3	7	1	26 (21/5)	55 (54/1)	--	4 (4/0)	--	11 (10/1)
Centralized-4	7	1	26 (21/5)	55 (54/1)	--	4 (4/0)	--	11 (10/1)
Centralized-5	1	1	15 (1/14)	6 (3/3)	--	0	--	4 (1/3)

LLW Alternatives	Number of Sites		Operations & Maintenance											
			Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
	T	D	CO (6)	NO2 (5)	Pb (4)	PM10 (6)	SO2 (4)	VOC (5)	CO	NO2	Pb	PM10	SO2	VOC
No Action	10**	6	8 (0/7)	2 (0/2)	0	0	0	2 (0/2)	--	--	--	--	--	--
Decentralized		16	39 (0/39)	8 (0/8)	0	0	0	9 (0/9)	--	--	--	--	--	--
Regionalized-1		12	39 (0/39)	8 (0/8)	0	0	0	9 (0/9)	--	--	--	--	--	--
Regionalized-2	11	12	55 (0/55)	12 (1/11)	0	1 (1/0)	0	13 (0/13)	0	0	0	0	0	0
Regionalized-3		6	11 (0/11)	2 (0/2)	0	0	0	3 (0/3)	--	--	--	--	--	--
Regionalized-4	7	6	33 (0/33)	8 (1/7)	0	1 (1/0)	0	8 (0/8)	0	0	0	0	0	0
Regionalized-5	4	6	11 (0/11)	2 (0/2)	0	0	0	3 (0/3)	--	--	--	--	--	--
Regionalized-6		2	11 (0/11)	2 (0/2)	0	0	0	3 (0/3)	--	--	--	--	--	--
Regionalized-7		2	11 (0/11)	2 (0/2)	0	0	0	3 (0/3)	--	--	--	--	--	--
Centralized-1		1	11 (0/11)	2 (0/2)	0	0	0	3 (0/3)	--	--	--	--	--	--
Centralized-2		1	11 (0/11)	2 (0/2)	0	0	0	3 (0/3)	--	--	--	--	--	--
Centralized-3	7	1	33 (0/33)	8 (1/7)	0	1 (1/0)	0	8 (0/8)	0	0	0	0	0	0
Centralized-4	7	1	33 (0/33)	8 (1/7)	0	1 (1/0)	0	8 (0/8)	0	0	0	0	0	0
Centralized-5	1	1	11 (0/11)	2 (0/2)	0	0	0	3 (0/3)	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) GCR de minimus levels are applied, since PSD regulations are not applicable to construction activities. Values = % of total emissions (% of equipment emissions / % of worker vehicle emissions)
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions for all but the Regionalized-2 and -4, and Centralized-3 and -4 Alternatives are assumed to be negligible.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.
(5) Nonattainment area for ozone. Pollutant is an ozone precursor, therefore GCR de minimus levels are applied. Values = % of total emissions (% of stationary-source emissions / % of mobile-source emissions).
(6) Nonattainment area for this pollutant, therefore GCR de minimus levels are applied. Values = % of total emissions (% of stationary-source emissions / % of mobile-source emissions).
** Ten sites use existing facilities for Volume Reduction.

Table II-14.2–8. RFETS—LLW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

LLW Alternatives	Number of Sites		Operations & Maintenance											
	T	D	Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action	10**	6	0	--	--	--	--	--	--	--	--	--	--	--
Decentralized		16	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-1		12	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-2	11	12	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-3		6	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	7	6	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-5	4	6	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-6		2	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-1		1	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-4	7	1	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	0	--	--	--	--	--	--	--	--	--	--	--

LLW Alternatives	Number of Sites		Operations & Maintenance									
	T	D	Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action	10**	6	--	--	--	--	--	--	--	--	--	--
Decentralized		16	--	--	--	--	--	--	--	--	--	--
Regionalized-1		12	--	--	--	--	--	--	--	--	--	--
Regionalized-2	11	12	--	--	--	--	--	--	--	--	--	--
Regionalized-3		6	--	--	--	--	--	--	--	--	--	--
Regionalized-4	7	6	--	--	--	--	--	--	--	--	--	--
Regionalized-5	4	6	--	--	--	--	--	--	--	--	--	--
Regionalized-6		2	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	--	--	--	--	--	--	--	--	--	--
Centralized-1		1	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--	--	--	--	--
Centralized-4	7	1	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--	--	--	--	--

Notes:
T= Treatment
D = Disposal
- - = Emissions of this hazardous or toxic air pollutant are assumed to be negligible.
Percentages <1% are shown as zeros.
** Ten sites use existing facilities for Volume Reduction.

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Table II-14.2-9. RFETS—LLW—Impacts on Water Resources Due to Increased Water Use

LLW Alternatives	Number of Sites		Construction			Operations			
	T	D	Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action	10**	6	2490	0.9	- -	914	0.3	- -	<0.1
Decentralized		16	12497	4.6	- -	5080	1.9	- -	<0.1
Regionalized-1		12	12497	4.6	- -	5080	1.9	- -	<0.1
Regionalized-2	11	12	17980	6.6	- -	11997	4.4	- -	<0.1
Regionalized-3		6	4025	1.5	- -	1478	0.5	- -	<0.1
Regionalized-4	7	6	11527	4.2	- -	9106	3.3	- -	<0.1
Regionalized-5	4	6	4025	1.5	- -	1478	0.5	- -	<0.1
Regionalized-6		2	4025	1.5	- -	1478	0.5	- -	<0.1
Regionalized-7		2	4025	1.5	- -	1478	0.5	- -	<0.1
Centralized-1		1	4025	1.5	- -	1478	0.5	- -	<0.1
Centralized-2		1	4025	1.5	- -	1478	0.5	- -	<0.1
Centralized-3	7	1	11527	4.2	- -	9106	3.3	- -	<0.1
Centralized-4	7	1	11527	4.2	- -	9106	3.3	- -	<0.1
Centralized-5	1	1	4025	1.5	- -	1478	0.5	- -	<0.1

Notes:
T = Treatment
D = Disposal
Water supplied by municipal water from the Denver Water Board. Current water use = 272,000 gallons/day.
Wastewater discharged to Walnut Creek. Average flow rate of Walnut Creek = 142,000,000 gallons/day.
** Ten sites use existing facilities for Volume Reduction.
- - = Wastewater discharged to evaporation ponds.
<0.1 indicates that the percentage is less than 0.1%.

Table II-14.2-10. RFETS—LLW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal

LLW Alternatives	Number of Sites T	Number of Sites D	Ac 225	Ac 227	Am 241	Am 242	Am 243	C 14	Cs 135	Cs 137	Cm 242	Cm 244	Cm 245	I 129	Pb 210	Np 237	Ni 59	Ni 63	Pd 107	Pu 238	Pu 239	Pu 240	Pu 241
No Action	10**	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized		16	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	900	2000	0
Regionalized-1		12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-2	11	12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-3		6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	7	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-5	4	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-6		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-1		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-4	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

LLW Alternatives	Number of Sites T	Number of Sites D	Po 210	K 40	Pa 231	Ra 223	Ra 226	Sm 151	Se 79	Sr 90	Tc 99	Th 227	Th 228	Th 229	Th 230	Th 232	Sn 126	U 233	U 234	U 235	U 236	U 238	Y 90	Zr 93
No Action	10**	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized		16	0	0	0	0	0	0	0	0	200	0	0	0	2	0	0	0	100	1	0	30000	0	
Regionalized-1		12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-2	11	12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-3		6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	7	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-5	4	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-6		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-1		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-4	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
** Ten sites use existing facilities for Volume Reduction
- - = Disposal is not considered for this Alternative.

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Table II-14.2-11. RFETS—LLW—Socioeconomic Impacts for Treatment and Disposal

LLW Alternatives	Number of Sites		Effect of Implementation of Alternatives					
				Jobs		Income		
	T	D	Cost (Millions) (1)	Jobs	% Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action	10**	6	219	184	0.02	2.1	0.01	0.01
Decentralized		16	623	654	0.05	7.4	0.02	0.03
Regionalized-1		12	623	654	0.05	7.4	0.02	0.03
Regionalized-2	11	12	923	968	0.08	10.9	0.03	0.05
Regionalized-3		6	201	211	0.02	2.4	0.01	0.01
Regionalized-4	7	6	610	640	0.05	7.2	0.02	0.03
Regionalized-5		6	201	211	0.02	2.4	0.01	0.01
Regionalized-6		2	201	211	0.02	2.4	0.01	0.01
Regionalized-7		2	201	211	0.02	2.4	0.01	0.01
Centralized-1		1	201	211	0.02	2.4	0.01	0.01
Centralized-2		1	201	211	0.02	2.4	0.01	0.01
Centralized-3	7	1	610	640	0.05	7.2	0.02	0.03
Centralized-4	7	1	610	640	0.05	7.2	0.02	0.03
Centralized-5	1	1	201	211	0.02	2.4	0.01	0.01

Notes:
T = Treatment
D = Disposal
(1) In constant 1990 dollars.
(2) Compared to 1990 baseline.
** Ten sites use existing facilities for Volume Reduction.

Table II-14.2–12. RFETS—LLW—Infrastructure Impacts for Treatment and Disposal

LLW Alternatives	Number of Sites		Effect of Implementation of Alternatives									
			Land Use		Water		Waste Water		Power		Employment (FTE)	
	T	D	Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	% Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Peak Construction Employment	% of Current Employment (1)
No Action	10**	6	1.1	0.02	2490	0.25	914	0.18	0.20	0.58	64	1
Decentralized		16	7.1	0.12	12496	1.25	5080	1.02	1.43	4.16	258	4
Regionalized-1		12	7.1	0.12	12496	1.25	5080	1.02	1.43	4.16	258	4
Regionalized-2	11	12	11.4	0.20	17980	1.84	11997	1.63	1.67	4.85	558	8
Regionalized-3		6	2.9	0.05	4025	0.40	1478	0.30	0.41	1.19	110	1
Regionalized-4	7	6	2.5	0.04	11527	1.15	9106	1.82	1.00	2.88	442	6
Regionalized-5	4	6	2.9	0.04	4025	0.33	1478	0.30	0.41	0.96	110	1
Regionalized-6		2	2.9	0.05	4025	0.40	1478	0.30	0.41	1.19	110	1
Regionalized-7		2	2.9	0.05	4025	0.40	1478	0.30	0.41	1.19	110	1
Centralized-1		1	2.9	0.05	4025	0.40	1478	0.30	0.41	1.19	110	1
Centralized-2		1	2.9	0.05	4025	0.40	1478	0.30	0.41	1.19	110	1
Centralized-3	7	1	2.5	0.04	11527	1.15	9106	1.82	1.00	2.88	442	7
Centralized-4	7	1	2.5	0.04	11527	1.15	9106	1.82	1.00	2.88	442	7
Centralized-5	1	1	2.9	0.04	4025	0.33	1478	0.30	0.41	0.96	110	1

Notes:
T = Treatment
D = Disposal
GPD = Gallons per Day
MW = Megawatts Electric
FTE = Full Time Equivalent
(1) Based on 1990 Site Employment.
** Ten sites use existing facilities for Volume Reduction.

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Table II-14.2-13. RFETS—LLW—Cost

LLW Alternatives	Number of Sites		Total Cost (Millions) (1)	Cost by Life-Cycle Component (1)				Cost by Functional Area (1)		
	T	D		Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Treatment (Millions)	Storage (Millions)	Disposal (Millions)
No Action	10**	6	248	10	32	194	12	248	0	0
Decentralized		16	705	61	96	452	96	190	0	515
Regionalized-1		12	705	61	96	452	96	190	0	517
Regionalized-2	11	12	1044	100	260	588	96	690	0	354
Regionalized-3		6	228	18	54	141	15	228	0	0
Regionalized-4	7	6	690	67	225	361	37	690	0	0
Regionalized-5	4	6	228	18	54	141	15	228	0	0
Regionalized-6		2	228	18	54	141	15	228	0	0
Regionalized-7		2	228	18	54	141	15	228	0	0
Centralized-1		1	228	18	54	141	15	228	0	0
Centralized-2		1	228	18	54	141	15	228	0	0
Centralized-3	7	1	690	67	225	361	37	690	0	0
Centralized-4	7	1	690	67	225	361	37	690	0	0
Centralized-5	1	1	228	18	54	141	15	228	0	0

Notes:
** Ten sites use existing facilities for Volume Reduction
T = Treatment
D = Disposal
The Life Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum may not reflect the true total cost.
(1) In current 1994 Dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

14.3 RFETS TRUW

Twelve tables immediately following portray the impacts of TRUW at RFETS. These tables are presented as follows:

Impact Category

No.	Description	Table No.	Page No.
1.	RFETS—TRUW—Treatment: Estimated Number of Fatalities	II-14.3-1	14-32
2.	RFETS—TRUW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects	II-14.3-2	14-33
4.	RFETS—TRUW—Treatment: MEI Probability of Cancer Fatality	II-14.3-3	14-34
5.	RFETS—TRUW—Treatment: MEI Probability of Cancer Incidences and Genetic Effects	II-14.3-4	14-35
6.	RFETS—TRUW—Treatment: Noncancer Health Risk From Chemical Exposure	II-14.3-5	14-36
7.	RFETS—TRUW—Emissions in Tons per Year of Criteria Air Pollutants	II-14.3-6	14-37
8.	RFETS—TRUW—Percent of Standard/Guideline for Criteria Air Pollutants	II-14.3-7	14-38
9.	RFETS—TRUW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-14.3-8	14-39
10.	RFETS—TRUW—Impacts on Water Resources Due to Increased Water Use	II-14.3-9	14-40
12.	RFETS—TRUW—Socioeconomic Impacts for Treatment	II-14.3-10	14-41
13.	RFETS—TRUW—Infrastructure Impacts for Treatment	II-14.3-11	14-42
14.	RFETS—TRUW—Cost	II-14.3-12	14-43

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Table II-14.3-1. RFETS—TRUW—Treatment: Estimated Number of Fatalities

TRUW Alternatives	Treatment						
	Number of Sites		Treat STD	WM Worker		Offsite Population Radiation Exposure	Noninvolved Workers Radiation Exposure
	CH Treat	RH Treat		Radiation Exposure	Physical Hazards		
No Action **	16	5	WIPP WAC	8.2E-05	7.3E-02	3.0E-06	1.5E-07
Decentralized ***	16	5	WIPP WAC	7.7E-03	2.1E-01	9.3E-06	4.7E-07
Regionalized-1	5	2	Reduce Gas	7.7E-03	3.3E-01	1.5E-05	7.6E-07
Regionalized-2	5	2	LDR	7.3E-03	5.6E-01	1.1E-01	5.6E-03
Regionalized-3	3	2	LDR	3.0E-02	1.3E-01	1.2E-05	6.1E-07
Centralized	WIPP	2	LDR	3.0E-02	1.3E-01	6.1E-01	6.1E-07

Notes:
** For No Action Alternative, storage is indefinite; no disposal at WIPP is assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at 16 sites, then transfered to interim storage at 10 sites, then to WIPP.

Table II-14.3-2. RFETS—TRUW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

TRUW Alternatives	Number of Sites		Treat STD	Offsite Population				Noninvolved Workers				WM Workers			
	CH Treat	RH Treat		Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects
No Action**	16	5	WIPP WAC	6.0E-03	1.0E-05	1.0E-10	6.0E-07	3.1E-04	5.2E-07	2.1E-11	3.1E-08	2.1E-01	2.9E-04	4.0E-09	1.2E-05
Decentralized***	16	5	WIPP WAC	1.9E-02	3.1E-05	4.8E-10	1.9E-06	9.4E-04	1.6E-06	9.6E-11	9.4E-08	1.9E+01	2.7E-02	6.8E-09	1.2E-03
Regionalized-1	5	2	Reduce Gas	3.0E-02	5.1E-05	6.3E-10	3.0E-06	1.5E-03	2.6E-06	1.3E-10	1.5E-07	1.9E+01	2.7E-02	2.1E-08	1.2E-03
Regionalized-2	5	2	LDR	2.2E+02	3.7E-01	8.4E-10	2.2E-02	1.1E+01	1.9E-02	1.7E-10	1.1E-03	1.8E+01	2.5E-02	6.2E-08	1.1E-03
Regionalized-3	3	2	LDR	2.4E-02	4.1E-05	1.1E-09	2.4E-06	1.2E-03	2.1E-06	2.3E-10	1.2E-07	7.4E+01	1.0E-01	2.6E-08	4.4E-03
Centralized	WIPP	2	LDR	2.4E-02	4.1E-05	1.1E-09	2.4E-06	1.2E-03	2.1E-06	2.3E-10	1.2E-07	7.4E+01	1.0E-01	2.6E-08	4.4E-03

Notes:
** For No Action Alternative, storage is indefinite; no disposal at WIPP is assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
T = Treatment
D = Disposal

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Table II-14.3-3. RFETS—TRUW—Treatment: MEI Probability of Cancer Fatality

TRUW Alternatives	Number of Sites		Treat STD	Treatment	
	CH Treat	RH Treat		Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability
No Action**	16	5	WIPP WAC	4.1E-11	9.2E-11
Decentralized***	16	5	WIPP WAC	1.3E-10	2.8E-10
Regionalized-1	5	2	Reduce Gas	2.0E-10	4.6E-10
Regionalized-2	5	2	LDR	1.5E-06	3.3E-06
Regionalized-3	3	2	LDR	1.6E-10	3.7E-10
Centralized	WIPP	2	LDR	1.6E-10	3.7E-10

Notes:
MEI = Maximally Exposed Individual
** For No Action Alternative, storage is indefinite; no disposal of WIPP is assumed, for all other alternatives disposal at WIPP is assumed.
***In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then transferred to interim storage at 10 sites, then to WIPP.

Table II-14.3–4. RFETS—TRUW—Treatment: MEI Probability of Cancer Incidences and Genetic Effects

TRUW Alternatives	Number of Sites		Treat STD	Treatment							
				Offsite MEI				Noninvolved Worker MEI			
	CH Treat	RH Treat		Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability
No Action **	16	5	WIPP WAC	8.2E-08	1.4E-10	0.0E+00	8.2E-12	1.8E-07	3.1E-10	1.1E-14	1.8E-11
Decentralized ***	16	5	WIPP WAC	2.5E-07	4.3E-10	0.0E+00	2.5E-11	5.7E-07	9.6E-10	4.9E-14	5.7E-11
Regionalized-1	5	2	Reduce Gas	4.0E-07	6.9E-10	0.0E+00	4.0E-11	9.1E-07	1.6E-09	6.5E-14	9.1E-11
Regionalized-2	5	2	LDR	3.0E-03	5.0E-06	0.0E+00	3.0E-07	6.7E-03	1.1E-05	8.5E-14	6.7E-07
Regionalized-3	3	2	LDR	3.3E-07	5.6E-10	9.0E-15	3.3E-11	7.4E-07	1.3E-09	1.2E-13	7.4E-11
Centralized	WIPP	2	LDR	3.3E-07	5.6E-10	9.0E-15	3.3E-11	7.4E-07	1.3E-09	1.2E-13	7.4E-11

Notes:
** For No Action Alternative, storage is indefinite; no disposal at WIPP is assumed for all other alternatives, disposal of WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites then to WIPP.
MEI = Maximally Exposed Individual

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Table II-14.3-5. RFETS—TRUW—Treatment: Noncancer Health Risk From Chemical Exposure

TRUW Alternatives	Number of Sites		Treat STD	Treatment		
	CH Treat	RH Treat		Offsite MEI Hazard Index	Noninvolved Worker MEI Hazard Index	WM Worker Exposure Index
No Action**	16	5	WIPP WAC	2.1E-11	2.7E-10	5.3E-07
Decentralized***	16	5	WIPP WAC	1.1E-10	1.4E-09	1.2E-06
Regionalized-1	5	2	Reduce Gas	2.0E-10	2.5E-09	1.2E-06
Regionalized-2	5	2	LDR	1.2E-09	1.5E-08	2.6E-05
Regionalized-3	3	2	LDR	1.5E-10	1.9E-09	2.3E-06
Centralized	WIPP	2	LDR	1.5E-10	1.9E-09	2.3E-06

Notes:
MEI = Maximally Exposed Individual
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
Hazard Index = Sum of hazard quotient values for all noncarcinogenic chemicals. The Hazard Quotient is the chemical-specific ratio of media exposure concentrations to concentrations exposure concentrations to concentrations believed to have no appreciable adverse effects.
Exposure Index = Ratio of exposure concentration to chemical-specific occupational threshold limits.

Table II-14.3-6. RFETS—TRUW—Emissions in Tons per Year of Criteria Air Pollutants

TRUW Alternatives	Number of Sites CH Treat	Number of Sites RH Treat	Treat STD	Construction Emissions in Tons/Year (1) CO	NO2	Pb	PM10	SO2	VOC	Operations & Maintenance Emissions in Tons/Year (2) CO	NO2	Pb	PM10	SO2	VOC
No Action**	16	5	WIPP WAC	- -	- -	- -	- -	- -	- -	8 (0/8)	2 (0/2)	0	0	0	1 (0/1)
Decentralized***	16	5	WIPP WAC	19 (3/16)	11 (8/3)	0	1 (1/0)	1 (1/0)	3 (1/2)	17 (0/17)	3 (0/3)	0	0	0	2 (0/2)
Regionalized-1	5	2	Reduce Gas	20 (3/17)	11 (8/3)	0	1 (1/0)	1 (1/0)	3 (1/2)	20 (0/20)	4 (0/4)	0	0	0	2 (0/2)
Regionalized-2	5	2	LDR	29 (4/25)	15 (10/5)	0	1 (1/0)	1 (1/0)	4 (/13)	24 (0/24)	5 (0/5)	0	0	0	3 (0/3)
Regionalized-3	3	2	LDR	7 (1/6)	4 (3/1)	0	0	0	1 (0/1)	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)
Centralized	WIPP	2	LDR	7 (1/6)	4 (3/1)	0	0	0	1 (0/1)	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)

Notes:
Emissions <1 ton per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions / worker vehicles emission)
(2) Values = total emissions (stationary-source emissions / mobile-source emission)
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

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Table II-14.3-7. RFETS—TRUW—Percent of Standard/Guideline for Criteria Air Pollutants

TRUW Alternatives	Number of Sites		Treat STD	Construction					
				Percent of Tons/Year General Conformity Rule (1)					
	CH Treat	RH Treat		CO	NO2	Pb	PM10	SO2	VOC
No Action	16	5	WIPP WAC	--	--	--	--	--	--
Decentralized	16	5	WIPP WAC	19 (3/16)	11 (3/3)	--	1 (1/0)	--	6 (2/4)
Regionalized-1	5	2	Reduce Gas	20 (3/17)	11 (8/3)	--	1 (1/0)	--	6 (2/4)
Regionalized-2	5	2	LDR	29 (4/25)	15 (10/5)	--	1 (1/0)	--	8 (2/6)
Regionalized-3	3	2	LDR	7 (1/6)	4 (3/1)	--	0	--	2 (1/1)
Centralized	WIPP	2	LDR	7 (1/6)	4 (3/1)	--	0	--	2 (1/1)

TRUW Alternatives	Number of Sites		Treat STD	Operations & Maintenance											
				Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
	CH Treat	RH Treat		CO (6)	NO2 (5)	Pb (4)	PM10 (6)	SO2 (4)	VOC (5)	CO	NO2	Pb	PM10	SO2	VOC
No Action	16	5	WIPP WAC	8 (0/8)	2 (0/2)	0	0	0	2 (0/2)	--	--	--	--	--	--
Decentralized	16	5	WIPP WAC	17 (0/17)	4 (0/3)	0	0	0	4 (0/4)	--	--	--	--	--	--
Regionalized-1	5	2	Reduce Gas	20 (0/20)	4 (0/4)	0	0	0	5 (0/5)	--	--	--	--	--	--
Regionalized-2	5	2	LDR	24 (0/24)	5 (0/5)	0	0	1 (0/0)	6 (0/6)	0	0	0	0	0	0
Regionalized-3	3	2	LDR	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)	--	--	--	--	--	--
Centralized	WIPP	2	LDR	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)	--	--	--	--	--	--

Notes:
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) GCR only applies to pollutants in nonattainment.
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions for alternatives that do not involve treatment to LDR (incineration) are assumed to be negligible.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.
(5) Nonattainment area for ozone. Pollutant is an ozone precursor, therefore GCR de minimus levels are applied. Values = % of total emissions (% of stationary-source emissions / % of mobile-source emissions).
(6) Nonattainment area for this pollutant, therefore GCR de minimus levels are applied. Values = % of total emissions (% of stationary-source emissions / % of mobile-source emissions).
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.

Table II-14.3-8. RFETS—TRUW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

TRUW Alternatives	Number of Sites		Treat STD	Operations & Maintenance											
	CH Treat	RH Treat		Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action**	16	5	WIPP - WAC	0	--	--	--	0	0	--	--	--	--	--	--
Decentralized***	16	5	WIPP - WAC	0	--	--	--	0	0	--	--	--	--	--	--
Regionalized-1	5	2	Reduce Gas	0	--	--	--	0	0	--	--	--	--	--	--
Regionalized-2	5	2	LDR	3	--	--	--	0	0	--	--	--	--	--	--
Regionalized-3	3	2	LDR	0	--	--	--	0	0	--	--	--	--	--	--
Centralized	WIPP	2	LDR	0	--	--	--	0	0	--	--	--	--	--	--

TRUW Alternatives	Number of Sites		Treat STD	Operations & Maintenance									
	CH Treat	RH Treat		Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action**	16	5	WIPP - WAC	0	0	--	--	--	0	0	--	--	--
Decentralized***	16	5	WIPP - WAC	0	0	--	--	--	0	0	--	--	--
Regionalized-1	5	2	Reduce Gas	0	0	--	--	--	0	0	--	--	--
Regionalized-2	5	2	LDR	0	0	--	--	--	0	0	--	--	--
Regionalized-3	3	2	LDR	0	0	--	--	--	0	0	--	--	--
Centralized	WIPP	2	LDR	0	0	--	--	--	0	0	--	--	--

Notes:

** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.

*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

-- = Emissions of this hazardous or toxic air pollutant are assumed to be negligible.

Percentages <1% are shown as zeros. CH = contact handled. RH = remote handled.

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Table II-14.3-9. RFETS—TRUW—Impacts on Water Resources Due to Increased Water Use

TRUW Alternatives	Number of Sites		Treat STD	Construction			Operations			
	CH Treat	RH Treat		Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action**	16	5	WIPP WAC	- -	- -	- -	2342	0.9	- -	<0.1
Decentralized***	16	5	WIPP WAC	5827	2.1	- -	3229	1.2	- -	<0.1
Regionalized-1	5	2	Reduce Gas	6029	2.2	- -	3985	1.5	- -	<0.1
Regionalized-2	5	2	LDR	8223	3.0	- -	4866	1.8	- -	<0.1
Regionalized-3	3	2	LDR	2173	0.8	- -	708	0.3	- -	<0.1
Centralized	WIPP	2	LDR	2173	0.8	- -	708	0.3	- -	<0.1

Notes:
Water supplied by municipal water from the Denver Water Board. Current water use = 272,000 gallons/day.
Wastewater discharged to Walnut Creek. Average flow rate of Walnut Creek = 142,000,000 gallons/day.
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
- - = Stream Flow is not considered for this site.
<0.1 indiicates that the percentage is less than 0.1%.

Table II-14.3-10. RFETS—TRUW—Socioeconomic Impacts for Treatment

TRUW Alternatives	Number of Sites		Effect of Implementation of Alternatives						
					Jobs		Income		
	CH Treat	RH Treat	Treat STD	Cost (Millions) (1)	Annual Jobs	% Annual Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action**	16	5	WIPP WAC	246	206	0.02	2.3	0.01	0.01
Decentralized***	16	5	WIPP WAC	333	349	0.03	3.9	0.01	0.01
Regionalized-1	5	2	Reduce Gas	372	391	0.03	4.4	0.01	0.02
Regionalized-2	5	2	LDR	470	493	0.04	5.5	0.01	0.02
Regionalized-3	3	2	LDR	112	117	0.01	1.3	0.00	0.00
Centralized	WIPP	2	LDR	112	117	0.01	1.3	0.00	0.00

Notes:
(1) In current 1990 dollars.
(2) Compared to 1990 baseline.
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

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Table II-14.3-11. RFETS—TRUW—Infrastructure Impacts for Treatment

TRUW Alternatives	Number of Sites		Treat STD	Effect of Implementation of Alternatives									
				Land Use		Water		Waste Water		Power		Employment (FTE)	
	CH Treat	RH Treat		Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Peak Construction Employment	% of Current Employment (1)
No Action**	16	5	WIPP WAC	0	0.00	2342	0.23	2342	0.47	0.12	0.35	0	0.00
Decentralized***	16	5	WIPP WAC	2.5	0.04	5827	0.59	3229	0.65	0.52	1.1	173	2.30
Regionalized-1	5	2	Reduce Gas	2.6	0.04	6029	0.61	3985	0.8	0.54	1.57	178	2.40
Regionalized-2	5	2	LDR	2.8	0.05	8223	0.82	4866	0.97	0.87	2.53	266	3.60
Regionalized-3	3	2	LDR	1.2	0.02	2173	0.22	708	0.14	0.45	1.31	62	0.80
Centralized	WIPP	2	LDR	1.2	0.02	2173	0.22	708	0.14	0.45	1.31	62	0.80

Notes:
GPD = Gallons per Day
MW = Megawatts Electric
FTE = Full Time Equivalent
(1) Based on 1990 Site Employment.
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

Table II-14.3-12. RFETS—TRUW—Cost

TRUW Alternatives	Number of Sites		Treat STD (2)	Total Cost (Millions) (1)	Life-Cycle Component				Functional Area		
	CH Treat	RH Treat			Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Retrieval Characterization (Millions)	Treatment (Millions)	Storage (Millions)
No Action**	11	5	WIPP - WAC	278	0	0	257	21	0	262	16
Decentralized***	16	5	WIPP - WAC	377	21	95	227	34	46	311	20
Regionalized-1	5	2	Reduce Gas	421	22	98	257	45	46	346	30
Regionalized-2	5	2	LDR	531	34	145	303	49	46	457	29
Regionalized-3	3	2	LDR	127	8	34	68	16	46	81	0
Centralized	WIPP	2	LDR	127	8	34	68	16	46	81	0

Notes:
** For No Action Alternative, storage is indefinite; no disposal at WIPP to be assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
The Life Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum may not reflect the true total cost.
(1) In Current 1994 Dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.
(2) Treatment standard (STD) applied: treat to WIPP Waste Acceptance Criteria (WIPP WAC), treat for reduced gas generation (Reduce Gas), treat to Land Disposal Restrictions (LDR).

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15.0 SNL-NM

SNL-NM currently is custodian of significant volumes of LLMW, LLW, and TRUW. Each of the waste types is treated independently in the following sections.

15.1 SNL-NM LLMW

Fifteen tables immediately following portray the impacts of LLMW at SNL-NM. These tables are presented as follows:

Impact Category

No.	Description	Table No.	Page No.
1.	SNL-NM—LLMW—Treatment and Disposal: Estimated Number of Fatalities	II-15.1-1	15-2
2.	SNL-NM—LLMW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects	II-15.1-2	15-3
3.	SNL-NM—LLMW—Disposal: Estimated Number of Cancer Incidences	II-15.1-3	15-4
4.	SNL-NM—LLMW—Treatment and Disposal: MEI Probability of Cancer Fatality	II-15.1-4	15-5
5.	SNL-NM—LLMW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects	II-15.1-5	15-6
6.	SNL-NM—LLMW—Treatment and Disposal: Noncancer Health Risk from Chemical Exposure	II-15.1-6	15-7
7.	SNL-NM—LLMW—Emissions in Tons per Year of Criteria Air Pollutants	II-15.1-7	15-8
8.	SNL-NM—LLMW—Percent of Standard/Guideline for Criteria Air Pollutants	II-15.1-8	15-9
9.	SNL-NM—LLMW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-15.1-9	15-10
10.	SNL-NM—LLMW—Impacts on Water Resources Due to Increased Water Use	II-15.1-10	15-11
11.	SNL-NM—LLMW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal (Contact-Handled)	II-15.1-11	15-12
12.	SNL-NM—LLMW—Percent of Drinking Water Standards from Hazardous Constituents in Groundwater from Disposal (Contact-Handled)	II-15.1-12	15-13
13.	SNL-NM—LLMW—Socioeconomics Impacts for Treatment and Disposal	II-15.1-13	15-14
14.	SNL-NM—LLMW—Infrastructure Impacts for Treatment and Disposal	II-15.1-14	15-15
15.	SNL-NM—LLMW—Cost	II-15.1-15	15-16

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Table II-15.1-1. SNL-NM—LLMW—Treatment and Disposal: Estimated Number of Fatalities

LLMW Alternatives	Number of Sites		Treatment				Disposal	
			WM Worker		Offsite Population	Noninvolved Workers	WM Worker	
	T	D	Radiation Exposure	Physical Hazards	Radiation Exposure	Radiation Exposure	Radiation Exposure	Physical Hazards
No Action	3	-	5.2E-05	2.4E-03	7.7E-05	1.5E-06	- -	- -
Decentralized	37	16	3.3E-04	5.1E-03	1.4E-04	7.8E-07	3.4E-05	7.4E-04
Regionalized-1	11	12	1.7E-05	1.2E-03	1.8E-08	3.5E-10	- -	- -
Regionalized-2	7	6	1.7E-05	1.2E-03	1.8E-08	3.5E-10	- -	- -
Regionalized-3	7	1	1.7E-05	1.2E-03	1.8E-08	3.5E-10	- -	- -
Regionalized-4	4	6	1.7E-05	1.2E-03	1.8E-08	3.5E-10	- -	- -
Centralized	1	1	1.7E-05	1.2E-03	1.8E-08	3.5E-10	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this Alternative.

Table II-15.1-2. SNL-NM—LLMW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

LLMW Alternatives	Number of Sites		Offsite Population				Noninvolved Workers				WM Worker			
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects
No Action	3	-	1.5E-01	2.6E-04	1.5E-06	1.5E-05	3.0E-03	5.1E-06	1.6E-07	3.0E-07	1.3E-01	1.8E-04	6.8E-10	7.7E-06
Decentralized	37	16	2.8E-01	4.7E-04	2.1E-08	2.8E-05	1.6E-03	2.7E-06	2.4E-09	1.6E-07	8.2E-01	1.2E-03	1.7E-08	4.9E-05
Regionalized-1	11	12	3.6E-05	6.1E-08	5.4E-10	3.6E-09	6.9E-07	1.2E-09	6.0E-11	6.9E-11	4.3E-02	6.1E-05	3.4E-10	2.6E-06
Regionalized-2	7	6	3.6E-05	6.1E-08	5.4E-10	3.6E-09	6.9E-07	1.2E-09	6.0E-11	6.9E-11	4.3E-02	6.1E-05	3.4E-10	2.6E-06
Regionalized-3	7	1	3.6E-05	6.1E-08	5.4E-10	3.6E-09	6.9E-07	1.2E-09	6.0E-11	6.9E-11	4.3E-02	6.1E-05	3.4E-10	2.6E-06
Regionalized-4	4	6	3.6E-05	6.1E-08	5.4E-10	3.6E-09	6.9E-07	1.2E-09	6.0E-11	6.9E-11	4.3E-02	6.1E-05	3.4E-10	2.6E-06
Centralized	1	1	3.6E-05	6.1E-08	5.4E-10	3.6E-09	6.9E-07	1.2E-09	6.0E-11	6.9E-11	4.3E-02	6.1E-05	3.4E-10	2.6E-06

Notes:
T = Treatment
D = Disposal

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Table II-15.1-3. SNL-NM—LLMW—Disposal: Estimated Number of Cancer Incidences

LLMW Alternatives	Number of Sites		WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	3	-	- -	- -	- -
Decentralized	37	16	8.6E-02	1.2E-04	5.2E-06
Regionalized-1	11	12	- -	- -	- -
Regionalized-2	7	6	- -	- -	- -
Regionalized-3	7	1	- -	- -	- -
Regionalized-4	4	6	- -	- -	- -
Centralized	1	1	- -	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this Alternative.

Table II-15.1–4. SNL-NM—LLMW—Treatment and Disposal: MEI Probability of Cancer Fatality

LLMW Alternatives	Number of Sites		Treatment		Disposal
	T	D	Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability	Hypothetical Farm Family Most Exposed Lifetime MEI Cancer Fatality Probability
No Action	3	-	3.0E-09	6.1E-10	- -
Decentralized	37	16	5.4E-09	3.2E-10	4.5E-05
Regionalized-1	11	12	7.1E-13	1.4E-13	- -
Regionalized-2	7	6	7.1E-13	1.4E-13	- -
Regionalized-3	7	1	7.1E-13	1.4E-13	- -
Regionalized-4	4	6	7.1E-13	1.4E-13	- -
Centralized	1	1	7.1E-13	1.4E-13	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered under the Alternative

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Table II-15.1–5. SNL-NM—LLMW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects

LLMW Alternatives	Number of Sites		Treatment								Disposal			
			Offsite Population MEI				Noninvolved Worker MEI				Most Exposed Farm Family Lifetime MEI			
	T	D	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability
No Action	3	-	6.1E-06	1.0E-08	6.2E-11	6.1E-10	1.2E-06	2.1E-09	6.2E-11	1.2E-10	- -	- -	- -	- -
Decentralized	37	16	1.1E-05	1.9E-08	9.1E-13	1.1E-09	6.4E-07	1.1E-09	9.1E-13	6.4E-11	9.0E-02	1.5E-04	1.3E-05	9.0E-06
Regionalized-1	11	12	1.4E-09	2.4E-12	2.3E-14	1.4E-13	2.9E-10	4.9E-13	2.3E-14	2.9E-14	- -	- -	- -	- -
Regionalized-2	7	6	1.4E-09	2.4E-12	2.3E-14	1.4E-13	2.9E-10	4.9E-13	2.3E-14	2.9E-14	- -	- -	- -	- -
Regionalized-3	7	1	1.4E-09	2.4E-12	2.3E-14	1.4E-13	2.9E-10	4.9E-13	2.3E-14	2.9E-14	- -	- -	- -	- -
Regionalized-4	4	6	1.4E-09	2.4E-12	2.3E-14	1.4E-13	2.9E-10	4.9E-13	2.3E-14	2.9E-14	- -	- -	- -	- -
Centralized	1	1	1.4E-09	2.4E-12	2.3E-14	1.4E-13	2.9E-10	4.9E-13	2.3E-14	2.9E-14	- -	- -	- -	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered for this alternative.

Table II-15.1–6. SNL-NM—LLMW—Treatment and Disposal: Noncancer Health Risk from Chemical Exposure

LLMW Alternatives	Number of Sites		Treatment			Disposal
	T	D	Offsite MEI Hazard Index	Noninvolved Worker MEI Hazard Index	WM Worker Exposure Index	Hypothetical Farm Family Most Exposed Lifetime Hazard Index
No Action	3	-	7.9E-08	7.9E-08	4.9E-08	- -
Decentralized	37	16	3.3E-09	3.3E-09	2.8E-06	2.3E-02
Regionalized-1	11	12	3.4E-11	3.4E-11	4.9E-08	- -
Regionalized-2	7	6	3.4E-11	3.4E-11	4.9E-08	- -
Regionalized-3	7	1	3.4E-11	3.4E-11	4.9E-08	- -
Regionalized-4	4	6	3.4E-11	3.4E-11	4.9E-08	- -
Centralized	1	1	3.4E-11	3.4E-11	4.9E-08	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this alternative.
MEI = Maximally Exposed Individual
Hazard Index = Sum of hazard quotient values for all noncarcinogenic chemicals. The hazard quotient is the chemical-specific ratio of media exposure concentrations to concentrations believed to have no appreciable adverse effects.
Exposure Index = Ratio of Exposure concentration to chemical-specific occupational threshold limits.

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Table II-15.1-7. SNL-NM—LLMW—Emissions in Tons per Year of Criteria Air Pollutants

LLMW Alternatives	Number of Sites		Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	3 (0/3)	1 (0/1)	0	0	0	0	1 (0/1)	0	0	0	0	0
Decentralized	37	16	8 (0/8)	3 (1/2)	0	0	0	1 (0/1)	2 (0/2)	0	0	0	0	0
Regionalized-1	11	12	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-2	7	6	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-3	7	1	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-4	4	6	0	0	0	0	0	0	0	0	0	0	0	0
Centralized	1	1	0	0	0	0	0	0	0	0	0	0	0	0

Notes:
T = Treatment
D = Disposal
Emissions <1 tons per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions / worker vehicles emission).
(2) Values = total emissions (stationary-source emissions / mobile-source emission).

Table II-15.1-8. SNL-NM—LLMW—Percent of Standard/Guideline for Criteria Air Pollutants

LLMW Alternatives	Number of Sites		Construction					
			Percent of Tons/Year General Conformity Rule (1)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	3 (0/3)	--	--	--	--	--
Decentralized	37	16	9 (0/9)	--	--	--	--	--
Regionalized-1	11	12	0	--	--	--	--	--
Regionalized-2	7	6	0	--	--	--	--	--
Regionalized-3	7	1	0	--	--	--	--	--
Regionalized-4	4	6	0	--	--	--	--	--
Centralized	1	1	0	--	--	--	--	--

LLMW Alternatives	Number of Sites		Operations & Maintenance											
			Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
	T	D	CO (5)	NO2 (4)	Pb (4)	PM10 (4)	SO2 (4)	VOC (4)	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	1 (0/1)	0	0	0	0	0	--	--	--	--	--	--
Decentralized	37	16	2 (0/2)	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1	11	12	0	0	0	0	0	0	--	--	--	--	--	--
Regionalized-2	7	6	0	0	0	0	0	0	--	--	--	--	--	--
Regionalized-3	7	1	0	0	0	0	0	0	--	--	--	--	--	--
Regionalized-4	4	6	0	0	0	0	0	0	--	--	--	--	--	--
Centralized	1	1	0	0	0	0	0	0	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) GCR de minimus levels are applied, since PSD regulations are not applicable to construction activities. Values = % of total emissions (% of equipment emissions / % of worker vehicles emission)
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions are assumed to be negligible for all but the Decentralized Alternative.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.
(5) Nonattainment area for this pollutant, therefore GCR de minimus levels are applied. Values = % of total emissions (% of stationary-source emissions / % of mobile-source emissions)

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Table II-15.1-9. SNL-NM—LLMW—Percent of Standards/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

LLMW Alternatives	Number of Sites		Operations & Maintenance											
	T	D	Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action	3	-	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Decentralized	37	16	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Regionalized-	11	12	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Regionalized-	7	6	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Regionalized-	7	1	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Regionalized-	4	6	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Centralized	1	1	0	0	0	- -	- -	0	- -	- -	0	0	0	0

LLMW Alternatives	Number of Sites		Operations & Maintenance									
	T	D	Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action	3	-	- -	0	0	0	- -	0	0	0	- -	- -
Decentralized	37	16	- -	0	0	0	- -	0	0	0	- -	- -
Regionalized-	11	12	- -	0	0	0	- -	0	0	0	- -	- -
Regionalized-	7	6	- -	0	0	0	- -	0	0	0	- -	- -
Regionalized-	7	1	- -	0	0	0	- -	0	0	0	- -	- -
Regionalized-	4	6	- -	0	0	0	- -	0	0	0	- -	- -
Centralized	1	1	- -	0	0	0	- -	0	0	0	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Emissions of this hazardous or toxic air pollutant are assumed to be negligible.
Percentages <1% are shown as zeros.

Table II-15.1-10. SNL-NM—LLMW—Impacts on Water Resources Due to Increased Water Use

LLMW Alternatives	Number of Sites		Construction			Operations			
	T	D	Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action	3	-	- -	- -	- -	18	<0.1	- -	- -
Decentralized	37	16	2079	0.2	- -	289	<0.1	- -	- -
Regionalized-1	11	12	- -	- -	- -	18	<0.1	- -	- -
Regionalized-2	7	6	- -	- -	- -	18	<0.1	- -	- -
Regionalized-3	7	1	- -	- -	- -	18	<0.1	- -	- -
Regionalized-4	4	6	- -	- -	- -	18	<0.1	- -	- -
Centralized	1	1	- -	- -	- -	18	<0.1	- -	- -

Notes:
T = Treatment
D = Disposal
Notes: Water supplied by the City of Albuquerque and Kirtland AFB. Current water use = 1,000,000 gallons/day. Wastewater discharged to the City of Albuquerque WWTP.
- - = Construction is not considered for this site except for the Decentralized Alternative, and for operations stream fl water stream flow are not considered for this site.
<0.1 indicates that the percentage is less than 0.1%.

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Table II-15.1-11. SNL-NM—LLMW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal (Contact-Handled)

LLMW Alternatives	Number of Sites T	Number of Sites D	Ac 225	Ac 227	Am 241	Am 242	Am 243	C 14	Cs 135	Cs 137	Cm 242	Cm 244	Cm 245	I 129	Pb 210	Np 237	Ni 59	Ni 63	Pd 107	Pu 238	Pu 239	Pu 240	Pu 241
No Action	3	-	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	900	0
Regionalized-1	11	12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-2	7	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	4	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

LLMW Alternatives	Number of Sites T	Number of Sites D	Po 210	K 40	Pa 231	Ra 223	Ra 226	Sm 151	Se 79	Sr 90	Tc 99	Th 227	Th 228	Th 229	Th 230	Th 232	Sn 126	U 233	U 234	U 235	U 236	U 238	Y 90	Zr 93
No Action	3	-	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0
Regionalized-1	11	12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-2	7	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	4	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
-- = No disposal at this site for this alternative.

Table II-15.1-12. SNL-NM—LLMW—Percent of Drinking Water Standards for Hazardous Constituents in Groundwater from Disposal (Contact-Handled)

LLMW Alternatives	T	D	Acetone	Arsenic	Barium	Benzene	Cadmium	Carbon Tetrachloride	Chromium	Cyanide
No Action	3	-	--	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	0	0	3	0	0
Regionalized-1	11	12	--	--	--	--	--	--	--	--
Regionalized-2	7	6	--	--	--	--	--	--	--	--
Regionalized-3	7	1	--	--	--	--	--	--	--	--
Regionalized-4	4	6	--	--	--	--	--	--	--	--
Centralized	1	1	--	--	--	--	--	--	--	--

LLMW Alternatives	T	D	1,2-dichloro-ethane	Lead	Mercury	Methylene Chloride	Selenium	Silver	1,2,2-trichloro-1,1-trifluoroethane
No Action	3	-	--	--	--	--	--	--	--
Decentralized	37	16	7	0	0	7	0	4	0
Regionalized-1	11	12	--	--	--	--	--	--	--
Regionalized-2	7	6	--	--	--	--	--	--	--
Regionalized-3	7	1	--	--	--	--	--	--	--
Regionalized-4	4	6	--	--	--	--	--	--	--
Centralized	1	1	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
"--" = No disposal at this site for this alternative.

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Table II-15.1-13. SNL-NM—LLMW—Socioeconomics Impacts for Treatment and Disposal

LLMW Alternatives	Number of Sites		Effect of Implementation of Alternatives					
				Jobs		Income		
	T	D	Cost (Millions) (1)	Annual Jobs	% Annual Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action	3	-	28	23	0.01	0.3	0.00	0.00
Decentralized	37	16	65	67	0.02	0.7	0.01	0.07
Regionalized-1	11	12	6	6	0.00	0.1	0.00	0.00
Regionalized-2	7	6	6	6	0.00	0.1	0.00	0.00
Regionalized-3	7	1	6	6	0.00	0.1	0.00	0.00
Regionalized-4	4	6	6	6	0.00	0.1	0.00	0.00
Centralized	1	1	6	6	0.00	0.1	0.00	0.00

Notes:
T = Treatment
D = Disposal
(1) In current 1990 dollars.
(2) Compared to 1990 baseline

Table II-15.1-14. SNL-NM—LLMW—Infrastructure Impacts for Treatment and Disposal

LLMW Alternatives	Number of Sites		Effect of Implementation of Alternatives									
			Land Use		Water		Waste Water		Power		Employment FTE	
	T	D	Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	% Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Peak Construction Employment	% of Current Employment
No Action	3	-	0.0	0.00	18	0.00	18	0.00	0.01	0.01	7	0.1
Decentralized	37	16	1.7	0.83	2079	0.05	289	0.05	0.15	0.31	66	1
Regionalized-1	11	12	0.0	0.00	18	0.00	18	0.00	0.01	0.01	0	0
Regionalized-2	7	6	0.0	0.00	18	0.00	18	0.00	0.01	0.01	0	0
Regionalized-3	7	1	0.0	0.00	18	0.00	18	0.00	0.01	0.01	0	0
Regionalized-4	4	6	0.0	0.00	18	0.00	18	0.00	0.01	0.01	0	0
Centralized	1	1	0.0	0.00	18	0.00	18	0.00	0.01	0.01	0	0

Notes:
T = Treatment
D = Disposal
GPD = Gallons per Day
MW = Megawatts
(1) Based on 1991 Site Employment

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Table II-15.1-15. SNL-NM—LLMW—Cost

LLMW Alternatives	Number of Sites		Total Cost (Millions) (1)	Cost by Life-Cycle Component (1)				Cost by Functional Area (1)		
	T	D		Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Treatment (Millions)	Storage (Millions)	Disposal (Millions)
No Action	3	-	32	4	8	9	12	19	12	0
Decentralized	37	16	73	14	28	28	3	73	0	0 (2)
Regionalized-1	11	12	6	0	0	2	5	6	0	0
Regionalized-2	7	6	6	0	0	2	5	6	0	0
Regionalized-3	7	1	6	0	0	2	5	6	0	0
Regionalized-4	4	6	6	0	0	2	5	6	0	0
Centralized	1	1	6	0	0	2	5	6	0	0

Notes:
T = Treatment
D = Disposal
The Life-Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum of these may not reflect the true total cost.
(1) In current 1994 dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

15.2 SNL-NM LLW

Thirteen tables immediately following portray the impacts of LLW at SNL-NM. These tables are presented as follows:

Impact Category

No.	Description	Table No.	Page No.
1.	SNL-NM—LLW—Treatment and Disposal: Estimated Number of Fatalities	II-15.2-1	15-18
2.	SNL-NM—LLW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects	II-15.2-2	15-19
3.	SNL-NM—LLW—Disposal: Estimated Number of Cancer Incidences and Genetic Effects	II-15.2-3	15-20
4.	SNL-NM—LLW—Treatment and Disposal: MEI Probability of Cancer Fatality	II-15.2-4	15-21
5.	SNL-NM—LLW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects	II-15.2-5	15-22
7.	SNL-NM—LLW—Emissions in Tons per Year of Criteria Air Pollutants	II-15.2-6	15-23
8.	SNL-NM—LLW—Percent of Standard/Guideline for Criteria Air Pollutants	II-15.2-7	15-24
9.	SNL-NM—LLW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-15.2-8	15-25
10.	SNL-NM—LLW—Impacts on Water Resources Due to Increased Water Use	II-15.2-9	15-26
11.	SNL-NM—LLW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal	II-15.2-10	15-27
12.	SNL-NM—LLW—Socioeconomic Impacts for Treatment and Disposal	II-15.2-11	15-28
13.	SNL-NM—LLW—Infrastructure Impacts for Treatment and Disposal	II-15.2-12	15-29
14.	SNL-NM—LLW—Cost	II-15.2-13	15-30

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Table II-15.2–1. SNL-NM—LLW—Treatment and Disposal: Estimated Number of Fatalities

LLW Alternatives	Number of Sites		Treatment				Disposal	
			WM Worker		Offsite Population	Noninvolved Workers	WM Worker	
	T	D	Radiation Exposure	Physical Hazards	Radiation Exposure	Radiation Exposure	Radiation Exposure	Physical Hazards
No Action	10**	6	5.1E-04	5.0E-02	1.7E-06	2.9E-08	- -	- -
Decentralized		16	2.2E-02	4.3E-02	1.8E-06	3.0E-08	6.3E-02	3.2E-02
Regionalized-1		12	4.1E-04	5.1E-02	1.8E-06	3.0E-08	- -	- -
Regionalized-2	11	12	4.1E-04	5.1E-02	1.8E-06	3.0E-08	- -	- -
Regionalized-3		6	4.1E-04	5.1E-02	1.8E-06	3.0E-08	- -	- -
Regionalized-4	7	6	4.1E-04	5.1E-02	1.8E-06	3.0E-08	- -	- -
Regionalized-5	4	6	4.1E-04	5.1E-02	1.8E-06	3.0E-08	- -	- -
Regionalized-6		2	4.1E-04	5.1E-02	1.8E-06	3.0E-08	- -	- -
Regionalized-7		2	4.1E-04	5.1E-02	1.8E-06	3.0E-08	- -	- -
Centralized-1		1	4.1E-04	5.1E-02	1.8E-06	3.0E-08	- -	- -
Centralized-2		1	4.1E-04	5.1E-02	1.8E-06	3.0E-08	- -	- -
Centralized-3	7	1	2.2E-02	5.5E-02	1.8E-06	3.0E-08	- -	- -
Centralized-4	7	1	2.2E-02	5.5E-02	1.8E-06	3.0E-08	- -	- -
Centralized-5	1	1	4.1E-04	5.1E-02	1.8E-06	3.0E-08	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered under the alternative
** Ten sites use existing facilities for Volume Reduction

Table II-15.2–2. SNL-NM—LLW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

LLW Alternatives	Number of Sites		Offsite Population			Noninvolved Worker			WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	10**	6	3.4E-03	5.8E-06	3.4E-07	5.8E-05	9.9E-08	5.8E-09	1.3E+00	1.8E-03	7.6E-05
Decentralized		16	3.6E-03	6.2E-06	3.6E-07	6.1E-05	1.0E-07	6.1E-09	5.4E+01	7.6E-02	3.3E-03
Regionalized-1		12	3.6E-03	6.2E-06	3.6E-07	6.1E-05	1.0E-07	6.1E-09	1.0E+00	1.5E-03	6.2E-05
Regionalized-2	11	12	3.6E-03	6.2E-06	3.6E-07	6.1E-05	1.0E-07	6.1E-09	1.0E+00	1.5E-03	6.2E-05
Regionalized-3		6	3.6E-03	6.2E-06	3.6E-07	6.1E-05	1.0E-07	6.1E-09	1.0E+00	1.5E-03	6.2E-05
Regionalized-4	7	6	3.6E-03	6.2E-06	3.6E-07	6.1E-05	1.0E-07	6.1E-09	1.0E+00	1.5E-03	6.2E-05
Regionalized-5	4	6	3.6E-03	6.2E-06	3.6E-07	6.1E-05	1.0E-07	6.1E-09	1.0E+00	1.5E-03	6.2E-05
Regionalized-6		2	3.6E-03	6.2E-06	3.6E-07	6.1E-05	1.0E-07	6.1E-09	1.0E+00	1.5E-03	6.2E-05
Regionalized-7		2	3.6E-03	6.2E-06	3.6E-07	6.1E-05	1.0E-07	6.1E-09	1.0E+00	1.5E-03	6.2E-05
Centralized-1		1	3.6E-03	6.2E-06	3.6E-07	6.1E-05	1.0E-07	6.1E-09	1.0E+00	1.5E-03	6.2E-05
Centralized-2		1	3.6E-03	6.2E-06	3.6E-07	6.1E-05	1.0E-07	6.1E-09	1.0E+00	1.5E-03	6.2E-05
Centralized-3	7	1	3.6E-03	6.2E-06	3.6E-07	6.1E-05	1.0E-07	6.1E-09	5.4E+01	7.6E-02	3.3E-03
Centralized-4	7	1	3.6E-03	6.2E-06	3.6E-07	6.1E-05	1.0E-07	6.1E-09	5.4E+01	7.6E-02	3.3E-03
Centralized-5	1	1	3.6E-03	6.2E-06	3.6E-07	6.1E-05	1.0E-07	6.1E-09	1.0E+00	1.5E-03	6.2E-05

Notes:
T = Treatment
D = Disposal
** Ten sites use existing facilities for Volume Reduction.

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Table II-15.2-3. SNL-NM—LLW—Disposal: Estimated Number of Cancer Incidences and Genetic Effects

LLW Alternatives	Number of Sites		WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	10**	6	- -	- -	- -
Decentralized		16	1.6E+02	2.2E-01	9.4E-03
Regionalized-1		12	- -	- -	- -
Regionalized-2	11	12	- -	- -	- -
Regionalized-3		6	- -	- -	- -
Regionalized-4	7	6	- -	- -	- -
Regionalized-5	4	6	- -	- -	- -
Regionalized-6		2	- -	- -	- -
Regionalized-7		2	- -	- -	- -
Centralized-1		1	- -	- -	- -
Centralized-2		1	- -	- -	- -
Centralized-3	7	1	- -	- -	- -
Centralized-4	7	1	- -	- -	- -
Centralized-5	1	1	- -	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered under the alternative.
** Ten sites use existing facilities for Volume Reduction.

Table II-15.2–4. SNL-NM—LLW—Treatment and Disposal: MEI Probability of Cancer Fatality

LLW Alternatives	Number of Sites		Treatment		Disposal
	T	D	Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability	Hypothetical Farm Family - Most Exposed Lifetime MEI Cancer Fatality Probability
No Action	10**	6	6.8E-11	1.2E-11	- -
Decentralized		16	7.1E-11	1.3E-11	1.6E-02
Regionalized-1		12	7.2E-11	1.3E-11	- -
Regionalized-2	11	12	7.2E-11	1.3E-11	- -
Regionalized-3		6	7.2E-11	1.3E-11	- -
Regionalized-4	7	6	7.2E-11	1.3E-11	- -
Regionalized-5	4	6	7.2E-11	1.3E-11	- -
Regionalized-6		2	7.2E-11	1.3E-11	- -
Regionalized-7		2	7.2E-11	1.3E-11	- -
Centralized-1		1	7.2E-11	1.3E-11	- -
Centralized-2		1	7.2E-11	1.3E-11	- -
Centralized-3	7	1	7.2E-11	1.3E-11	- -
Centralized-4	7	1	7.2E-11	1.3E-11	- -
Centralized-5	1	1	7.2E-11	1.3E-11	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered under the Alternative.
** Ten sites use existing facilities for Volume Reduction.

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Table II-15.2–5. SNL-NM—LLW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects

LLW Alternatives	Number of Sites		Treatment						Disposal		
			Offsite MEI			Noninvolved Worker MEI			Most Exposed Lifetime MEI		
	T	D	Dose (rem)	Radiation Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Radiation Genetic Effects Probability
No Action	10**	6	1.4E-07	2.3E-10	1.4E-11	2.4E-08	4.2E-11	2.4E-12	- -	- -	- -
Decentralized		16	1.4E-07	2.4E-10	1.4E-11	2.5E-08	4.3E-11	2.5E-12	3.2E+01	5.3E-02	3.2E-03
Regionalized-1		12	1.4E-07	2.4E-10	1.4E-11	2.6E-08	4.3E-11	2.6E-12	- -	- -	- -
Regionalized-2	11	12	1.4E-07	2.4E-10	1.4E-11	2.6E-08	4.3E-11	2.6E-12	- -	- -	- -
Regionalized-3		6	1.4E-07	2.4E-10	1.4E-11	2.6E-08	4.3E-11	2.6E-12	- -	- -	- -
Regionalized-4	7	6	1.4E-07	2.4E-10	1.4E-11	2.6E-08	4.3E-11	2.6E-12	- -	- -	- -
Regionalized-5	4	6	1.4E-07	2.4E-10	1.4E-11	2.6E-08	4.3E-11	2.6E-12	- -	- -	- -
Regionalized-6		2	1.4E-07	2.4E-10	1.4E-11	2.6E-08	4.3E-11	2.6E-12	- -	- -	- -
Regionalized-7		2	1.4E-07	2.4E-10	1.4E-11	2.6E-08	4.3E-11	2.6E-12	- -	- -	- -
Centralized-1		1	1.4E-07	2.4E-10	1.4E-11	2.6E-08	4.3E-11	2.6E-12	- -	- -	- -
Centralized-2		1	1.4E-07	2.4E-10	1.4E-11	2.6E-08	4.3E-11	2.6E-12	- -	- -	- -
Centralized-3	7	1	1.4E-07	2.4E-10	1.4E-11	2.6E-08	4.3E-11	2.6E-12	- -	- -	- -
Centralized-4	7	1	1.4E-07	2.4E-10	1.4E-11	2.6E-08	4.3E-11	2.6E-12	- -	- -	- -
Centralized-5	1	1	1.4E-07	2.4E-10	1.4E-11	2.6E-08	4.3E-11	2.6E-12	- -	- -	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered under the alternative.
** Ten sites use existing facilities for Volume Reduction.

Table II-15.2–6. SNL-NM—LLW—Emissions in Tons per Year of Criteria Air Pollutants

LLW Alternatives	Number of Sites		Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action	10**	6	9 (2/7)	5 (4/1)	0	0	0	1 (0/1)	3 (0/3)	1 (0/1)	0	0	0	0
Decentralized		16	10 (1/9)	5 (3/2)	0	0	0	1 (0/1)	13 (0/13)	3 (0/3)	0	0	0	2 (0/2)
Regionalized-1		12	10 (1/9)	4 (2/2)	0	0	0	1 (0/1)	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)
Regionalized-2	11	12	10 (1/9)	4 (2/2)	0	0	0	1 (0/1)	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)
Regionalized-3		6	10 (1/9)	4 (2/2)	0	0	0	1 (0/1)	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)
Regionalized-4	7	6	10 (1/9)	4 (2/2)	0	0	0	1 (0/1)	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)
Regionalized-5	4	6	10 (1/9)	4 (2/2)	0	0	0	1 (0/1)	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)
Regionalized-6		2	10 (1/9)	4 (2/2)	0	0	0	1 (0/1)	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)
Regionalzied-7		2	10 (1/9)	4 (2/2)	0	0	0	1 (0/1)	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)
Centralized-1		1	10 (1/9)	4 (2/2)	0	0	0	1 (0/1)	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)
Centralized-2		1	10 (1/9)	4 (2/2)	0	0	0	1 (0/1)	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)
Centralized-3	7	1	10 (1/9)	4 (2/2)	0	0	0	1 (0/1)	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)
Centralized-4	7	1	10 (1/9)	4 (2/2)	0	0	0	1 (0/1)	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)
Centralized-5	1	1	10 (1/9)	4 (2/2)	0	0	0	1 (0/1)	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)

Notes:
T = Treatment
D = Disposal
Emissions <1 ton per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions/worker vehicles emission)
(2) Values = total emissions (stationary-source emissions/mobile-source emission)
** Ten sites use existing facilities for Volume Reduction.

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Table II-15.2-7. SNL-NM—LLW—Percent of Standard/Guideline for Criteria Air Pollutants

LLW Alternatives	Number of Sites		Construction					
			Percent of Tons/Year General Conformity Rule (1)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC
No Action	10**	6	9 (2/7)	--	--	--	--	--
Decentralized		16	10 (1/9)	--	--	--	--	--
Regionalized-1		12	10 (1/9)	--	--	--	--	--
Regionalized-2	11	12	10 (1/9)	--	--	--	--	--
Regionalized-3		6	10 (1/9)	--	--	--	--	--
Regionalized-4	7	6	10 (1/9)	--	--	--	--	--
Regionalized-5	4	6	10 (1/9)	--	--	--	--	--
Regionalized-6		2	10 (1/9)	--	--	--	--	--
Regionalized-7		2	10 (1/9)	--	--	--	--	--
Centralized-1		1	10 (1/9)	--	--	--	--	--
Centralized-2		1	10 (1/9)	--	--	--	--	--
Centralized-3	7	1	10 (1/9)	--	--	--	--	--
Centralized-4	7	1	10 (1/9)	--	--	--	--	--
Centralized-5	1	1	10 (1/9)	--	--	--	--	--

LLW Alternatives	Number of Sites		Operations & Maintenance											
			Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
	T	D	CO (5)	NO2 (4)	Pb (4)	PM10 (4)	SO2 (4)	VOC (4)	CO	NO2	Pb	PM10	SO2	VOC
No Action	10**	6	3 (0/3)	0	0	0	0	0	--	--	--	--	--	--
Decentralized		16	13 (0/13)	0	0	0	0	0	--	--	--	--	--	--
Regionalized-1		12	5 (0/5)	0	0	0	0	0	--	--	--	--	--	--
Regionalized-2	11	12	5 (0/5)	0	0	0	0	0	--	--	--	--	--	--
Regionalized-3		6	5 (0/5)	0	0	0	0	0	--	--	--	--	--	--
Regionalized-4	7	6	5 (0/5)	0	0	0	0	0	--	--	--	--	--	--
Regionalized-5	4	6	5 (0/5)	0	0	0	0	0	--	--	--	--	--	--
Regionalized-6		2	5 (0/5)	0	0	0	0	0	--	--	--	--	--	--
Regionalized-7		2	5 (0/5)	0	0	0	0	0	--	--	--	--	--	--
Centralized-1		1	5 (0/5)	0	0	0	0	0	--	--	--	--	--	--
Centralized-2		1	5 (0/5)	0	0	0	0	0	--	--	--	--	--	--
Centralized-3	7	1	5 (0/5)	0	0	0	0	0	--	--	--	--	--	--
Centralized-4	7	1	5 (0/5)	0	0	0	0	0	--	--	--	--	--	--
Centralized-5	1	1	5 (0/5)	0	0	0	0	0	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) GCR de minimus levels are applied, since PSD regulations are not applicable to construction activities. Values = % of total emissions (% of equipment emissions / % of worker vehicle emissions)
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions for all alternatives are assumed to be negligible.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.
(5) Nonattainment area for this pollutant, therefore GCR de minimus levels are applied. Values = % of total emissions (% of stationary-source emissions / % of mobile-source emissions).
** Ten sites use existing facilities for Volume Reduction.

Table II-15.2–8. SNL-NM—LLW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

LLW Alternatives	Number of Sites		Operations & Maintenance											
	T	D	Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action	10**	6	0	--	--	--	--	--	--	--	--	--	--	--
Decentralized		16	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-1		12	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-2	11	12	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-3		6	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	7	6	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-5	4	6	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-6		2	0	--	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-1		1	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-4	7	1	0	--	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	0	--	--	--	--	--	--	--	--	--	--	--

LLW Alternatives	Number of Sites		Operations & Maintenance									
	T	D	Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action			--	--	--	--	--	--	--	--	--	--
Decentralized	10**	6	--	--	--	--	--	--	--	--	--	--
Regionalized-1		16	--	--	--	--	--	--	--	--	--	--
Regionalized-2		12	--	--	--	--	--	--	--	--	--	--
Regionalized-3	11	12	--	--	--	--	--	--	--	--	--	--
Regionalized-4		6	--	--	--	--	--	--	--	--	--	--
Regionalized-5	7	6	--	--	--	--	--	--	--	--	--	--
Regionalized-6	4	6	--	--	--	--	--	--	--	--	--	--
Regionalized-7		2	--	--	--	--	--	--	--	--	--	--
Centralized-1		2	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--	--	--	--	--
Centralized-3		1	--	--	--	--	--	--	--	--	--	--
Centralized-4	7	1	--	--	--	--	--	--	--	--	--	--
Centralized-5	7	1	--	--	--	--	--	--	--	--	--	--
Centralized - 5	1	1	--	--	--	--	--	--	--	--	--	--

Notes:
T= Treatment
D = Disposal
- - = Emissions of this hazardous or toxic air pollutant are assumed to be negligible.
Percentages <1% are shown as zeros.

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Table II-15.2-9. SNL-NM—LLW—Impacts on Water Resources Due to Increased Water Use

LLW Alternatives	Number of Sites		Construction			Operations			
	T	D	Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action	10**	6	1077	0.1	- -	622	0.1	- -	- -
Decentralized		16	3675	0.4	- -	1146	0.1	- -	- -
Regionalized-1		12	2499	0.2	- -	627	0.1	- -	- -
Regionalized-2	11	12	2499	0.2	- -	627	0.1	- -	- -
Regionalized-3		6	2499	0.2	- -	627	0.1	- -	- -
Regionalized-4	7	6	2499	0.2	- -	627	0.1	- -	- -
Regionalized-5	4	6	2499	0.2	- -	627	0.1	- -	- -
Regionalized-6		2	2499	0.2	- -	627	0.1	- -	- -
Regionalized-7		2	2499	0.2	- -	627	0.1	- -	- -
Centralized-1		1	2499	0.2	- -	627	0.1	- -	- -
Centralized-2		1	2499	0.2	- -	627	0.1	- -	- -
Centralized-3	7	1	2499	0.2	- -	627	0.1	- -	- -
Centralized-4	7	1	2499	0.2	- -	627	0.1	- -	- -
Centralized-5	1	1	2499	0.2	- -	627	0.1	- -	- -

Notes:
T = Treatment
D = Disposal
Water supplied by the City of Albuquerque and Kirtland AFB. Current water use = 1,000,000 gallons/day.
Wastewater discharged to the City of Albuquerque WWTP.
** Ten sites use existing facilities for Volume Reduction.
- - = Stream Flow is not considered for this site.

Table II-15.2–10. SNL-NM—LLW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal

LLW Alternatives	Number of Sites T	Number of Sites D	Ac 225	Ac 227	Am 241	Am 242	Am 243	C 14	Cs 135	Cs 137	Cm 242	Cm 244	Cm 245	I 129	Pb 210	Np 237	Ni 59	Ni 63	Pd 107	Pu 238	Pu 239	Pu 240	Pu 241
No Action	10**	6	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
Decentralized		16	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
Regionalized-1		12	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
Regionalized-2	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
Regionalized-3		6	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
Regionalized-4	7	6	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
Regionalized-5	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
Regionalized-6		2	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	0	0	0	0	0
Regionalized-7		2	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	0	0	0	0	0
Centralized-1		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-4	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

LLW Alternatives	Number of Sites T	Number of Sites D	Po 210	K 40	Pa 231	Ra 223	Ra 226	Sm 151	Se 79	Sr 90	Tc 99	Th 227	Th 228	Th 229	Th 230	Th 232	Sn 126	U 233	U 234	U 235	U 236	U 238	Y 90	Zr 93
No Action	10**	6	0	0	0	0	0	0	0	0	3	0	0	0	1	0	0	0	5	0	0	900	0	0
Decentralized		16	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	4	0	0	700	0	0
Regionalized-1		12	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	4	0	0	700	0	0
Regionalized-2	11	12	0	0	8	0	0	0	0	0	3	0	0	0	1	0	0	0	5	0	0	900	0	0
Regionalized-3		6	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	4	0	0	700	0	0
Regionalized-4	7	6	0	0	0	0	0	0	0	0	3	0	0	0	1	0	0	0	5	0	0	900	0	0
Regionalized-5	4	6	0	0	0	0	0	0	0	0	3	0	0	0	1	0	0	0	5	0	0	900	0	0
Regionalized-6		2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	500	0	0
Regionalized-7		2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	500	0	0
Centralized-1		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-4	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
** Ten sites use existing facilities for Volume Reduction
- - = Disposal is not considered for this Alternative.

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Table II-15.2-11. SNL-NM—LLW—Socioeconomic Impacts for Treatment and Disposal

LLW Alternatives	Number of Sites		Effect of Implementation of Alternatives					
				Jobs		Income		
	T	D	Cost (Millions) (1)	Jobs	% Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action	10**	6	100	83	0.02	0.9	0.01	0.01
Decentralized		16	215	223	0.06	2.4	0.02	0.03
Regionalized-1		12	96	99	0.03	1.1	0.01	0.01
Regionalized-2	11	12	96	99	0.03	1.1	0.01	0.01
Regionalized-3		6	96	99	0.03	1.1	0.01	0.01
Regionalized-4	7	6	96	99	0.03	1.1	0.01	0.01
Regionalized-5		6	96	99	0.03	1.1	0.01	0.01
Regionalized-6		2	96	99	0.03	1.1	0.01	0.01
Regionalized-7		2	96	99	0.03	1.1	0.01	0.01
Centralized-1		1	96	99	0.03	1.1	0.01	0.01
Centralized-2		1	96	99	0.03	1.1	0.01	0.01
Centralized-3	7	1	96	99	0.03	1.1	0.01	0.01
Centralized-4	7	1	96	99	0.03	1.1	0.01	0.01
Centralized-5	1	1	96	99	0.03	1.1	0.01	0.01

Notes:
T = Treatment
D = Disposal
(1) In constant 1990 dollars.
(2) Compared to 1990 baseline.
** Ten sites use existing facilities for Volume Reduction.

Table II-15.2–12. SNL-NM—LLW—Infrastructure Impacts for Treatment and Disposal

LLW Alternatives	Number of Sites		Effect of Implementation of Alternatives									
			Land Use		Water		Waste Water		Power		Employment (FTE)	
	T	D	Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	% Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Peak Construction Employment	% of Current Employment (1)
No Action	10**	6	0.9	0.44	1077	0.03	622	0.11	0.12	0.24	51	1
Decentralized		16	3.0	0.97	3675	0.09	1146	0.21	0.39	0.77	110	1
Regionalized-1		12	1.9	0.92	2499	0.06	627	0.11	0.24	0.46	69	1
Regionalized-2	11	12	1.9	0.92	2499	0.06	627	0.11	0.24	0.46	69	1
Regionalized-3		6	1.9	0.92	2499	0.06	627	0.11	0.24	0.46	69	1
Regionalized-4	7	6	1.9	0.92	2499	0.06	627	0.11	0.24	0.46	69	1
Regionalized-5	4	6	1.9	0.92	2499	0.06	627	0.11	0.24	0.46	69	1
Regionalized-6		2	1.9	0.92	2499	0.06	627	0.11	0.24	0.46	69	1
Regionalized-7		2	1.9	0.92	2499	0.06	627	0.11	0.24	0.46	69	1
Centralized-1		1	1.9	0.92	2499	0.06	627	0.11	0.24	0.46	69	1
Centralized-2		1	1.9	0.92	2499	0.06	627	0.11	0.24	0.46	69	1
Centralized-3	7	1	1.9	0.92	2499	0.06	627	0.11	0.24	0.46	69	1
Centralized-4	7	1	1.9	0.92	2499	0.06	627	0.11	0.24	0.46	69	1
Centralized-5	1	1	1.9	0.92	2499	0.06	627	0.11	0.24	0.46	69	1

Notes:
T = Treatment
D = Disposal
GPD = Gallons per Day
MW = Megawatts Electric
FTE = Full Time Equivalent
(1) Based on 1991 Site Employment.
** Ten sites use existing facilities for Volume Reduction.

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Table II-15.2–13. SNL-NM—LLW—Cost

LLW Alternatives	Number of Sites		Total Cost (Millions) (1)	Cost by Life-Cycle Component (1)				Cost by Functional Area (1)		
	T	D		Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Treatment (Millions)	Storage (Millions)	Disposal (Millions)
No Action	10**	6	113	8	25	75	4	113	0	0
Decentralized		16	243	22	47	105	69	108	0	135
Regionalized-1		12	108	10	37	52	10	108	0	0
Regionalized-2		12	108	10	37	52	10	108	0	0
Regionalized-3		6	108	10	37	52	10	108	0	0
Regionalized-4		12	108	10	37	52	10	108	0	0
Regionalized-5		12	108	10	37	52	10	108	0	0
Regionalized-6		2	108	10	37	52	10	108	0	0
Regionalized-7		2	108	10	37	52	10	108	0	0
Centralized-1		1	108	10	37	52	10	108	0	0
Centralized-2		1	108	10	37	52	10	108	0	0
Centralized-3		12	108	10	37	52	10	108	0	0
Centralized-4		12	108	10	37	52	10	108	0	0
Centralized-5		12	108	10	37	52	10	108	0	0

Notes:
** Ten sites use existing facilities for Volume Reduction
T = Treatment
D = Disposal
The Life Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum may not reflect the true total cost.
(1) In Current 1994 Dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

16.0 SRS

SRS currently is custodian of significant volumes of LLMW, LLW, and TRUW. Each of the waste types is treated independently in the following sections.

16.1 SRS LLMW

Seventeen tables immediately following portray the impacts of LLMW at SRS. These tables are presented as follows:

Impact Category

No.	Description	Table No.	Page No.
1.	SRS—LLMW—Treatment and Disposal: Estimated Number of Fatalities	II-16.1-1	16-3
2.	SRS—LLMW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects	II-16.1-2	16-4
3.	SRS—LLMW—Disposal: Estimated Number of Cancer Incidences	II-16.1-3	16-5
4.	SRS—LLMW—Treatment and Disposal: MEI Probability of Cancer Fatality	II-16.1-4	16-6
5.	SRS—LLMW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects	II-16.1-5	16-7
6.	SRS—LLMW—Treatment and Disposal: Noncancer Health Risk from Chemical Exposure	II-16.1-6	16-8
7.	SRS—LLMW—Emissions in Tons per Year of Criteria Air Pollutants	II-16.1-7	16-9
8.	SRS—LLMW—Percent of Standard/Guideline for Criteria Air Pollutants	II-16.1-8	16-10
9.	SRS—LLMW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-16.1-9	16-11
10.	SRS—LLMW—Impacts on Water Resources Due to Increased Water Use	II-16.1-10	16-12
11.	SRS—LLMW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal (Contact-Handled)	II-16.1-11	16-13
12.	SRS—LLMW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria for Disposal (Remote-Handled)	II-16-12	10-14
13.	SRS—LLMW—Percent of Drinking Water Standards for Hazardous Constituents in Groundwater from Disposal (Contact-Handled)	II-16-13	10-15
14.	SRS—LLMW—Percent of Drinking Water Standards for Hazardous Constituents in Groundwater from Disposal (Remote-Handled)	II-16.1-14	10-16

15.	SRS—LLMW—Socioeconomics Impacts for Treatment and Disposal	II-16.1-15	16-17
16.	SRS—LLMW—Infrastructure Impacts for Treatment and Disposal	II-16.1-16	16-18
17.	SRS—LLMW—Cost	II-16.1-17	16-19

Table II-16.1-1. SRS—LLMW—Treatment and Disposal: Estimated Number of Fatalities

LLMW Alternatives	Number of Sites		Treatment				Disposal	
			WM Worker		Offsite Population	Noninvolved Workers	WM Worker	
	T	D	Radiation Exposure	Physical Hazards	Radiation Exposure	Radiation Exposure	Radiation Exposure	Physical Hazards
No Action	3	-	2.3E-01	2.3E-01	4.3E-03	2.4E-04	- -	- -
Decentralized	37	16	1.1E-01	3.3E-01	1.7E-03	6.1E-05	3.9E-02	1.0E-01
Regionalized-1	11	12	1.1E-01	3.3E-01	1.8E-03	6.1E-05	3.9E-02	1.0E-01
Regionalized-2	7	6	1.1E-01	3.3E-01	1.8E-03	6.1E-05	3.9E-02	1.0E-01
Regionalized-3	7	1	1.1E-01	3.3E-01	1.8E-03	6.1E-05	- -	- -
Regionalized-4	4	6	1.1E-01	3.3E-01	1.8E-03	6.1E-05	3.9E-02	1.0E-01
Centralized	1	1	3.3E-02	4.9E-02	1.3E-06	6.5E-08	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this Alternative.

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Table II-16.1-2. SRS—LLMW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

LLMW Alternatives	Number of Sites		Offsite Population				Noninvolved Workers				WM Worker			
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects
No Action	3	-	8.5E+00	1.5E-02	1.8E-05	8.5E-04	4.8E-01	8.1E-04	8.8E-06	4.8E-05	5.6E+02	7.9E-01	1.2E-03	3.4E-02
Decentralized	37	16	3.5E+00	5.9E-03	9.8E-07	3.5E-04	1.2E-01	2.1E-04	4.9E-07	1.2E-05	2.6E+02	3.7E-01	7.0E-04	1.6E-02
Regionalized -1	11	12	3.5E+00	6.0E-03	9.8E-07	3.5E-04	1.2E-01	2.1E-04	4.9E-07	1.2E-05	2.7E+02	3.8E-01	7.0E-04	1.6E-02
Regionalized-2	7	6	3.5E+00	6.0E-03	9.8E-07	3.5E-04	1.2E-01	2.1E-04	4.9E-07	1.2E-05	2.7E+02	3.8E-01	7.0E-04	1.6E-02
Regionalized-3	7	1	3.5E+00	6.0E-03	9.4E-07	3.5E-04	1.2E-01	2.1E-04	4.7E-07	1.2E-05	2.7E+02	3.8E-01	7.0E-04	1.6E-02
Regionalized-4	4	6	3.5E+00	6.0E-03	9.8E-07	3.5E-04	1.2E-01	2.1E-04	4.9E-07	1.2E-05	2.7E+02	3.8E-01	7.0E-04	1.6E-02
Centralized	1	1	2.7E-03	4.6E-06	6.1E-08	2.7E-07	1.3E-04	2.2E-07	3.1E-08	1.3E-08	8.2E+01	1.1E-01	3.8E-05	4.9E-03

Notes:
T = Treatment
D = Disposal

Table II-16.1-3. SRS—LLMW—Disposal: Estimated Number of Cancer Incidences

LLMW Alternatives	Number of Sites		WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	3	-	- -	- -	- -
Decentralized	37	16	9.7E+01	1.4E-01	5.8E-03
Regionalized-1	11	12	9.7E+01	1.4E-01	5.8E-03
Regionalized-2	7	6	9.7E+01	1.4E-01	5.8E-03
Regionalized-3	7	1	- -	- -	- -
Regionalized-4	4	6	9.7E+01	1.4E-01	5.8E-03
Centralized	1	1	- -	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this Alternative.

Table II-16.1–4. SRS—LLMW—Treatment and Disposal: MEI Probability of Cancer Fatality

LLMW Alternatives	Number of Sites		Treatment		Disposal
	T	D	Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability	Hypothetical Farm Family Most Exposed Lifetime MEI Cancer Fatality Probability
No Action	3	-	4.0E-08	2.1E-07	- -
Decentralized	37	16	1.7E-08	5.3E-08	2.4E-05
Regionalized-1	11	12	1.7E-08	5.3E-08	2.4E-05
Regionalized-2	7	6	1.7E-08	5.3E-08	2.4E-05
Regionalized-3	7	1	1.7E-08	5.3E-08	- -
Regionalized-4	4	6	1.7E-08	5.3E-08	2.4E-05
Centralized	1	1	1.3E-11	5.7E-11	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered under the Alternative

Table II-16.1-5. SRS—LLMW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects

LLMW Alternatives	Number of Sites		Treatment								Disposal			
			Offsite Population MEI				Noninvolved Worker MEI				Most Exposed Farm Family Lifetime MEI			
	T	D	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability
No Action	3	-	8.1E-05	1.4E-07	2.3E-10	8.1E-09	4.2E-04	7.1E-07	1.0E-08	4.2E-08	--	--	--	--
Decentralized	37	16	3.3E-05	5.6E-08	1.3E-11	3.3E-09	1.1E-04	1.8E-07	5.6E-10	1.1E-08	4.9E-02	8.2E-05	1.0E-01	4.8E-06
Regionalized-1	11	12	3.3E-05	5.7E-08	1.3E-11	3.3E-09	1.1E-04	1.8E-07	5.6E-10	1.1E-08	4.9E-02	8.2E-05	1.0E-01	4.8E-06
Regionalized-2	7	6	3.3E-05	5.7E-08	1.3E-11	3.3E-09	1.1E-04	1.8E-07	5.6E-10	1.1E-08	4.9E-02	8.2E-05	1.0E-01	4.8E-06
Regionalized-3	7	1	3.3E-05	5.7E-08	1.2E-11	3.3E-09	1.1E-04	1.8E-07	5.4E-10	1.1E-08	--	--	--	--
Regionalized-4	4	6	3.3E-05	5.7E-08	1.3E-11	3.3E-09	1.1E-04	1.8E-07	5.6E-10	1.1E-08	4.9E-02	8.2E-05	1.0E-01	4.8E-06
Centralized	1	1	2.5E-08	4.3E-11	7.9E-13	2.5E-12	1.1E-07	1.9E-10	3.5E-11	1.1E-11	--	--	--	--

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
-- = Disposal is not considered for this site.

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Table II-16.1–6. SRS—LLMW—Treatment and Disposal: Noncancer Health Risk from Chemical Exposure

LLMW Alternatives	Number of Sites		Treatment			Disposal
	T	D	Offsite MEI Hazard Index	Noninvolved Worker MEI Hazard Index	WM Worker Exposure Index	Hypothetical Farm Family Most Exposed Lifetime Hazard Index
No Action	3	-	1.5E-07	6.6E-06	5.8E-03	- -
Decentralized	37	16	1.6E-08	6.9E-07	5.8E-03	2.7E+00
Regionalized-1	11	12	1.6E-08	6.9E-07	5.8E-03	2.7E+00
Regionalized-2	7	6	1.6E-08	6.9E-07	5.8E-03	2.7E+00
Regionalized-3	7	1	1.4E-08	6.3E-07	5.8E-03	- -
Regionalized-4	4	6	1.6E-08	6.9E-07	5.8E-03	2.7E+00
Centralized	1	1	1.6E-10	7.0E-09	1.0E-04	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for No Action Alternative for LLMW.
MEI = Maximally Exposed Individual
Hazard Index = Sum of hazard quotient values for all noncarcinogenic chemicals. The hazard quotient is the chemical-specific ratio of media exposure concentrations to concentrations believed to have no appreciable adverse effects.
Exposure Index = Ratio of Exposure concentration to chemical-specific occupational threshold limits.

Table II-16.1-7. SRS—LLMW—Emissions in Tons per Year of Criteria Air Pollutants

LLMW Alternatives	Number of Sites		Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	82 (30/52)	89 (79/10)	0	6 (6/0)	8 (8/0)	14 (8/6)	23 (2/21)	9 (5/4)	0	1 (1/0)	0	2 (0/2)
Decentralized	37	16	123 (19/104)	70 (49/21)	0	4 (4/0)	5 (5/0)	17 (5/12)	60 (1/59)	15 (3/12)	0	2 (0/2)	0	7 (0/7)
Regionalized-1	11	12	128 (19/109)	71 (49/22)	0	4 (4/0)	5 (5/0)	18 (5/13)	62 (1/61)	15 (3/12)	0	2 (0/2)	0	7 (0/7)
Regionalized-2	7	6	128 (19/109)	71 (49/22)	0	4 (4/0)	5 (5/0)	18 (5/13)	62 (1/61)	15 (3/12)	0	2 (0/2)	0	7 (0/7)
Regionalized-3	7	1	99 (4/95)	29 (10/19)	0	1 (1/0)	1 (1/0)	12 (1/11)	47 (0/47)	11 (2/9)	0	1 (1/0)	0	6 (0/6)
Regionalized-4	4	6	128 (19/109)	71 (49/22)	0	4 (4/0)	5 (5/0)	18 (5/13)	62 (1/61)	15 (3/12)	0	2 (0/2)	0	7 (0/7)
Centralized	1	1	39 (1/38)	10 (2/8)	0	0	0	5 (0/5)	11 (0/11)	2 (0/2)	0	0	0	1 (0/1)

Notes:
T = Treatment
D = Disposal
Emissions <1 tons per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions / worker vehicles emission).
(2) Values = total emissions (stationary-source emissions / mobile-source emission).

Table II-16.1-8. SRS—LLMW—Percent of Standard/Guideline for Criteria Air Pollutants

LLMW Alternatives	Number of Sites		Construction					
			Percent of Tons/Year General Conformity Rule (1)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	--	--	--	--	--	--
Decentralized	37	16	--	--	--	--	--	--
Regionalized-1	11	12	--	--	--	--	--	--
Regionalized-2	7	6	--	--	--	--	--	--
Regionalized-3	7	1	--	--	--	--	--	--
Regionalized-4	4	6	--	--	--	--	--	--
Centralized	1	1	--	--	--	--	--	--

LLMW Alternatives	Number of Sites		Operations & Maintenance											
			Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
	T	D	CO (4)	NO2 (4)	Pb (4)	PM10 (4)	SO2 (4)	VOC (4)	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	2	13	0	10	0	1	0	0	0	0	0	0
Decentralized	37	16	1	8	0	10	0	0	0	0	0	0	0	0
Regionalized-1	11	12	1	8	0	10	0	0	0	0	0	0	0	0
Regionalized-2	7	6	1	8	0	10	0	0	0	0	0	0	0	0
Regionalized-3	7	1	0	6	0	9	0	0	0	0	0	0	0	0
Regionalized-4	4	6	1	8	0	10	0	0	0	0	0	0	0	0
Centralized	1	1	0	0	0	0	0	0	0	0	0	0	0	0

Notes:
T = Treatment
D = Disposal
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) SRS is in an attainment area for all criteria pollutants, therefore the GCR doe not apply.
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions for the No Action and minimum treatment (no incineration) alternatives are assumed to be negligible.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.

Table II-16.1-9. SRS—LLMW—Percent of Standards/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

LLMW Alternatives	Number of Sites		Operations & Maintenance											
	T	D	Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action	3	-	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Decentralized	37	16	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Regionalized-1	11	12	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Regionalized-2	7	6	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Regionalized-3	7	1	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Regionalized-4	4	6	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Centralized	1	1	0	0	0	- -	- -	0	- -	- -	0	0	0	0

LLMW Alternatives	Number of Sites		Operations & Maintenance									
	T	D	Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action	3	-	- -	0	0	0	- -	0	0	0	- -	- -
Decentralized	37	16	- -	0	0	0	- -	0	0	0	- -	- -
Regionalized-1	11	12	- -	0	0	0	- -	0	0	0	- -	- -
Regionalized-2	7	6	- -	0	0	0	- -	0	0	0	- -	- -
Regionalized-3	7	1	- -	0	0	0	- -	0	0	0	- -	- -
Regionalized-4	4	6	- -	0	0	0	- -	0	0	0	- -	- -
Centralized	1	1	- -	0	0	0	- -	0	0	0	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Emissions of this hazardous or toxic air pollutant are assumed to be negligible.
Percentages <1% are shown as zeros.

Table II-16.1-10. SRS—LLMW—Impacts on Water Resources Due to Increased Water Use

LLMW Alternatives	Number of Sites		Construction			Operations			
	T	D	Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action	3	-	74593	4.7	- -	7487	0.5	- -	<0.1
Decentralized	37	16	34974	2.2	- -	8956	0.6	- -	<0.1
Regionalized-1	11	12	35688	2.2	- -	8980	0.6	- -	<0.1
Regionalized-2	7	6	35688	2.2	- -	8980	0.6	- -	<0.1
Regionalized-3	7	1	16697	1.0	- -	7577	0.5	- -	<0.1
Regionalized-4	4	6	35717	2.2	- -	8968	0.6	- -	<0.1
Centralized	1	1	2832	0.2	- -	1053	0.1	- -	<0.1

Notes:
T = Treatment
D = Disposal
Notes: Water supplied by groundwater. Current water use = 1,600,000 gallons/day.
Wastewater discharged to the Savannah River. Average flow rate of the Savannah River = 6,463,000,000 gallons/day
- - = Stream Flow is not considered for this site.
<0.1 indicates that the percentage is less than 0.1%.

Table II-16.1-11. SRS—LLMW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal (Contact-Handled)

LLMW Alternatives	Number of Sites T	Number of Sites D	Ac 225	Ac 227	Am 241	Am 242	Am 243	C 14	Cs 135	Cs 137	Cm 242	Cm 244	Cm 245	I 129	Pb 210	Np 237	Ni 59	Ni 63	Pd 107	Pu 238	Pu 239	Pu 240	Pu 241
No Action	3	-	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Decentralized	37	16	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0
Regionalized-1	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0
Regionalized-2	7	6	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0
Regionalized-3	7	1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-4	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0
Centralized	1	1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

LLMW Alternatives	Number of Sites T	Number of Sites D	Po 210	K 40	Pa 231	Ra 223	Ra 226	Sm 151	Se 79	Sr 90	Tc 99	Th 227	Th 228	Th 229	Th 230	Th 232	Sn 126	U 233	U 234	U 235	U 236	U 238	Y 90	Zr 93
No Action	3	-	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Decentralized	37	16	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	4	0	0	600	0	0
Regionalized-1	11	12	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	4	0	0	600	0	0
Regionalized-2	7	6	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	4	0	0	600	0	0
Regionalized-3	7	1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-4	4	6	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	4	0	0	600	0	0
Centralized	1	1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

Notes:
T = Treatment
D = Disposal
- - = No disposal of CH-LLMW at this site for this alternative.

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Table II-16.1-12. SRS—LLMW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) from Disposal (Remote-Handled)

LLMW Alternatives	T	D *	Ac 225	Ac 227	Am 241	Am 242	Am 243	C 14	Cs 135	Cs 137	Cm 242	Cm 244	Cm 245	I 129	Pb 210	Np 237	Ni 59	Ni 63	Pd 107	Pu 238	Pu 239	Pu 240	Pu 241
No Action	3	-	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-2	7	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-3	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-4	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centralized	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

LLMW Alternatives	T	D *	Po 210	K 40	Pa 231	Ra 223	Ra 226	Sm 151	Se 79	Sr 90	Tc 99	Th 227	Th 228	Th 229	Th 230	Th 232	Sn 126	U 233	U 234	U 235	U 236	U 238	Y 90	Zr 93
No Action	3	-	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Decentralized	37	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0
Regionalized-1	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0
Regionalized-2	7	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0
Regionalized-3	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0
Regionalized-4	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0
Centralized	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0

Notes:
T = Treatment
D = Disposal
* = In addition to the CH-LLMW disposal sites indicated below, disposal of RH-LLMW occurs at four sites (Hanford, INEL, ORR and SRS) for all alternatives except No Action.
- - = No disposal at this site for this alternative.

Table II-16.1-13. SRS—LLMW—Percent of Drinking Water Standards for Hazardous Constituents in Groundwater from Disposal (Contact-Handled)

LLMW Alternatives	T	D	Acetone	Arsenic	Barium	Benzene	Cadmium	Carbon Tetrachloride	Chromium	Cyanide
No Action	3	-	--	--	--	--	--	--	--	--
Decentralized	37	16	0	30	0	3000	0	1000	400	0
Regionalized-1	11	12	0	30	0	3000	0	1000	400	0
Regionalized-2	7	6	0	30	0	3000	0	1000	400	0
Regionalized-3	7	1	--	--	--	--	--	--	--	--
Regionalized-4	4	6	0	30	0	3000	0	1000	400	0
Centralized	1	1	--	--	--	--	--	--	--	--

LLMW Alternatives	T	D	1,2-dichloro-ethane	Lead	Mercury	Methylene Chloride	Selenium	Silver	1,2,2-trichloro-1,1-trifluoroethane
No Action	3	-	--	--	--	--	--	--	--
Decentralized	37	16	2000	0	0	5000	300	100	0
Regionalized-1	11	12	2000	0	0	5000	300	100	0
Regionalized-2	7	6	2000	0	0	5000	300	100	0
Regionalized-3	7	1	--	--	--	--	--	--	--
Regionalized-4	4	6	2000	0	0	5000	300	100	0
Centralized	1	1	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
"--" = No disposal at this site for this alternative.

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Table II-16.1-14. SRS—LLMW—Percent of Drinking Water Standards for Hazardous Constituents in Groundwater from Disposal (Remote-Handled)

LLMW Alternatives	T	D *	Acetone	Arsenic	Barium	Benzene	Cadmium	Carbon Tetrachloride	Chromium
No Action	3	-	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	5	0	7	1
Regionalized-1	11	12	0	0	0	5	0	7	1
Regionalized-2	7	6	0	0	0	5	0	7	1
Regionalized-3	7	1	0	0	0	5	0	7	1
Regionalized-4	4	6	0	0	0	5	0	7	1
Centralized	1	1	0	0	0	5	0	7	1

LLMW Alternatives	T	D *	1,2-dichloro-ethane	Lead	Mercury	Methylene Chloride	Selenium	Silver	1,2,2-trichloro-1,1-trifluoroethane
No Action	3	-	--	--	--	--	--	--	--
Decentralized	37	16	10	0	0	30	0	0	0
Regionalized-1	11	12	10	0	0	30	0	0	0
Regionalized-2	7	6	10	0	0	30	0	0	0
Regionalized-3	7	1	10	0	0	30	0	0	0
Regionalized-4	4	6	10	0	0	30	0	0	0
Centralized	1	1	10	0	0	30	0	0	0

Notes:
T = Treatment
D = Disposal
* = In addition to the CH-LLMW disposal sites indicated below, disposal of RH-LLMW occurs at four sites (Hanford, INEL, ORR and SRS) for all alternatives except No Action.
"--" = No disposal at this site for this alternative.

Table II-16.1-15. SRS—LLMW—Socioeconomics Impacts for Treatment and Disposal

LLMW Alternatives	Number of Sites		Effect of Implementation of Alternatives					
				Jobs		Income		
	T	D	Cost (Millions) (1)	Annual Jobs	% Annual Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action	3	-	506	436	0.17	4.7	0.06	0.11
Decentralized	37	16	1058	1139	0.45	12.3	0.17	0.31
Regionalized-1	11	12	1100	1184	0.46	12.8	0.18	0.32
Regionalized-2	7	6	1100	1184	0.46	12.8	0.18	0.32
Regionalized-3	7	1	844	909	0.36	9.8	0.13	0.21
Regionalized-4	4	6	1100	1184	0.46	12.8	0.18	0.32
Centralized	1	1	222	239	0.09	2.6	0.04	0.04

Notes:
T = Treatment
D = Disposal
(1) In current 1990 dollars.
(2) Compared to 1990 baseline

Table II-16.1-16. SRS—LLMW—Infrastructure Impacts for Treatment and Disposal

LLMW Alternatives	Number of Sites		Effect of Implementation of Alternatives									
			Land Use		Water		Waste Water		Power		Employment (FTE)	
	T	D	Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	% Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Peak Construction Employment	% of Current Employment
No Action	3	-	24.9	0.02	74593	1.49	7487	1.00	10.46	5.98	232	1
Decentralized	37	16	22.6	0.02	34974	0.70	8956	1.19	2.51	1.44	727	4
Regionalized-1	11	12	22.6	0.02	35688	0.71	8980	1.20	2.51	1.44	760	4
Regionalized-2	7	6	22.6	0.02	35688	0.71	8980	1.20	2.55	1.46	649	4
Regionalized-3	7	1	12.8	0.01	16697	0.33	7577	1.01	1.41	0.80	760	4
Regionalized-4	4	6	22.6	0.02	35717	0.71	8968	1.20	2.51	1.44	788	5
Centralized	1	1	12.8	0.00	2832	0.06	1053	0.14	1.41	0.81	207	1

Notes:
T = Treatment
D = Disposal
GPD = Gallons per Day
MW = Megawatts
(1) Based on 1991 Site Employment

Table II-16.1-17. SRS—LLMW—Cost

LLMW Alternatives	Number of Sites		Total Cost (Millions) (1)	Cost by Life-Cycle Component (1)				Cost by Functional Area (1)		
	T	D		Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Treatment (Millions)	Storage (Millions)	Disposal (Millions)
No Action	3	-	572	37	111	389	36	339	234	0
Decentralized	37	16	1198	133	331	603	122	908	0	289
Regionalized-1	11	12	1245	142	349	628	125	955	0	289
Regionalized-2	7	6	1245	142	349	628	125	955	0	289
Regionalized-3	7	1	955	116	308	483	46	955	0	0
Regionalized-4	4	6	1245	142	349	628	125	955	0	289
Centralized	1	1	253	37	96	104	14	253	0	0

Notes:
T = Treatment
D = Disposal
The Life-Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum of these may not reflect the true total cost.
(1) In current 1994 dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

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16.2 SRS LLW

Thirteen tables immediately following portray the impacts of LLW at SRS. These tables are presented as follows:

Impact Category

No.	Description	Table No.	Page No.
1.	SRS—LLW—Treatment and Disposal: Estimated Number of Fatalities	II-16.2-1	16-21
2.	SRS—LLW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects	II-16.2-2	16-22
3.	SRS—LLW—Disposal: Estimated Number of Cancer Incidences and Genetic Effects	II-16.2-3	16-23
4.	SRS—LLW—Treatment and Disposal: MEI Probability of Cancer Fatality	II-16.2-4	16-24
5.	SRS—LLW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects	II-16.2-5	16-25
7.	SRS—LLW—Emissions in Tons per Year of Criteria Air Pollutants	II-16.2-6	16-26
8.	SRS—LLW—Percent of Standard/Guideline for Criteria Air Pollutants	II-16.2-7	16-27
9.	SRS—LLW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-16.2-8	16-28
10.	SRS—LLW—Impacts on Water Resources Due to Increased Water Use	II-16.2-9	16-29
11.	SRS—LLW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal	II-16.2-10	16-30
12.	SRS—LLW—Socioeconomic Impacts for Treatment and Disposal	II-16.2-11	16-31
13.	SRS—LLW—Infrastructure Impacts for Treatment and Disposal	II-16.2-12	16-32
14.	SRS—LLW—Cost	II-16.2-13	16-33

Table II-16.2–1. SRS—LLW—Treatment and Disposal: Estimated Number of Fatalities

LLW Alternatives	Number of Sites		Treatment				Disposal	
			WM Worker		Offsite Population	Noninvolved Workers	WM Worker	
	T	D	Radiation Exposure	Physical Hazards	Radiation Exposure	Radiation Exposure	Radiation Exposure	Physical Hazards
No Action	10**	6	3.3E-01	5.2E-01	5.9E-04	3.2E-05	7.3E-01	2.1E+00
Decentralized		16	2.3E-01	4.4E-01	1.9E-05	1.3E-06	5.8E-01	3.5E+00
Regionalized-1		12	2.3E-01	4.4E-01	1.9E-05	1.3E-06	5.8E-01	3.5E+00
Regionalized-2	11	12	2.8E-01	5.6E-01	6.1E-04	3.3E-05	5.7E-01	3.0E+00
Regionalized-3		6	2.3E-01	4.4E-01	1.9E-05	1.3E-06	5.8E-01	3.5E+00
Regionalized-4	7	6	2.8E-01	5.6E-01	6.1E-04	3.3E-05	5.7E-01	3.0E+00
Regionalized-5	4	6	2.8E-01	5.6E-01	6.1E-04	3.3E-05	5.7E-01	3.0E+00
Regionalized-6		2	2.3E-01	4.4E-01	1.9E-05	1.3E-06	6.1E-01	5.8E+00
Regionalized-7		2	2.3E-01	4.4E-01	1.9E-05	1.3E-06	6.1E-01	5.8E+00
Centralized-1		1	2.3E-01	4.4E-01	1.9E-05	1.3E-06	- -	- -
Centralized-2		1	2.3E-01	4.4E-01	1.9E-05	1.3E-06	- -	- -
Centralized-3	7	1	2.8E-01	5.6E-01	6.1E-04	3.3E-05	- -	- -
Centralized-4	7	1	2.8E-01	5.6E-01	6.1E-04	3.3E-05	- -	- -
Centralized-5	1	1	2.3E-01	4.4E-01	1.2E-05	1.1E-06	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered under the alternative
** Ten sites use existing facilities for Volume Reduction

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Table II-16.2-2. SRS—LLW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

LLW Alternatives	Number of Sites		Offsite Population			Noninvolved Worker			WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	10**	6	1.2E+00	2.0E-03	1.2E-04	6.4E-02	1.1E-04	6.4E-06	8.3E+02	1.2E+00	5.0E-02
Decentralized		16	3.7E-02	6.3E-05	3.7E-06	2.6E-03	4.4E-06	2.6E-07	5.7E+02	7.9E-01	3.4E-02
Regionalized-1		12	3.7E-02	6.3E-05	3.7E-06	2.6E-03	4.4E-06	2.6E-07	5.7E+02	7.9E-01	3.4E-02
Regionalized-2	11	12	1.2E+00	2.1E-03	1.2E-04	6.6E-02	1.1E-04	6.6E-06	6.9E+02	9.6E-01	4.1E-02
Regionalized-3		6	3.7E-02	6.3E-05	3.7E-06	2.6E-03	4.4E-06	2.6E-07	5.7E+02	7.9E-01	3.4E-02
Regionalized-4	7	6	1.2E+00	2.1E-03	1.2E-04	6.6E-02	1.1E-04	6.6E-06	6.9E+02	9.6E-01	4.1E-02
Regionalized-5	4	6	1.2E+00	2.1E-03	1.2E-04	6.6E-02	1.1E-04	6.6E-06	6.9E+02	9.6E-01	4.1E-02
Regionalized-6		2	3.7E-02	6.3E-05	3.7E-06	2.6E-03	4.4E-06	2.6E-07	5.7E+02	7.9E-01	3.4E-02
Regionalized-7		2	3.7E-02	6.3E-05	3.7E-06	2.6E-03	4.4E-06	2.6E-07	5.7E+02	7.9E-01	3.4E-02
Centralized-1		1	3.7E-02	6.3E-05	3.7E-06	2.6E-03	4.4E-06	2.6E-07	5.7E+02	8.0E-01	3.4E-02
Centralized-2		1	3.7E-02	6.3E-05	3.7E-06	2.6E-03	4.4E-06	2.6E-07	5.7E+02	8.0E-01	3.4E-02
Centralized-3	7	1	1.2E+00	2.1E-03	1.2E-04	6.7E-02	1.1E-04	6.7E-06	6.9E+02	9.6E-01	4.1E-02
Centralized-4	7	1	1.2E+00	2.1E-03	1.2E-04	6.7E-02	1.1E-04	6.7E-06	6.9E+02	9.6E-01	4.1E-02
Centralized-5	1	1	2.5E-02	4.2E-05	2.5E-06	2.2E-03	3.7E-06	2.2E-06	5.7E+02	7.9E-01	3.4E-02

Notes:
T = Treatment
D = Disposal
** Ten sites use existing facilities for Volume Reduction.

Table II-16.2-3. SRS—LLW—Disposal: Estimated Number of Cancer Incidences and Genetic Effects

LLW Alternatives	Number of Sites		WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	10**	6	1.8E+03	2.5E+00	1.1E-01
Decentralized		16	1.5E+03	2.0E+00	8.7E-02
Regionalized-1		12	1.5E+03	2.0E+00	8.7E-02
Regionalized-2	11	12	1.4E+03	2.0E+00	8.5E-02
Regionalized-3		6	1.5E+03	2.0E+00	8.7E-02
Regionalized-4	7	6	1.4E+03	2.0E+00	8.5E-02
Regionalized-5	4	6	1.4E+03	2.0E+00	8.5E-02
Regionalized-6		2	1.5E+03	2.1E+00	9.1E-02
Regionalized-7		2	1.5E+03	2.1E+00	9.1E-02
Centralized-1		1	- -	- -	- -
Centralized-2		1	- -	- -	- -
Centralized-3	7	1	- -	- -	- -
Centralized-4	7	1	- -	- -	- -
Centralized-5	1	1	- -	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered under the alternative.
** Ten sites use existing facilities for Volume Reduction.

Table II-16.2–4. SRS—LLW—Treatment and Disposal: MEI Probability of Cancer Fatality

LLW Alternatives	Number of Sites		Treatment		Disposal
	T	D	Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability	Hypothetical Farm Family - Most Exposed Lifetime MEI Cancer Fatality Probability
No Action	10**	6	5.6E-09	2.9E-08	3.7E-05
Decentralized		16	1.7E-10	1.1E-09	2.8E-05
Regionalized-1		12	1.7E-10	1.1E-09	3.0E-05
Regionalized-2	11	12	5.7E-09	3.0E-08	3.6E-05
Regionalized-3		6	1.7E-10	1.1E-09	3.0E-05
Regionalized-4	7	6	5.7E-09	3.0E-08	3.6E-05
Regionalized-5	4	6	5.7E-09	3.0E-08	3.6E-05
Regionalized-6		2	1.7E-10	1.1E-09	4.3E-05
Regionalized-7		2	1.7E-10	1.1E-09	4.3E-05
Centralized-1		1	1.8E-10	1.1E-09	- -
Centralized-2		1	1.8E-10	1.1E-09	- -
Centralized-3	7	1	5.7E-09	3.0E-08	- -
Centralized-4	7	1	5.7E-09	3.0E-08	- -
Centralized-5	1	1	1.2E-10	9.5E-10	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered under the Alternative.
** Ten sites use existing facilities for Volume Reduction.

Table II-16.2–5. SRS—LLW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects

LLW Alternatives	Number of Sites		Treatment						Disposal		
			Offsite MEI			Noninvolved Worker MEI			Most Exposed Lifetime MEI		
	T	D	Dose (rem)	Radiation Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Radiation Genetic Effects Probability
No Action	10**	6	1.1E-05	1.9E-08	1.1E-09	5.7E-05	9.7E-08	5.7E-09	7.4E-02	1.3E-04	7.4E-06
Decentralized		16	3.5E-07	5.9E-10	3.5E-11	2.3E-06	3.8E-09	2.3E-10	5.7E-02	9.6E-05	5.7E-06
Regionalized-1		12	3.5E-07	5.9E-10	3.5E-11	2.3E-06	3.8E-09	2.3E-10	6.0E-02	1.0E-04	6.0E-06
Regionalized-2	11	12	1.1E-05	1.9E-08	1.1E-09	5.9E-05	1.0E-07	5.9E-09	7.2E-02	1.2E-04	7.2E-06
Regionalized-3		6	3.5E-07	5.9E-10	3.5E-11	2.3E-06	3.8E-09	2.3E-10	6.0E-02	1.0E-04	6.0E-06
Regionalized-4	7	6	1.1E-05	1.9E-08	1.1E-09	5.9E-05	1.0E-07	5.9E-09	7.2E-02	1.2E-04	7.2E-06
Regionalized-5	4	6	1.1E-05	1.9E-08	1.1E-09	5.9E-05	1.0E-07	5.9E-09	7.2E-02	1.2E-04	7.2E-06
Regionalized-6		2	3.5E-07	5.9E-10	3.5E-11	2.3E-06	3.8E-09	2.3E-10	8.6E-02	1.5E-04	8.6E-06
Regionalized-7		2	3.5E-07	5.9E-10	3.5E-11	2.3E-06	3.8E-09	2.3E-10	8.6E-02	1.5E-04	8.6E-06
Centralized-1		1	3.5E-07	5.9E-10	3.5E-11	2.3E-06	3.9E-09	2.3E-10	- -	- -	- -
Centralized-2		1	3.5E-07	5.9E-10	3.5E-11	2.3E-06	3.9E-09	2.3E-10	- -	- -	- -
Centralized-3	7	1	1.2E-05	2.0E-08	1.2E-09	5.9E-05	1.0E-07	5.9E-09	- -	- -	- -
Centralized-4	7	1	1.2E-05	2.0E-08	1.2E-09	5.9E-05	1.0E-07	5.9E-09	- -	- -	- -
Centralized-5	1	1	2.3E-07	3.9E-10	2.3E-11	1.9E-06	3.2E-09	1.9E-10	- -	- -	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered under the alternative.
** Ten sites use existing facilities for Volume Reduction.

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Table II-16.2-6. SRS—LLW—Emissions in Tons per Year of Criteria Air Pollutants

LLMW Alternatives	Number of Sites		Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action	10**	6	48 (19/29)	56 (50/6)	0	4 (4/0)	5 (5/0)	8 (5/3)	213 (2/211)	46 (4/42)	0	1 (1/0)	0	26 (0/25)
Decentralized		16	83 (23/60)	73 (61/12)	0	5 (5/0)	6 (6/0)	13 (6/7)	197 (1/196)	41 (1/39)	0	0	0	24 (0/24)
Regionalized-1		12	259 (199/60)	529 (517/12)	0	41 (41/0)	49 (49/0)	57 (50/7)	197 (1/196)	41 (1/39)	0	0	0	24 (0/24)
Regionalized-2	11	12	107 (22/85)	75 (58/17)	0	5 (5/0)	6 (6/0)	16 (6/10)	198 (1/197)	41 (2/39)	0	1 (1/0)	0	24 (0/24)
Regionalized-3		6	83 (23/60)	73 (61/12)	0	5 (5/0)	6 (6/0)	13 (6/7)	198 (1/197)	41 (1/39)	0	0	0	24 (0/24)
Regionalized-4	7	6	107 (22/85)	75 (58/17)	0	5 (5/0)	6 (6/0)	16 (6/10)	198 (1/197)	41 (2/39)	0	1 (1/0)	0	24 (0/24)
Regionalized-5	4	6	119 (35/84)	109 (92/17)	0	7 (7/0)	9 (9/0)	19 (9/10)	198 (1/197)	41 (2/39)	0	1 (1/0)	0	24 (0/24)
Regionalized-6		2	96 (37/60)	107 (95/12)	0	8 (8/0)	9 (9/0)	16 (9/7)	324 (1/323)	76 (2/74)	0	1 (0/1)	0	40 (0/39)
Regionalized-7		2	96 (37/60)	107 (95/12)	0	8 (8/0)	9 (9/0)	16 (9/7)	324 (1/323)	76 (2/74)	0	1 (0/1)	0	40 (0/39)
Centralized-1		1	87 (7/80)	35 (19/16)	0	1 (1/0)	2 (2/0)	12 (2/10)	77 (0/76)	21 (1/20)	0	0	0	10 (0/9)
Centralized-2		1	87 (7/80)	35 (19/16)	0	1 (1/0)	2 (2/0)	12 (2/10)	77 (0/76)	21 (1/20)	0	0	0	10 (0/9)
Centralized-3	7	1	94 (9/85)	35 (19/16)	0	2 (2/0)	2 (2/0)	12 (2/10)	91 (0/91)	24 (1/23)	0	1 (1/0)	0	11 (0/11)
Centralized-4	7	1	94 (9/85)	40 (23/17)	0	2 (2/0)	2 (2/0)	12 (2/10)	91 (0/91)	24 (1/23)	0	1 (1/0)	0	11 (0/11)
Centralized-5	1	1	66 (7/59)	35 (19/16)	0	2 (1/0)	2 (2/0)	11 (2/10)	66 (0/66)	19 (1/18)	0	0	0	8 (0/8)

Notes:
T = Treatment
D = Disposal
Emissions <1 ton per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions/worker vehicles emission)
(2) Values = total emissions (stationary-source emissions/mobile-source emission)
** Ten sites use existing facilities for Volume Reduction.

Table II-16.2-7. SRS—LLW—Percent of Standard/Guideline for Criteria Air Pollutants

LLW Alternatives	Number of Sites		Construction					
			Percent of Tons/Year General Conformity Rule (1)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC
No Action	10**	6	--	--	--	--	--	--
Decentralized		16	--	--	--	--	--	--
Regionalized-1		12	--	--	--	--	--	--
Regionalized-2	11	12	--	--	--	--	--	--
Regionalized-3		6	--	--	--	--	--	--
Regionalized-4	7	6	--	--	--	--	--	--
Regionalized-5	4	6	--	--	--	--	--	--
Regionalized-6		2	--	--	--	--	--	--
Regionalized-7		2	--	--	--	--	--	--
Centralized-1		1	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--
Centralized-4	7	1	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--

LLW Alternatives	Number of Sites		Operations & Maintenance											
			Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
	T	D	CO (4)	NO2 (4)	Pb (4)	PM10 (4)	SO2 (4)	VOC (6)	CO	NO2	Pb	PM10	SO2	VOC
No Action	10**	6	2	11	0	6	0	1	0	0	0	0	0	0
Decentralized		16	1	3	0	2	0	0	--	--	--	--	--	--
Regionalized-1		12	1	3	0	2	0	0	--	--	--	--	--	--
Regionalized-2	11	12	1	6	0	5	0	0	0	0	0	0	0	0
Regionalized-3		6	1	3	0	2	0	0	--	--	--	--	--	--
Regionalized-4	7	6	1	6	0	5	0	0	0	0	0	0	0	0
Regionalized-5	4	6	1	6	0	5	0	0	0	0	0	0	0	0
Regionalized-6		2	1	5	0	2	0	0	--	--	--	--	--	--
Regionalized-7		2	1	5	0	2	0	0	--	--	--	--	--	--
Centralized-1		1	0	2	0	1	0	0	--	--	--	--	--	--
Centralized-2		1	0	2	0	1	0	0	--	--	--	--	--	--
Centralized-3	7	1	0	4	0	4	0	0	0	0	0	0	0	0
Centralized-4	7	1	0	4	0	4	0	0	0	0	0	0	0	0
Centralized-5	1	1	0	2	0	1	0	0	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) SRS is in an attainment area for all criteria pollutants, therefore the GCR doe not apply.
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions for the minimum treatment (no incineration) alternatives, and the Centralized - 5 Alternative are assumed to be negligible.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.
** Ten sites use existing facilities for Volume Reduction.

Table II-16.2-8. SRS—LLW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

LLW Alternatives	Number of Sites		Operations & Maintenance											
	T	D	Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action	10**	6	0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Decentralized		16	0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-1		12	0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-2	11	12	0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-3		6	0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-4	7	6	0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-5	4	6	0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-6		2	0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-7		2	0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Centralized-1		1	0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Centralized-2		1	0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Centralized-3	7	1	0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Centralized-4	7	1	0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Centralized-5	1	1	0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

LLW Alternatives	Number of Sites		Operations & Maintenance									
	T	D	Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action	10**	6	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Decentralized		16	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-1		12	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-2	11	12	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-3		6	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-4	7	6	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-5	4	6	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-6		2	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-7		2	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Centralized-1		1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Centralized-2		1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Centralized-3	7	1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Centralized-4	7	1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Centralized-5	1	1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

Notes:
T= Treatment
D = Disposal
- - = Emissions of this hazardous or toxic air pollutant are assumed to be negligible.
Percentages <1% are shown as zeros.
** Ten sites use existing facilities for Volume Reduction.

Table II-16.2–9. SRS—LLW—Impacts on Water Resources Due to Increased Water Use

LLW Alternatives	Number of Sites		Construction			Operations			
	T	D	Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action	10**	6	13690	0.9	- -	21968	1.4	- -	<0.1
Decentralized		16	105325	6.6	- -	25298	1.6	- -	<0.1
Regionalized-1		12	105325	6.6	- -	25298	1.6	- -	<0.1
Regionalized-2	11	12	99729	6.2	- -	25682	1.6	- -	<0.1
Regionalized-3		6	105325	6.6	- -	25298	1.6	- -	<0.1
Regionalized-4	7	6	99729	6.2	- -	25682	1.6	- -	<0.1
Regionalized-5	4	6	99729	6.2	- -	25682	1.6	- -	<0.1
Regionalized-6		2	174220	10.9	- -	40247	2.5	- -	<0.1
Regionalized-7		2	174220	10.9	- -	40247	2.5	- -	<0.1
Centralized-1		1	24652	1.5	- -	7911	0.5	- -	<0.1
Centralized-2		1	24652	1.5	- -	7911	0.5	- -	<0.1
Centralized-3	7	1	27709	1.7	- -	10438	0.7	- -	<0.1
Centralized-4	7	1	27709	1.7	- -	10438	0.7	- -	<0.1
Centralized-5	1	1	24652	1.5	- -	7911	0.5	- -	<0.1

Notes:
T = Treatment
D = Disposal
Water supplied by groundwater. Current water use = 1,600,000 gallons/day.
Wastewater discharged to the Savannah River. Average flow rate of the Savannah River = 6,463,000,000 gallons/day.
** Ten sites use existing facilities for Volume Reduction.
- - = Wastewater discharged to evaporation ponds.
<0.1 indicates that the percentage is less than 0.1%.

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Table II-16.2-10. SRS—LLW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal

LLW Alternatives	Number of Sites T	Number of Sites D	Ac 225	Ac 227	Am 241	Am 242	Am 243	C 14	Cs 135	Cs 137	Cm 242	Cm 244	Cm 245	I 129	Pb 210	Np 237	Ni 59	Ni 63	Pd 107	Pu 238	Pu 239	Pu 240	Pu 241
No Action	10**	6	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
Decentralized		16	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
Regionalized-1		12	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
Regionalized-2	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
Regionalized-3		6	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
Regionalized-4	7	6	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
Regionalized-5	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
Regionalized-6		2	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	0	0	0	0	0
Regionalized-7		2	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	0	0	0	0	0
Centralized-1		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-4	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

LLW Alternatives	Number of Sites T	Number of Sites D	Po 210	K 40	Pa 231	Ra 223	Ra 226	Sm 151	Se 79	Sr 90	Tc 99	Th 227	Th 228	Th 229	Th 230	Th 232	Sn 126	U 233	U 234	U 235	U 236	U 238	Y 90	Zr 93
No Action	10**	6	0	0	0	0	0	0	0	0	3	0	0	0	1	0	0	0	5	0	0	900	0	0
Decentralized		16	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	4	0	0	700	0	0
Regionalized-1		12	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	4	0	0	700	0	0
Regionalized-2	11	12	0	0	8	0	0	0	0	0	3	0	0	0	1	0	0	0	5	0	0	900	0	0
Regionalized-3		6	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	4	0	0	700	0	0
Regionalized-4	7	6	0	0	0	0	0	0	0	0	3	0	0	0	1	0	0	0	5	0	0	900	0	0
Regionalized-5	4	6	0	0	0	0	0	0	0	0	3	0	0	0	1	0	0	0	5	0	0	900	0	0
Regionalized-6		2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	500	0	0
Regionalized-7		2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	500	0	0
Centralized-1		2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-2		1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-4	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized-5	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
** Ten sites use existing facilities for Volume Reduction
-- = Disposal is not considered for this Alternative.

Table II-16.2-11. SRS—LLW—Socioeconomic Impacts for Treatment and Disposal

LLW Alternatives	Number of Sites		Effect of Implementation of Alternatives					
				Jobs		Income		
	T	D	Cost (Millions) (1)	Jobs	% Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action	10**	6	4128	3555	1.40	38.4	0.53	0.48
Decentralized		16	4365	4699	1.84	50.7	0.69	0.82
Regionalized-1		12	4365	4699	1.84	50.7	0.69	0.82
Regionalized-2	11	12	4136	4452	1.75	48.1	0.69	0.77
Regionalized-3		6	4365	4699	1.84	50.7	0.69	0.82
Regionalized-4	7	6	4136	4452	1.75	48.1	0.69	0.77
Regionalized-5		6	4136	4452	1.75	48.1	0.69	0.77
Regionalized-6		2	5860	6308	2.48	68.1	0.93	1.33
Regionalized-7		2	5860	6308	2.48	68.1	0.93	1.33
Centralized-1		1	942	1014	0.40	10.9	0.15	0.19
Centralized-2		1	942	1014	0.40	10.9	0.15	0.19
Centralized-3	7	1	1125	1211	0.48	13.1	0.18	0.23
Centralized-4	7	1	1125	1211	0.48	13.1	0.18	0.23
Centralized-5	1	1	942	1014	0.40	10.9	0.15	0.19

Notes:
T = Treatment
D = Disposal
(1) In constant 1990 dollars.
(2) Compared to 1990 baseline.
** Ten sites use existing facilities for Volume Reduction.

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Table II-16.2–12. SRS—LLW—Infrastructure Impacts for Treatment and Disposal

LLW Alternatives	Number of Sites		Effect of Implementation of Alternatives									
			Land Use		Water		Waste Water		Power		Employment (FTE)	
	T	D	Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	% Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Peak Construction Employment	% of Current Employment (1)
No Action	10**	6	23.0	0.02	13690	0.27	21968	2.95	5.31	3.03	224	1
Decentralized		16	49.8	0.03	105325	2.11	25298	3.37	6.46	3.69	3818	22
Regionalized-1		12	49.8	0.03	105325	2.11	25298	3.37	6.46	3.69	3818	22
Regionalized-2	11	12	46.6	0.02	99729	1.99	25682	3.42	6.52	3.73	3289	19
Regionalized-3		6	49.8	0.03	105325	2.11	25298	3.37	6.46	3.69	3818	22
Regionalized-4	7	6	46.6	0.02	99729	1.99	25682	3.42	6.52	3.73	3290	19
Regionalized-5	4	6	46.6	0.03	99729	1.99	25478	3.42	6.52	3.73	3290	19
Regionalized-6		2	82.5	0.06	174220	3.48	40247	5.37	9.77	5.58	6213	36
Regionalized-7		2	82.5	0.06	174220	3.48	40247	5.37	9.77	5.58	6213	36
Centralized-1		1	49.8	0.01	24652	0.49	25097	1.05	6.46	3.69	618	4
Centralized-2		1	49.8	0.01	24652	0.49	25097	1.05	6.46	3.69	618	4
Centralized-3	7	1	13.4	0.01	27709	0.55	10438	1.39	6.36	3.63	660	4
Centralized-4	7	1	13.4	0.01	27709	0.55	10438	1.39	6.36	3.63	660	4
Centralized-5	1	1	49.8	0.01	24652	0.49	25097	1.05	6.46	3.69	618	4

Notes:
T = Treatment
D = Disposal
GPD = Gallons per Day
MW = Megawatts Electric
FTE = Full Time Equivalent
(1) Based on 1991 Site Employment.
** Ten sites use existing facilities for Volume Reduction.

Table II-16.2-13. SRS—LLW—Cost

LLW Alternatives	Number of Sites		Total Cost (Millions) (1)	Cost by Life-Cycle Component (1)				Cost by Functional Area (1)		
	T	D		Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Treatment (Millions)	Storage (Millions)	Disposal (Millions)
No Action	10**	6	4670	35	1658	2761	216	947	0	3723
Decentralized		16	4939	322	1969	2438	210	904	0	4035
Regionalized-1		12	4939	322	1969	2438	210	904	0	4035
Regionalized-2	11	12	4679	327	1758	2369	225	1267	0	3412
Regionalized-3		6	4939	322	1969	2437	210	904	0	4035
Regionalized-4	7	6	4679	327	1758	2369	225	1267	0	3412
Regionalized-5	4	6	4679	327	1758	2369	225	1267	0	3412
Regionalized-6		2	6630	439	2682	3300	210	904	0	5726
Regionalized-7		2	6630	439	2682	3300	210	904	0	5726
Centralized-1		1	1066	79	321	622	44	1066	0	0
Centralized-2		1	1066	79	321	622	44	1066	0	0
Centralized-3	7	1	1272	116	299	801	56	1272	0	0
Centralized-4	7	1	1272	116	299	801	56	1272	0	0
Centralized-5	1	1	1066	79	321	622	44	1066	0	0

Notes:
** Ten sites use existing facilities for Volume Reduction
T = Treatment
D = Disposal
The Life Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum may not reflect the true total cost.
(1) In Current 1994 Dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

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16.3 SRS TRUW

Twelve tables immediately following portray the impacts of TRUW at SRS. These tables are presented as follows:

Impact Category

No.	Description	Table No.	Page No.
1.	SRS—TRUW—Treatment: Estimated Number of Fatalities	II-16.3-1	16-35
2.	SRS—TRUW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects	II-16.3-2	16-36
4.	SRS—TRUW—Treatment: MEI Probability of Cancer Fatality	II-16.3-3	16-37
5.	SRS—TRUW—Treatment: MEI Probability of Cancer Incidences and Genetic Effects	II-16.3-4	16-38
6.	SRS—TRUW—Treatment: Noncancer Health Risk From Chemical Exposure	II-16.3-5	16-39
7.	SRS—TRUW—Emissions in Tons per Year of Criteria Air Pollutants	II-16.3-6	16-40
8.	SRS—TRUW—Percent of Standard/Guideline for Criteria Air Pollutants	II-16.3-7	16-41
9.	SRS—TRUW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-16.3-8	16-42
10.	SRS—TRUW—Impacts on Water Resources Due to Increased Water Use	II-16.3-9	16-43
12.	SRS—TRUW—Socioeconomic Impacts for Treatment	II-16.3-10	16-44
13.	SRS—TRUW—Infrastructure Impacts for Treatment	II-16.3-11	16-45
14.	SRS—TRUW—Cost	II-16.3-12	16-46

Table II-16.3-1. SRS—TRUW—Treatment: Estimated Number of Fatalities

TRUW Alternatives	Treatment						
	Number of Sites		Treat STD	WM Worker		Offsite Population Radiation Exposure	Noninvolved Workers Radiation Exposure
	CH Treat	RH Treat		Radiation Exposure	Physical Hazards		
No Action **	16	5	WIPP WAC	2.1E-03	7.4E-02	1.4E-05	1.5E-06
Decentralized ***	16	5	WIPP WAC	8.8E-02	2.6E-01	5.1E-05	5.4E-06
Regionalized-1	5	2	Reduce Gas	9.0E-02	3.7E-01	8.1E-05	8.8E-06
Regionalized-2	5	2	LDR	8.5E-02	5.9E-01	2.6E+00	2.8E-01
Regionalized-3	3	2	LDR	8.5E-02	5.9E-01	2.6E+00	2.8E-01
Centralized	WIPP	2	LDR	9.5E-02	1.3E-01	6.4E-05	6.9E-06

Notes:
** For No Action Alternative, storage is indefinite; no disposal at WIPP is assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at 16 sites, then transfered to interim storage at 10 sites, then to WIPP.

Table II-16.3-2. SRS—TRUW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

TRUW Alternatives	Number of Sites		Treat STD	Offsite Population				Noninvolved Workers				WM Workers			
	CH Treat	RH Treat		Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects
No Action**	16	5	WIPP WAC	2.7E-02	4.7E-05	1.3E-10	2.7E-06	3.0E-03	5.0E-06	6.7E-11	3.0E-07	5.3E+00	7.4E-03	9.2E-08	3.2E-04
Decentralized***	16	5	WIPP WAC	1.0E-01	1.7E-04	7.0E-10	1.0E-05	1.1E-02	1.9E-05	3.5E-10	1.1E-06	2.2E+02	3.1E-01	2.1E-07	1.3E-02
Regionalized-1	5	2	Reduce Gas	1.6E-01	2.8E-04	1.0E-09	1.6E-05	1.8E-02	3.0E-05	5.1E-10	1.8E-06	2.2E+02	3.1E-01	8.4E-07	1.3E-02
Regionalized-2	5	2	LDR	5.1E+03	8.8E+00	4.7E-10	5.1E-01	5.5E+02	9.4E-01	2.3E-10	5.5E-02	2.1E+02	3.0E-01	6.4E-07	1.3E-02
Regionalized-3	3	2	LDR	5.1E+03	8.8E+00	4.7E-10	5.1E-01	5.5E+02	9.4E-01	2.3E-10	5.5E-02	2.1E+02	3.0E-01	6.4E-07	1.3E-02
Centralized	WIPP	2	LDR	1.3E-01	2.2E-04	1.6E-09	1.3E-05	1.4E-02	2.3E-05	8.1E-10	1.4E-06	2.4E+02	3.3E-01	7.3E-07	1.4E-02

Notes:
** For No Action Alternative, storage is indefinite; no disposal at WIPP is assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
T = Treatment
D = Disposal

Table II-16.3-3. SRS—TRUW—Treatment: MEI Probability of Cancer Fatality

TRUW Alternatives	Number of Sites		Treat STD	Treatment	
	CH Treat	RH Treat		Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability
No Action**	16	5	WIPP WAC	1.3E-10	1.3E-09
Decentralized***	16	5	WIPP WAC	4.8E-10	4.8E-09
Regionalized-1	5	2	Reduce Gas	7.7E-10	7.7E-09
Regionalized-2	5	2	LDR	2.4E-05	2.4E-04
Regionalized-3	3	2	LDR	2.4E-05	2.4E-04
Centralized	WIPP	2	LDR	6.0E-10	6.0E-09

Notes:
MEI = Maximally Exposed Individual
** For No Action Alternative, storage is indefinite; no disposal of WIPP is assumed, for all other alternatives disposal at WIPP is assumed.
***In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then transferred to interim storage at 10 sites, then to WIPP.

Table II-16.3-4. SRS—TRUW—Treatment: MEI Probability of Cancer Incidences and Genetic Effects

TRUW Alternatives	Number of Sites		Treat STD	Treatment							
				Offsite MEI				Noninvolved Worker MEI			
	CH Treat	RH Treat		Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability
No Action **	16	5	WIPP WAC	2.6E-07	4.4E-10	0.0E+00	2.6E-11	2.6E-06	4.4E-09	7.7E-14	2.6E-10
Decentralized ***	16	5	WIPP WAC	9.5E-07	1.6E-09	9.0E-15	1.0E-10	1.0E-05	1.6E-08	4.0E-13	1.0E-09
Regionalized-1	5	2	Reduce Gas	1.5E-06	2.6E-09	1.3E-14	1.5E-10	1.5E-05	2.6E-08	5.8E-13	1.5E-09
Regionalized-2	5	2	LDR	4.8E-02	8.2E-05	0.0E+00	4.8E-06	4.8E-01	8.2E-04	2.7E-13	4.9E-05
Regionalized-3	3	2	LDR	4.8E-02	8.2E-05	0.0E+00	4.8E-06	4.8E-01	8.2E-04	2.7E-13	4.9E-05
Centralized	WIPP	2	LDR	1.2E-06	2.0E-09	2.1E-14	1.2E-10	1.2E-05	2.0E-08	9.2E-13	1.2E-09

Notes:
** For No Action Alternative, storage is indefinite; no disposal at WIPP is assumed for all other alternatives, disposal of WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites then to WIPP.
MEI = Maximally Exposed Individual

Table II-16.3-5. SRS—TRUW—Treatment: Noncancer Health Risk From Chemical Exposure

TRUW Alternatives	Number of Sites		Treat STD	Treatment		
	CH Treat	RH Treat		Offsite MEI Hazard Index	Noninvolved Worker MEI Hazard Index	WM Worker Exposure Index
No Action**	16	5	WIPP WAC	1.1E-13	5.1E-12	4.5E-07
Decentralized***	16	5	WIPP WAC	1.1E-12	5.1E-11	1.3E-06
Regionalized-1	5	2	Reduce Gas	1.8E-12	7.9E-11	1.3E-06
Regionalized-2	5	2	LDR	3.0E-09	1.3E-07	8.6E-04
Regionalized-3	3	2	LDR	3.0E-09	1.3E-07	8.6E-04
Centralized	WIPP	2	LDR	2.6E-12	1.1E-10	5.6E-06

Notes:
MEI = Maximally Exposed Individual
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
Hazard Index = Sum of hazard quotient values for all noncarcinogenic chemicals. The Hazard Quotient is the chemical-specific ratio of media exposure concentrations to concentrations exposure concentrations to concentrations believed to have no appreciable adverse effects.
Exposure Index Ratio of exposure concentration to chemical-specific occupational threshold limits.

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Table II-16.3-6. SRS—TRUW—Emissions in Tons per Year of Criteria Air Pollutants

TRUW Alternatives	Number of Sites		Treat STD	Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
	CH Treat	RH Treat		CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action**	16	5	WIPP WAC	- -	- -	- -	- -	- -	- -	7 (0/7)	1 (0/1)	0	0	0	1 (0/1)
Decentralized***	16	5	WIPP WAC	31 (8/23)	25 (20/5)	0	2 (2/0)	2 (2/0)	5 (2/3)	23 (0/23)	5 (0/5)	0	0	0	3 (3/0)
Regionalized-1	5	2	Reduce Gas	53 (10/43)	34 (25/9)	0	2 (2/0)	2 (2/0)	7 (2/5)	39 (0/39)	8 (1/8)	0	0	0	5 (0/5)
Regionalized-2	5	2	LDR	68 (11/57)	40 (29/11)	0	2 (2/0)	3 (3/0)	10 (3/7)	40 (0/40)	8 (1/8)	0	0	0	5 (0/5)
Regionalized-3	3	2	LDR	68 (11/57)	40 (29/11)	0	2 (2/0)	3 (3/0)	10 (3/7)	40 (0/40)	8 (1/8)	0	0	0	5 (0/5)
Centralized	WIPP	2	LDR	14 (5/9)	16 (14/2)	0	1 (1/0)	1 (1/0)	2 (1/1)	9 (0/9)	2 (0/2)	0	0	0	1 (0/1)

Notes:
Emissions <1 ton per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions / worker vehicles emission)
(2) Values = total emissions (stationary-source emissions / mobile-source emission)
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

Table II-16.3-7. SRS—TRUW—Percent of Standard/Guideline for Criteria Air Pollutants

TRUW Alternatives	Number of Sites		Treat STD	Construction					
				Percent of Tons/Year General Conformity Rule (1)					
	CH Treat	RH Treat		CO	NO2	Pb	PM10	SO2	VOC
No Action**	16	5	WIPP WAC	--	--	--	--	--	--
Decentralized***	16	5	WIPP WAC	--	--	--	--	--	--
Regionalized-1	5	2	Reduce Gas	--	--	--	--	--	--
Regionalized-2	5	2	LDR	--	--	--	--	--	--
Regionalized-3	3	2	LDR	--	--	--	--	--	--
Centralized	WIPP	2	LDR	--	--	--	--	--	--

TRUW Alternatives	Number of Sites		Treat STD	Operations & Maintenance											
				Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
	CH Treat	RH Treat		CO (4)	NO2 (4)	Pb (4)	PM10 (4)	SO2 (4)	VOC (6)	CO	NO2	Pb	PM10	SO2	VOC
No Action**	16	5	WIPP WAC	0	0	0	0	0	0	--	--	--	--	--	--
Decentralized***	16	5	WIPP WAC	0	1	0	0	0	0	--	--	--	--	--	--
Regionalized-1	5	2	Reduce Gas	0	1	0	1	0	0	--	--	--	--	--	--
Regionalized-2	5	2	LDR	0	2	0	9	4	0	0	0	0	0	0	0
Regionalized-3	3	2	LDR	0	2	0	9	4	0	0	0	0	0	0	0
Centralized	WIPP	2	LDR	0	0	0	0	0	0	--	--	--	--	--	--

Notes:
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) SRS is in an attainment area for all criteria pollutants, therfore the GCR does not apply.
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions for all alternatives are assumed to be negligible.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

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Table II-16.3-8. SRS—TRUW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

TRUW Alternatives	Number of Sites		Treat STD	Operations & Maintenance											
	CH Treat	RH Treat		Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action**	16	5	WIPP - WAC	0	- -	- -	- -	0	0	- -	- -	- -	- -	- -	- -
Decentralized***	16	5	WIPP - WAC	0	- -	- -	- -	0	0	- -	- -	- -	- -	- -	- -
Regionalized-1	5	2	Reduce Gas	0	- -	- -	- -	0	0	- -	- -	- -	- -	- -	- -
Regionalized-2	5	2	LDR	48	- -	- -	- -	0	0	- -	- -	- -	- -	- -	- -
Regionalized-3	3	2	LDR	48	- -	- -	- -	0	0	- -	- -	- -	- -	- -	- -
Centralized	WIPP	2	LDR	0	- -	- -	- -	0	0	- -	- -	- -	- -	- -	- -

TRUW Alternatives	Number of Sites		Treat STD	Operations & Maintenance									
	CH Treat	RH Treat		Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action**	16	5	WIPP - WAC	0	0	- -	- -	- -	0	0	- -	- -	- -
Decentralized***	16	5	WIPP - WAC	0	0	- -	- -	- -	0	0	- -	- -	- -
Regionalized-1	5	2	Reduce Gas	0	0	- -	- -	- -	0	0	- -	- -	- -
Regionalized-2	5	2	LDR	0	0	- -	- -	- -	0	0	- -	- -	- -
Regionalized-3	3	2	LDR	0	0	- -	- -	- -	0	0	- -	- -	- -
Centralized	WIPP	2	LDR	0	0	- -	- -	- -	0	0	- -	- -	- -

Notes:
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
- - = Emissions of this hazardous or toxic air pollutant are assumed to be negligible.
Percentages <1% are shown as zeros. CH = contact handled. RH = remote handled.

Table II-16.3-9. SRS—TRUW—Impacts on Water Resources Due to Increased Water Use

TRUW Alternatives	Number of Sites		Treat STD	Construction			Operations			
	CH Treat	RH Treat		Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action**	16	5	WIPP WAC	- -	- -	- -	1973	0.1	- -	<0.1
Decentralized***	16	5	WIPP WAC	13231	0.8	- -	4116	0.3	- -	<0.1
Regionalized-1	5	2	Reduce Gas	18457	1.2	- -	7185	0.4	- -	<0.1
Regionalized-2	5	2	LDR	22118	1.4	- -	7366	0.5	- -	<0.1
Regionalized-3	3	2	LDR	22118	1.4	- -	7366	0.5	- -	<0.1
Centralized	WIPP	2	LDR	8530	0.5	- -	847	0.1	- -	<0.1

Notes:
Water supplied by groundwater. Current water use = 1,600,000 gallons/day.
Wastewater discharged to the Savannah River. Average flow rate of the Savannah River = 6,463,000,000 gallons/day.
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assume
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
- - = Stream Flow is not considered for this site.

Table II-16.3-10. SRS—TRUW—Socioeconomic Impacts for Treatment

TRUW Alternatives	Number of Sites		Effect of Implementation of Alternatives						
					Jobs		Income		
	CH Treat	RH Treat	Treat STD	Cost (Millions) (1)	Annual Jobs	% Annual Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action**	16	5	WIPP WAC	142	123	0.05	1.3	0.02	0.02
Decentralized***	16	5	WIPP WAC	446	480	0.19	5.2	0.07	0.08
Regionalized-1	5	2	Reduce Gas	757	814	0.32	8.8	0.12	0.14
Regionalized-2	5	2	LDR	905	975	0.38	10.5	0.14	0.16
Regionalized-3	3	2	LDR	905	975	0.38	10.5	0.14	0.16
Centralized	WIPP	2	LDR	164	176	0.07	1.9	0.03	0.03

Notes:
(1) In current 1990 dollars.
(2) Compared to 1990 baseline.
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

Table II-16.3–11. SRS—TRUW—Infrastructure Impacts for Treatment

TRUW Alternatives	Number of Sites		Treat STD	Effect of Implementation of Alternatives									
				Land Use		Water		Waste Water		Power		Employment (FTE)	
	CH Treat	RH Treat		Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Peak Construction Employment	% of Current Employment (1)
No Action**	16	5	WIPP WAC	0	0.00	1973	0.04	1973	0.26	0.07	0.04	0	0.00
Decentralized***	16	5	WIPP WAC	6.3	0.00	13231	0.26	4116	0.55	0.58	0.33	244	1.40
Regionalized-1	5	2	Reduce Gas	7.8	0.01	18457	0.37	7185	0.96	0.94	0.54	475	2.80
Regionalized-2	5	2	LDR	8.2	0.01	22118	0.44	7366	0.98	1.17	0.67	625	3.60
Regionalized-3	3	2	LDR	8.2	0.01	22118	0.44	7366	0.98	1.17	0.67	625	3.60
Centralized	WIPP	2	LDR	4.3	0.00	8530	0.17	847	0.11	0.19	0.11	86	0.50

Notes:
GPD = Gallons per Day
MW = Megawatts Electric
FTE = Full Time Equivalent
(1) Based on 1991 Site Employment.
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

Table II-16.3-12. SRS—TRUW—Cost

TRUW Alternatives	Number of Sites		Treat STD (2)	Total Cost (Millions) (1)	Life-Cycle Component				Functional Area		
	CH Treat	RH Treat			Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Retrieval Characterization (Millions)	Treatment (Millions)	Storage (Millions)
No Action**	11	5	WIPP - WAC	161	0	0	144	17	0	144	17
Decentralized***	16	5	WIPP - WAC	505	30	134	251	90	15	457	33
Regionalized-1	5	2	Reduce Gas	856	68	246	421	120	15	780	61
Regionalized-2	5	2	LDR	1024	87	327	509	100	15	982	28
Regionalized-3	3	2	LDR	1024	87	327	509	100	15	982	28
Centralized	WIPP	2	LDR	186	8	51	71	55	15	170	0

Notes:
** For No Action Alternative, storage is indefinite; no disposal at WIPP to be assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
The Life Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum may not reflect the true total cost.
(1) In Current 1994 Dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.
(2) Treatment standard (STD) applied: treat to WIPP Waste Acceptance Criteria (WIPP WAC), treat for reduced gas generation (Reduce Gas), treat to Land Disposal Restrictions (LDR).

16.4 SRS HLW

Nine of the 14 impact categories apply to HLW at SRS. These impacts are presented in the following tables.

Impact Category

No.	Description	Table No.	Page No.
1.	SRS—HLW—Storage: Estimated Number of Fatalities	II-16.4-1	16-48
2.	SRS—HLW—Storage: Estimated Number of Cancer Incidences and Genetic Effects	II-16.4-2	16-49
7.	SRS—HLW—Emissions in Tons per Year of Criteria Air Pollutants	II-16.4-3	16-50
8.	SRS—HLW—Percent of Standard/Guideline for Criteria Air Pollutants	II-16.4-4	16-51
9.	SRS—HLW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-16.4-5	16-52
10.	SRS—HLW—Impacts on Water Resources Due to Increased Water Use	II-16.4-6	16-53
12.	SRS—HLW—Socioeconomics Impacts for Storage	II-16.4-7	16-54
13.	SRS—HLW—Infrastructure Impacts for Storage	II-16.4-8	16-55
14.	SRS—HLW—Cost	II-16.4-9	16-56

Table II-16.4–1. SRS—HLW—Storage: Estimated Number of Fatalities

HLW Alternatives	Number of Sites	WM Worker	
	S	Radiation Exposure	Physical Hazards
No Action	4	9.6E-01	3.5E-01
Decentralized	4	9.6E-01	3.5E-01
Regionalized-1	3	1.0E+00	3.7E-01
Regionalized-2	3	9.6E-01	2.8E-01
Centralized	3	7.8E-01	2.6E-01

Note:
S = Storage

Table II-16.4-2. SRS—HLW—Storage: Estimated Number of Cancer Incidences and Genetic Effects

HLW Alternatives	Number of Sites	WM Worker		
	S	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	4	2.4E+03	3.4E+00	1.4E-01
Decentralized	4	2.4E+03	3.4E+00	1.4E-01
Regionalized-1	3	2.6E+03	3.6E+00	1.5E-01
Regionalized-2	3	2.4E+03	3.4E+00	1.4E-01
Centralized	3	2.0E+03	2.7E+00	1.2E-01

Notes:
S = Storage

Table II-16.4–3. SRS—HLW—Emissions in Tons per Year of Criteria Air Pollutants

HLW Alternatives	Number of Sites S	Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
		CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action	4	6 (4/2)	11 (11/0)	0	1 (1/0)	1 (1/0)	1 (1/0)	6 (0/6)	1 (0/1)	0	0	0	1 (0/1)
Decentralized	4	6 (4/2)	11 (11/0)	0	1 (1/0)	1 (1/0)	1 (1/0)	6 (0/6)	1 (0/1)	0	0	0	1 (0/1)
Regionalized-1	3	8 (6/2)	16 (16/0)	0	1 (1/0)	2 (2/0)	2 (2/0)	8 (0/8)	2 (0/2)	0	0	0	1 (0/1)
Regionalized-2	3	8 (6/2)	16 (16/0)	0	1 (1/0)	2 (2/0)	2 (2/0)	8 (0/8)	2 (0/2)	0	0	0	1 (0/1)
Centralized	3	7 (5/2)	13 (13/0)	0	1 (1/0)	1 (1/0)	1 (1/0)	10 (0/10)	2 (0/2)	0	0	0	1 (0/1)

Notes:
S = Storage
Data is based on repository beginning to accept HLW canisters in 2015.
Emissions <1 ton per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions / worker vehicles emission)
(2) Values = total emissions (stationary-source emissions / mobile-source emission)

Table II-16.4-4. SRS—HLW—Percent of Standard/Guideline for Criteria Air Pollutants

HLW Alternatives	Number of Sites S	Construction: Percent of Tons/Year General Conformity Rule (1)					
		CO	NO2	Pb	PM10	SO2	VOC
No Action	4	--	--	--	--	--	--
Decentralized	4	--	--	--	--	--	--
Regionalized-1	3	--	--	--	--	--	--
Regionalized-2	3	--	--	--	--	--	--
Centralized	1	--	--	--	--	--	--

HLW Alternatives	Number of Sites S	Operations & Maintenance: Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)				
		CO (4)	NO2 (4)	Pb (4)	PM10 (4)	SO2 (4)	VOC (4)	CO	NO2	Pb	PM10	SO2
No Action	4	--	--	--	--	--	--	--	--	--	--	--
Decentralized	4	--	--	--	--	--	--	--	--	--	--	--
Regionalized-1	3	--	--	--	--	--	--	--	--	--	--	--
Regionalized-2	3	--	--	--	--	--	--	--	--	--	--	--
Centralized	1	--	--	--	--	--	--	--	--	--	--	--

Notes:
S = Storage
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) SRS is in an attainment area for all criteria pollutants, therfore the GCR does not apply.
(2) Stationary-source emissions from HLW storage facilities are assumed to be negligible.
(3) Stationary-source emissions from HLW storage facilities are assumed to be negligible.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.

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Table II-16.4–5. SRS—HLW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

HLW Alternatives	Number of Sites S	Operations & Maintenance											
		Total Radio-nuclides	Other Hazardous and Toxic Air Pollutants	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action	4	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Decentralized	4	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-1	3	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-2	3	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Centralized	1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

HLW Alternatives	Number of Sites S	Operations & Maintenance									
		Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action	4	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Decentralized	4	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-1	3	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-2	3	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Centralized	1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

Notes:
S = Storage
- - = Emissions of hazardous and toxic air pollutants, including radionuclides, from HLW storage facilities are assumed to be negligible.

Table II-16.4–6. SRS—HLW—Impacts on Water Resources Due to Increased Water Use

HLW Alternatives	Number of Sites S	Construction Water Use GPD	Construction % Current Use	Construction % Stream Flow	Operations Water Use GPD	Operations % Current Use	Operations % Stream Flow	Operations Waste Water % Stream Flow
No Action	4	28	<0.1	- -	2700	0.2	- -	<0.1
Decentralized	4	28	<0.1	- -	2700	0.2	- -	<0.1
Regionalized-1	3	28	<0.1	- -	2800	0.2	- -	<0.1
Regionalized-2	3	28	<0.1	- -	2700	0.2	- -	<0.1
Centralized	3	26	<0.1	- -	2600	0.2	- -	<0.1

Notes:
S = Storage
Water supplied by groundwater. Current water use = 1,600,000 gallons/day.
Wastewater discharged to the Savannah River. Average flow rate of the Savannah River = 6,463,000,000 gallons
Data is based on repository beginning to accept HLW canisters in 2015.
- - = Stream Flow is not considered for this site.
<0.1 indicates that the percentage is less than 0.1%.

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Table II-16.4–5. SRS—HLW—Socioeconomics Impacts for Storage

HLW Alternatives	Number of Sites	Effect of Implementation of Alternatives					
			Jobs		Income		
	S	Cost (Millions) (1)	Annual Jobs	% Annual Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action	4	193	199	0.08	2.2	0.03	0.03
Decentralized	4	193	199	0.08	2.2	0.03	0.03
Regionalized-1	3	198	205	0.08	2.2	0.03	0.03
Regionalized-2	3	193	199	0.08	2.2	0.03	0.03
Centralized	3	152	157	0.06	1.7	0.02	0.00

Notes:
S = Storage
(1) In current 1990 dollars. The economic multiplies analysis only was applied to costs through 2015.
(2) Compared to 1990 baseline.

Table II-16.4-8. SRS—HLW—Infrastructure Impacts for Storage

HLW Alternatives	Number of Sites	Effect of Implementation of Alternatives									
		Land Use		Water		Waste Water		Power		Employment (FTE)	
	S	Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Construction Employment	% of Current Employment (1)
No Action	4	2	0.00	2700	0.1	2700	0.36	0.08	0.04	0	0
Decentralized	4	2	0.00	2700	0.1	2700	0.36	0.08	0.04	16	0
Regionalized-1	3	2	0.00	2800	0.1	2800	0.37	0.08	0.04	17	0
Regionalized-2	3	2	0.00	2700	0.1	2700	0.36	0.08	0.04	16	0
Centralized	3	0	0.00	2600	0.1	2600	0.34	0.08	0.04	9	0

Notes:
S = Storage
GPD = Gallons per Day
MW = Megawatts Electric
FTE = Full Time Equivalent
(1) Based on 1991 Site Employment.

Table II-16.4–9. SRS—HLW—Cost

HLW Alternatives	Number of Sites	Total Cost (Millions) (1)	Cost by Life-Cycle Component (1)		Cost by Functional Area (1)	
	S		Construction (Millions) (2)	Operations & Maintenance (3) (Millions)	Storage (Millions)	Handling (Millions)
No Action	4	490	40	451	159	332
Decentralized	4	567	40	527	91	476
Regionalized-1	3	594	40	554	94	500
Regionalized-2	3	567	40	527	91	476
Centralized	3	283	0	283	17	266
Centralized Delayed Acceptance	3	401	0	401	17	384

Notes:
S = Storage
The Life Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum may not reflect the true total cost.
(1) In current 1994 Dollars; Total Cost = Sum of Life Cycle Components = Sum of Functional Areas.
(2) Construction costs are for the interim storage facilities.
(3) Operations and maintenance costs include operation and maintenance of the interim storage facilities, and the handling of canisters (unloading/loading of canisters into or out of the interim storage facilities).

16.5 SRS HW

Eleven of the 14 impact categories apply to HW at SRS. These impacts are presented in the following tables.

Impact Category

No.	Description	Table No.	Page No.
1.	SRS—HW—Treatment: Estimated Number of Fatalities	II-16.16-1	16-58
2.	SRS—HW—Treatment: Estimated Number of Cancer Incidences	II-16.16-2	16-59
3.	SRS—HW—Treatment: MEI Probability of Cancer Incidences	II-16.16-3	16-60
6.	SRS—HW—Treatment: Noncancer Health Risk From Chemical Exposure	II-16.16-4	16-61
7.	SRS—HW—Emissions in Tons per Year of Criteria Air Pollutants	II-16.16-5	16-62
8.	SRS—HW—Percent of Standard/Guideline for Criteria Air Pollutants	II-16.16-6	16-63
9.	SRS—HW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-16.16-7	16-64
10.	SRS—HW—Impacts on Water Resources Due to Increased Water Use	II-16.16-8	16-65
12.	SRS—HW—Socioeconomics Impacts for Treatment	II-16.16-9	16-66
13.	SRS—HW—Infrastructure Impacts for Treatment	II-16.16-10	16-67
14.	SRS—HW—Cost	II-16.16-11	16-68

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Table II-16.5-1. SRS—HW—Treatment: Estimated Number of Fatalities

HW Alternatives	Number of Sites	WM Worker
	T	Physical Hazards
No Action	2	- -
Decentralized	3	8.4E-03
Regionalized-1	5	7.9E-03
Regionalized-2	2	- -

Notes:
- - = Treatment is not considered for this alternative
T = Treatment

Table II-16.5-2. SRS—HW—Treatment: Estimated Number of Cancer Incidences

HW Alternatives	Number of Sites	Treatment		
	T	Offsite MEI Hazard Index	Noninvolved Worker MEI Hazard Index	WM Worker Exposure Index
No Action	2	- -	- -	- -
Decentralized	3	2.2E-04	9.9E-03	5.3E+00
Regionalized-1	5	2.0E-04	9.0E-03	5.2E+00
Regionalized-2	2	- -	- -	- -

Notes:
T = Treatment
MEI = Maximally Exposed Individual
- - = Treatment is not considered for this alternative.
Hazard Index = Sum of hazard quotient values for all noncarcinogenic chemicals. The Hazard Quotient is the chemical-specific ratio of media exposure concentrations to concentrations believed to have no appreciable adverse effects.
Exposure Index = Ratio of exposure concentration to chemical-specific occupational threshold limits.

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Table II-16.5-3. SRS—HW—Treatment: MEI Probability of Cancer Incidences

HW Alternatives	Number of Sites	Treatment	
	T	Offsite MEI Cancer Incidence Probability	Noninvolved MEI Cancer Incidence Probability
No Action	2	- -	- -
Decentralized	3	1.7E-08	7.4E-07
Regionalized-1	5	1.5E-08	6.7E-07
Regionalized-2	2	- -	- -

Notes:
T = Treatment
MEI = Maximally Exposed Individual
- - = Treatment is not considered for this alternative.

Table II-16.5–4. SRS—HW—Treatment: Noncancer Health Risk From Chemical Exposure

HW Alternatives	Number of Sites	Treatment		
	T	Offsite Population Chemical Cancer Incidence	Noninvolved Worker Chemical Cancer Incidence	WM Worker Chemical Cancer Incidence
No Action	2	- -	- -	- -
Decentralized	3	1.3E-03	6.5E-04	1.0E-01
Regionalized-1	5	1.2E-03	5.9E-04	9.3E-02
Regionalized-2	2	- -	- -	- -

Notes:
T = Treatment
- - = Treatment is not considered for this alternative.

Table II-16.5-5. SRS—HW—Emissions in Tons per Year of Criteria Air Pollutants

HW Alternatives	Number of Sites T	Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
		CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action	2	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Decentralized	3	3 (2/1)	5 (5/0)	0	0	0	1 (0/0)	0	0	0	0	1 (1/0)	0
Regionalized - 1	5	3 (2/1)	5 (5/0)	0	0	0	1 (0/0)	0	0	0	0	1 (1/0)	0
Regionalized - 2	2	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

Notes:
T = Treatment
Emissions <1 ton per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions / worker vehicles emission)
(2) Values = total emissions (stationary-source emissions / mobile-source emission)

Table II-16.5-6. SRS—HW—Percent of Standard/Guideline for Criteria Air Pollutants

HW Alternatives	Number of Sites T	Construction: Percent of Tons/Year General Conformity Rule (1)					
		CO	NO2	Pb	PM10	SO2	VOC
No Action	2	--	--	--	--	--	--
Decentralized	3	--	--	--	--	--	--
Regionalized-1	5	--	--	--	--	--	--
Regionalized-2	2	--	--	--	--	--	--

HW Alternatives	Number of Sites T	Operations & Maintenance: Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
		CO (4)	NO2 (4)	Pb (4)	PM10 (4)	SO2 (4)	VOC (4)	CO	NO2	Pb	PM10	SO2	VOC
No Action	2	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized	3	0	0	0	3 (3/0)	1 (1/0)	0	0	0	0	0	0	0
Regionalized-1	5	0	0	0	3 (3/0)	1 (1/0)	0	0	0	0	0	0	0
Regionalized-2	2	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
T = Treatment
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) SRS is in an attainment area for all criteria pollutants, therefore the GCR does not apply.
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions for the Regionalized-2 Alternative are assumed to be negligible.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.

Table II-16.5-7. SRS—HW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

HW Alternatives	Number of Sites T	Operations & Maintenance											
		Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action	2	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Decentralized	3	- -	- -	- -	0	- -	- -	0	0	- -	- -	- -	- -
Regionalized - 1	5	- -	- -	- -	0	- -	- -	0	0	- -	- -	- -	- -
Regionalized - 2	2	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

HW Alternatives	Number of Sites T	Operations & Maintenance									
		Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action	2	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Decentralized	3	- -	0	- -	- -	0	- -	0	0	0	1
Regionalized - 1	5	- -	0	- -	- -	0	- -	0	0	0	1
Regionalized - 2	2	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

Notes:
T = Treatment
Percentages <1% are shown as zeros.
- - = Emissions of certain hazardous or toxic air pollutants, including radionuclides, from HW treatment facilities are assumed to be negligible.

Table II-16.5-8. SRS—HW—Impacts on Water Resources Due to Increased Water Use

HW Alternatives	Number of Sites	Construction			Operations			
	T	Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action	2	- -	- -	- -	- -	- -	- -	- -
Decentralized	3	516	<0.1	- -	358	<0.1	- -	<0.1
Regionalized-	5	593	<0.1	- -	371	<0.1	- -	<0.1
Regionalized-	2	- -	- -	- -	- -	- -	- -	- -

Notes:
T = Treatment
Water supplied by groundwater. Current water use = 1,600,000 gallons/day.
Wastewater discharged to the Savannah River. Average flow rate of the Savannah River = 6,463,000,000 gallons/d
- - = Not considered for this site.
<0.1 indicates that the percentage is less than 0.1%.

Table II-16.5-9. SRS—HW—Socioeconomics Impacts for Treatment

HW Alternatives	Number of Sites	Effect of Implementation of Alternatives					
			Jobs		Income		
	T	Cost (Millions) (1)	Annual Jobs	% Annual Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action	2	- -	- -	- -	- -	- -	- -
Decentralized	3	24	30	0.01	0.3	0.00	0.00
Regionalized 1	5	25	31	0.01	0.3	0.00	0.00
Regionalized 2	2	- -	- -	- -	- -	- -	- -

Notes:
T = Treatment
- - = Treatment is not considered for this alternative.
(1) In current 1990 dollars.
(2) Compared to 1990 baseline.

Table II-16.5-10. SRS—HW—Infrastructure Impacts for Treatment

HW Alternatives	Number of Sites	Effect of Implementation of Alternatives									
		Land Use		Water		Waste Water		Power		Employment (FTE)	
	T	Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	% Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Construction Employment	% of Current Employment (1)
No Action	2	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Decentralized	3	1	0.000	516	0.01	358	0.05	0.13	0.07	8	0
Regionalized-1	5	1	0.001	593	0.01	371	0.05	0.13	0.07	10	0
Regionalized-2	2	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

Notes:
T = Treatment
GPD = Gallons per Day
MW = Megawatts Electric
- - = Treatment is not considered for this alternative
(1) Based on 1991 Site Employment.

Table II-16.5-11. SRS—HW—Cost

HW Alternatives	Number of Sites	Total Cost (Millions) (1)	Government Cost by Life-Cycle Component (1)				Cost by Functional Area (1)	
							Treatment & Disposal	
	T		Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Government (2) (Millions)	Commercial (Millions)
No Action	2	3	0	0	3	0	0	3
Decentralized	3	31	2	10	15	1	28	3
Regionalized-1	5	32	2	10	16	1	29	3
Regionalized-2	2	- -	- -	- -	- -	- -	- -	- -

Notes:
T = Treatment
- - = Not considered for this site.
The Life Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum may not reflect the true total cost.
(1) In current 1994 Dollars; Total Cost = Sum of the Functional Areas.
(2) Government costs equal to the sum of the life-cycle components.

17.0 WIPP

17.1 WIPP LLMW

WIPP is not one of the sites considered for management of LLMW. Therefore, Section 17.1 has been intentionally left blank.

17.2 WIPP LLW

WIPP is not considered for the management of LLW. Therefore, Section 17.2 has been intentionally left blank.

17.3 WIPP TRUW

Twelve tables immediately following portray the impacts of TRUW at WIPP. These tables are presented as follows:

Impact Category

No.	Description	Table No.	Page No.
1.	WIPP—TRUW—Treatment: Estimated Number of Fatalities	II-17.3-1	17-3
2.	WIPP—TRUW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects	II-17.3-2	17-4
4.	WIPP—TRUW—Treatment: MEI Probability of Cancer Fatality	II-17.3-3	17-5
5.	WIPP—TRUW—Treatment: MEI Probability of Cancer Incidences and Genetic Effects	II-17.3-4	17-6
6.	WIPP—TRUW—Treatment: Noncancer Health Risk From Chemical Exposure	II-17.3-5	17-7
7.	WIPP—TRUW—Emissions in Tons per Year of Criteria Air Pollutants	II-17.3-6	17-8
8.	WIPP—TRUW—Percent of Standard/Guideline for Criteria Air Pollutants	II-17.3-7	17-9
9.	WIPP—TRUW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-17.3-8	17-10
10.	WIPP—TRUW—Impacts on Water Resources Due to Increased Water Use	II-17.3-9	17-11
12.	WIPP—TRUW—Socioeconomic Impacts for Treatment	II-17.3-10	17-12
13.	WIPP—TRUW—Infrastructure Impacts for Treatment	II-17.3-11	17-13
14.	WIPP—TRUW—Cost	II-17.3-12	17-14

Table II-17.3-1. WIPP—TRUW—Treatment: Estimated Number of Fatalities

TRUW Alternatives	Treatment						
	Number of Sites		Treat STD	WM Worker		Offsite Population Radiation Exposure	Noninvolved Workers Radiation Exposure
	CH Treat	RH Treat		Radiation Exposure	Physical Hazards		
No Action **	16	5	WIPP WAC	- -	- -	- -	- -
Decentralized ***	16	5	WIPP WAC	- -	- -	- -	- -
Regionalized-1	5	2	Reduce Gas	- -	- -	- -	- -
Regionalized-2	5	2	LDR	- -	- -	- -	- -
Regionalized-3	3	2	LDR	- -	- -	- -	- -
Centralized	WIPP	2	LDR	6.5E-02	1.7E+00	6.1E-01	5.0E-02

Notes:
- - = WIPP is only considered under the Centralized Alternative.
** For No Action Alternative, storage is indefinite; no disposal at WIPP is assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at 16 sites, then transfered to interim storage at 10 sites, then to WIPP.

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Table II-17.3-2. WIPP—TRUW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

TRUW Alternatives	Number of Sites		Treat STD	Offsite Population				Noninvolved Workers				WM Workers			
	CH Treat	RH Treat		Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects
No Action**	16	5	WIPP WAC	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized***	16	5	WIPP WAC	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-1	5	2	Reduce Gas	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-2	5	2	LDR	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-3	3	2	LDR	--	--	--	--	--	--	--	--	--	--	--	--
Centralized	WIPP	2	LDR	1.2E+03	2.1E+00	5.1E-09	1.2E-01	9.9E+01	1.7E-01	2.6E-09	9.9E-03	1.6E+02	2.3E-01	3.9E-05	9.7E-03

Notes:
** For No Action Alternative, storage is indefinite; no disposal at WIPP is assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
T = Treatment
D = Disposal

Table II-17.3–3. WIPP—TRUW—Treatment: MEI Probability of Cancer Fatality

TRUW Alternatives	Number of Sites		Treat STD	Treatment	
	CH Treat	RH Treat		Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability
No Action**	16	5	WIPP WAC	- -	- -
Decentralized***	16	5	WIPP WAC	- -	- -
Regionalized-1	5	2	Reduce Gas	- -	- -
Regionalized-2	5	2	LDR	- -	- -
Regionalized-3	3	2	LDR	- -	- -
Centralized	WIPP	2	LDR	1.6E-04	1.9E-04

Notes:
- - = Treatment is not considered under this alternative
MEI = Maximally Exposed Individual
** For No Action Alternative, storage is indefinite; no disposal of WIPP is assumed, for all other alternatives disposal at WIPP is assumed.
***In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then transferred to interim storage

Table II-17.3–4. WIPP—TRUW—Treatment: MEI Probability of Cancer Incidences and Genetic Effects

TRUW Alternatives	Number of Sites		Treat STD	Treatment							
				Offsite MEI				Noninvolved Worker MEI			
	CH Treat	RH Treat		Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability
No Action **	16	5	WIPP WAC	- -	- -	- -	- -	- -	- -	- -	- -
Decentralized ***	16	5	WIPP WAC	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-1	5	2	Reduce Gas	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-2	5	2	LDR	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-3	3	2	LDR	- -	- -	- -	- -	- -	- -	- -	- -
Centralized	WIPP	2	LDR	3.2E-01	5.4E-04	1.9E-12	3.2E-05	3.8E-01	6.5E-04	1.2E-11	3.8E-05

Notes:
** For No Action Alternative, storage is indefinite; no disposal at WIPP is assumed for all other alternatives, disposal of WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites then to WIPP.
- - = WIPP is only considered under the Centralized Alternative.

Table II-17.3-5. WIPP—TRUW—Treatment: Noncancer Health Risk From Chemical Exposure

TRUW Alternatives	Number of Sites		Treat STD	Treatment		
	CH Treat	RH Treat		Offsite MEI Hazard Index	Noninvolved Worker MEI Hazard Index	WM Worker Exposure Index
No Action**	16	5	WIPP WAC	- -	- -	- -
Decentralized***	16	5	WIPP WAC	- -	- -	- -
Regionalized-1	5	2	Reduce Gas	- -	- -	- -
Regionalized-2	5	2	LDR	- -	- -	- -
Regionalized-3	3	2	LDR	- -	- -	- -
Centralized	WIPP	2	LDR	7.6E-08	4.6E-07	1.1E-03

Notes:
MEI = Maximally Exposed Individual
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
- - = Treatment is not considered under this alternative.
Hazard Index = Sum of hazard quotient values for all noncarcinogenic chemicals. The Hazard Quotient is the chemical-specific ratio of media exposure concentrations to concentrations exposure concentrations to concentrations believed to have no appreciable adverse effects.
Exposure Index Ratio of exposure concentration to chemical-specific occupational threshold

Table II-17.3-6. WIPP—TRUW—Emissions in Tons per Year of Criteria Air Pollutants

TRUW Alternatives	Number of Sites		Treat STD	Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
	CH Treat	RH Treat		CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action**	16	5	WIPP WAC	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Decentralized***	16	5	WIPP WAC	- -	- -	- -	- -	- -	- -	1 (0/1)	2 (0/2)	0	0	0	0
Regionalized-1	5	2	Reduce Gas	- -	- -	- -	- -	- -	- -	1 (0/1)	2 (0/2)	0	0	0	0
Regionalized-2	5	2	LDR	- -	- -	- -	- -	- -	- -	0	1 (0/1)	0	0	0	0
Regionalized-3	3	2	LDR	- -	- -	- -	- -	- -	- -	0	1 (0/1)	0	0	0	0
Centralized	WIPP	2	LDR	74 (74/0)	193 (193/0)	0	15 (15/0)	18 (18/0)	19 (19/0)	1 (0/1)	2 (0/2)	0	0	0	0

Notes:
Emissions <1 ton per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions / worker vehicles emission)
(2) Values = total emissions (stationary-source emissions / mobile-source emission)
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

Table II-17.3–7. WIPP—TRUW—Percent of Standard/Guideline for Criteria Air Pollutants

TRUW Alternatives	Number of Sites		Treat STD	Construction					
				Percent of Tons/Year General Conformity Rule (1)					
	CH Treat	RH Treat		CO	NO2	Pb	PM10	SO2	VOC
No Action	16	5	WIPP WAC	--	--	--	--	--	--
Decentralized	16	5	WIPP WAC	--	--	--	--	--	--
Regionalized-1	5	2	Reduce Gas	--	--	--	--	--	--
Regionalized-2	5	2	LDR	--	--	--	--	--	--
Regionalized-3	3	2	LDR	--	--	--	--	--	--
Centralized	WIPP	2	LDR	--	--	--	--	--	--

TRUW Alternatives	Number of Sites		Treat STD	Operations & Maintenance											
				Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
	CH Treat	RH Treat		CO (4)	NO2 (4)	Pb (4)	PM10 (4)	SO2 (4)	VOC (6)	CO	NO2	Pb	PM10	SO2	VOC
No Action	16	5	WIPP WAC	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized	16	5	WIPP WAC	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-1	5	2	Reduce Gas	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-2	5	2	LDR	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-3	3	2	LDR	--	--	--	--	--	--	--	--	--	--	--	--
Centralized	WIPP	2	LDR	1	4	0	25	12	0	0	0	0	2	0	0

Notes:
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) WIPP is in an attainment area for all criteria pollutants, therfore the GCR does not apply.
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions for alternatives that do not involve treatment to LDR (incineration) are assumed to be negligible.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

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Table II-17.3-8. WIPP—TRUW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

TRUW Alternatives	Number of Sites		Treat STD	Operations & Maintenance											
	CH Treat	RH Treat		Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action**	16	5	WIPP - WAC	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized***	16	5	WIPP - WAC	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-1	5	2	Reduce Gas	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-2	5	2	LDR	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-3	3	2	LDR	--	--	--	--	--	--	--	--	--	--	--	--
Centralized	WIPP	2	LDR	319	--	--	--	0	0	--	--	--	--	--	--

TRUW Alternatives	Number of Sites		Treat STD	Operations & Maintenance									
	CH Treat	RH Treat		Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action**	16	5	WIPP - WAC	--	--	--	--	--	--	--	--	--	--
Decentralized***	16	5	WIPP - WAC	--	--	--	--	--	--	--	--	--	--
Regionalized-1	5	2	Reduce Gas	--	--	--	--	--	--	--	--	--	--
Regionalized-2	5	2	LDR	--	--	--	--	--	--	--	--	--	--
Regionalized-3	3	2	LDR	--	--	--	--	--	--	--	--	--	--
Centralized	WIPP	2	LDR	0	0	--	--	--	0	0	--	--	--

Notes:
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
-- = Emissions of this hazardous or toxic air pollutant are assumed to be negligible.
Percentages <1% are shown as zeros. CH = contact handled. RH = remote handled.

Table II-17.3-9. WIPP—TRUW—Impacts on Water Resources Due to Increased Water Use

TRUW Alternatives	Number of Sites		Treat STD	Construction			Operations			
	CH Treat	RH Treat		Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action**	16	5	WIPP WAC	- -	- -	- -	- -	- -	- -	- -
Decentralized***	16	5	WIPP WAC	- -	- -	- -	- -	- -	- -	- -
Regionalized-1	5	2	Reduce Gas	- -	- -	- -	- -	- -	- -	- -
Regionalized-2	5	2	LDR	- -	- -	- -	- -	- -	- -	- -
Regionalized-3	3	2	LDR	- -	- -	- -	- -	- -	- -	- -
Centralized	WIPP	2	LDR	41429	287.7	- -	15204	105.6	- -	- -

Notes:
Water supplied by municipal system from City of Carlsbad. Current water use = 14,400 gallons/day.
Wastewater discharged to onsite evaporation ponds.
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
- - = WIPP is only considered under the Centralized Alternative, and Stream Flow and Waste Water Stream Flow are not considered for WIP

Table II-17.3-10. WIPP—TRUW—Socioeconomic Impacts for Treatment

TRUW Alternatives	Number of Sites		Effect of Implementation of Alternatives						
					Jobs		Income		
	CH Treat	RH Treat	Treat STD	Cost (Millions) (1)	Annual Jobs	% Annual Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action**	16	5	WIPP WAC	- -	- -	- -	- -	- -	- -
Decentralized***	16	5	WIPP WAC	- -	- -	- -	- -	- -	- -
Regionalized-1	5	2	Reduce Gas	- -	- -	- -	- -	- -	- -
Regionalized-2	5	2	LDR	- -	- -	- -	- -	- -	- -
Regionalized-3	3	2	LDR	- -	- -	- -	- -	- -	- -
Centralized	WIPP	2	LDR	2074	2046	2.05	22.1	0.75	0.64

Notes:
(1) In current 1990 dollars.
(2) Compared to 1990 baseline.
- - = WIPP is only considered under the Centralized Alternative.
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.

Table II-17.3-11. WIPP—TRUW—Infrastructure Impacts for Treatment

TRUW Alternatives	Number of Sites		Treat STD	Effect of Implementation of Alternatives									
				Land Use		Water		Waste Water		Power		Employment (FTE)	
	CH Treat	RH Treat		Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Peak Construction Employment	% of Current Employment (1)
No Action**	16	5	WIPP WAC	--	--	--	--	--	--	--	--	--	--
Decentralized***	16	5	WIPP WAC	--	--	--	--	--	--	--	--	--	--
Regionalized-1	5	2	Reduce Gas	--	--	--	--	--	--	--	--	--	--
Regionalized-2	5	2	LDR	--	--	--	--	--	--	--	--	--	--
Regionalized-3	3	2	LDR	--	--	--	--	--	--	--	--	--	--
Centralized	WIPP	2	LDR	8.8	0.09	41429	0.48	15204	82.18	3.5	49.96	1512	2350.00

Notes:
GPD = Gallons per Day
MW = Megawatts Electric
FTE = Full Time Equivalent
(1) Based on 1991 Site Employment.
** For No Action Alternative, storage is indefinite: no disposal at WIPP to assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
-- = WIPP is only considered under the Centralized Alternative.

Table II-17.3-12. WIPP—TRUW—Cost

TRUW Alternatives	Number of Sites		Treat STD (2)	Total Cost (Millions) (1)	Life-Cycle Component				Functional Area		
	CH Treat	RH Treat			Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Retrieval Characterization (Millions)	Treatment (Millions)	Storage (Millions)
No Action**	11	5	WIPP - WAC	- -	- -	- -	- -	- -	- -	- -	- -
Decentralized***	16	5	WIPP - WAC	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-1	5	2	Reduce Gas	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-2	5	2	LDR	- -	- -	- -	- -	- -	- -	- -	- -
Regionalized-3	3	2	LDR	- -	- -	- -	- -	- -	- -	- -	- -
Centralized	WIPP	2	LDR	2346	185	832	1243	86	0	2346	0

Notes:
** For No Action Alternative, storage is indefinite; no disposal at WIPP to be assumed, for all other alternatives, disposal at WIPP is assumed.
*** In Decentralized Alternative, TRUW is processed at all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
The Life Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum may not reflect the true total cost.
(1) In Current 1994 Dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.
(2) Treatment standard (STD) applied: treat to WIPP Waste Acceptance Criteria (WIPP WAC), treat for reduced gas generation (Reduce Gas), treat to Land Disposal Restrictions (LDR).

18.0 WVDP

WVDP currently is custodian of significant volumes of LLMW, LLW, and TRUW. Each of the waste types is treated independently in the following sections.

18.1 WVDP LLMW

Fourteen tables immediately following portray the impacts of LLMW at WVDP. These tables are presented as follows:

Impact Category

No.	Description	Table No.	Page No.
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Table II-18.1-1. WVDP—LLMW—Treatment and Disposal: Estimated Number of Fatalities

LLMW Alternatives	Number of Sites		Treatment				Disposal	
			WM Worker		Offsite Population	Noninvolved Workers	WM Worker	
	T	D	Radiation Exposure	Physical Hazards	Radiation Exposure	Radiation Exposure	Radiation Exposure	Physical Hazards
No Action	3	-	6.7E-05	2.8E-03	2.7E-04	6.7E-07	- -	- -
Decentralized	37	16	2.5E-03	4.8E-03	2.5E-07	4.2E-10	- -	- -
Regionalized-1	11	12	2.8E-05	3.2E-03	1.7E-07	2.2E-10	- -	- -
Regionalized-2	7	6	2.8E-05	3.2E-03	1.7E-07	2.2E-10	- -	- -
Regionalized-3	7	1	2.8E-05	3.2E-03	1.7E-07	2.2E-10	- -	- -
Regionalized-4	4	6	2.9E-05	3.3E-03	1.7E-07	2.3E-10	- -	- -
Centralized	1	1	2.9E-05	3.3E-03	1.7E-07	2.3E-10	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this Alternative.

Table II-18.1-2. WVDP—LLMW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

LLMW Alternatives	Number of Sites		Offsite Population				Noninvolved Workers				WM Worker			
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects	Dose (person-re	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects
No Action	3	-	5.5E-01	9.3E-04	3.0E-07	5.5E-05	1.3E-03	2.3E-06	5.9E-09	1.3E-07	1.7E-01	2.4E-04	2.3E-09	1.0E-05
Decentralized	37	16	5.0E-04	8.6E-07	5.1E-09	5.0E-08	8.4E-07	1.4E-09	1.0E-10	8.4E-11	6.2E+00	8.6E-03	1.2E-09	3.7E-04
Regionalized-1	11	12	3.4E-04	5.8E-07	4.5E-09	3.4E-08	4.4E-07	7.5E-10	8.9E-11	4.4E-11	6.9E-02	9.6E-05	1.1E-09	4.1E-06
Regionalized-2	7	6	3.4E-04	5.8E-07	4.5E-09	3.4E-08	4.4E-07	7.5E-10	8.9E-11	4.4E-11	6.9E-02	9.6E-05	1.1E-09	4.1E-06
Regionalized-3	7	1	3.4E-04	5.8E-07	4.5E-09	3.4E-08	4.4E-07	7.5E-10	8.9E-11	4.4E-11	6.9E-02	9.6E-05	1.1E-09	4.1E-06
Regionalized-4	4	6	3.5E-04	5.9E-07	4.5E-09	3.5E-08	4.6E-07	7.8E-10	9.0E-11	4.6E-11	7.3E-02	1.0E-04	1.2E-09	4.4E-06
Centralized	1	1	3.5E-04	5.9E-07	4.5E-09	3.5E-08	4.6E-07	7.8E-10	9.0E-11	4.6E-11	7.3E-02	1.0E-04	1.2E-09	4.4E-06

Notes:
T = Treatment
D = Disposal

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Table II-18.1-3. WVDP—LLMW—Disposal: Estimated Number of Cancer Incidences

LLMW Alternatives	Number of Sites		WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	3	-	- -	- -	- -
Decentralized	37	16	- -	- -	- -
Regionalized-1	11	12	- -	- -	- -
Regionalized-2	7	6	- -	- -	- -
Regionalized-3	7	1	- -	- -	- -
Regionalized-4	4	6	- -	- -	- -
Centralized	1	1	- -	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this Alternative.

Table II-18.1-4. WVDP—LLMW—Treatment and Disposal: MEI Probability of Cancer Fatality

LLMW Alternatives	Number of Sites		Treatment		Disposal
	T	D	Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability	Hypothetical Farm Family Most Exposed Lifetime MEI Cancer Fatality Probability
No Action	3	-	4.1E-09	3.8E-09	- -
Decentralized	37	16	3.8E-12	2.4E-12	- -
Regionalized-1	11	12	2.6E-12	1.3E-12	- -
Regionalized-2	7	6	2.6E-12	1.3E-12	- -
Regionalized-3	7	1	2.6E-12	1.3E-12	- -
Regionalized-4	4	6	2.6E-12	1.3E-12	- -
Centralized	1	1	2.6E-12	1.3E-12	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered under the Alternative

Table II-18.1-5. WVDP—LLMW—Treatment and Disposal: MEI Probability of Cancer Incidences and Genetic Effects

LLMW Alternatives	Number of Sites		Treatment								Disposal			
			Offsite Population MEI				Noninvolved Worker MEI				Most Exposed Farm Family Lifetime MEI			
	T	D	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability	Dose (rem)	Radiation Cancer Incidence Probability	Chemical Cancer Incidence Probability	Radiation Genetic Effects Probability
No Action	3	-	8.2E-06	1.4E-08	1.0E-11	8.2E-10	7.6E-06	1.3E-08	3.0E-11	7.6E-10	- -	- -	- -	- -
Decentralized	37	16	7.6E-09	1.3E-11	1.7E-13	7.6E-13	4.8E-09	8.1E-12	5.1E-13	4.8E-13	- -	- -	- -	- -
Regionalized-1	11	12	5.2E-09	8.8E-12	1.5E-13	5.2E-13	2.5E-09	4.3E-12	4.5E-13	2.5E-13	- -	- -	- -	- -
Regionalized-2	7	6	5.2E-09	8.8E-12	1.5E-13	5.2E-13	2.5E-09	4.3E-12	4.5E-13	2.5E-13	- -	- -	- -	- -
Regionalized-3	7	1	5.2E-09	8.8E-12	1.5E-13	5.2E-13	2.5E-09	4.3E-12	4.5E-13	2.5E-13	- -	- -	- -	- -
Regionalized-4	4	6	5.2E-09	8.9E-12	1.5E-13	5.2E-13	2.6E-09	4.4E-12	4.5E-13	2.6E-13	- -	- -	- -	- -
Centralized	1	1	5.2E-09	8.9E-12	1.5E-13	5.2E-13	2.6E-09	4.4E-12	4.5E-13	2.6E-13	- -	- -	- -	- -

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
- - = Disposal is not considered for this alternative.

Table II-18.1-6. WVDP—LLMW—Treatment and Disposal: Noncancer Health Risk from Chemical Exposure

LLMW Alternatives	Number of Sites		Treatment			Disposal
	T	D	Offsite MEI Hazard Index	Noninvolved Worker MEI Hazard Index	WM Worker Exposure Index	Hypothetical Farm Family Most Exposed Lifetime Hazard Index
No Action	3	-	9.7E-09	2.9E-08	8.7E-08	- -
Decentralized	37	16	7.1E-11	2.1E-10	9.9E-08	- -
Regionalized-1	11	12	2.1E-11	6.2E-11	8.7E-08	- -
Regionalized-2	7	6	2.1E-11	6.2E-11	8.7E-08	- -
Regionalized-3	7	1	2.1E-11	6.2E-11	8.7E-08	- -
Regionalized-4	4	6	2.4E-11	6.9E-11	9.9E-08	- -
Centralized	1	1	2.4E-11	6.9E-11	9.9E-08	- -

Notes:
T = Treatment
D = Disposal
- - = Disposal is not considered for this alternative.
MEI = Maximally Exposed Individual
Hazard Index = Sum of hazard quotient values for all noncarcinogenic chemicals. The hazard quotient is the chemical-specific ratio of media exposure concentrations to concentrations believed to have no appreciable adverse effects.
Exposure Index = Ratio of Exposure concentration to chemical-specific occupational threshold limits.

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Table II-18.1-7. WVDP—LLMW—Emissions in Tons per Year of Criteria Air Pollutants

LLMW Alternatives	Number of Sites		Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	4 (0/4)	1 (0/1)	0	0	0	1 (0/1)	0	0	0	0	0	0
Decentralized	37	16	3 (1/2)	2 (2/0)	0	0	0	0	1 (0/1)	0	0	0	0	0
Regionalized-1	11	12	1 (0/1)	0	0	0	0	0	0	0	0	0	0	0
Regionalized-2	7	6	1 (0/1)	0	0	0	0	0	0	0	0	0	0	0
Regionalized-3	7	1	1 (0/1)	0	0	0	0	0	0	0	0	0	0	0
Regionalized-4	4	6	1 (0/1)	0	0	0	0	0	0	0	0	0	0	0
Centralized	1	1	1 (0/1)	0	0	0	0	0	0	0	0	0	0	0

Notes:
T = Treatment
D = Disposal
Emissions <1 tons per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions / worker vehicles emission).
(2) Values = total emissions (stationary-source emissions / mobile-source emission).

Table II-18.1-8. WVDP—LLMW—Percent of Standard/Guideline for Criteria Air Pollutants

LLMW Alternatives	Number of Sites		Construction					
			Percent of Tons/Year General Conformity Rule (1)					
	T	D	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	--	--	--	--	--	--
Decentralized	37	16	--	--	--	--	--	--
Regionalized-1	11	12	--	--	--	--	--	--
Regionalized-2	7	6	--	--	--	--	--	--
Regionalized-3	7	1	--	--	--	--	--	--
Regionalized-4	4	6	--	--	--	--	--	--
Centralized	1	1	--	--	--	--	--	--

LLMW Alternatives	Number of Sites		Operations & Maintenance											
			Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)					
	T	D	CO (4)	NO2 (4)	Pb (4)	PM10 (4)	SO2 (4)	VOC (4)	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	0	0	0	0	0	0	--	--	--	--	--	--
Decentralized	37	16	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1	11	12	0	0	0	0	0	0	--	--	--	--	--	--
Regionalized-2	7	6	0	0	0	0	0	0	--	--	--	--	--	--
Regionalized-3	7	1	0	0	0	0	0	0	--	--	--	--	--	--
Regionalized-4	4	6	0	0	0	0	0	0	--	--	--	--	--	--
Centralized	1	1	0	0	0	0	0	0	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) WVDP is in an attainment area for all criteria pollutants, therefore the GCR does not apply.
(2) Percent of either PSD or GCR tons per year (tpy) limit as indicated by pollutant footnote.
(3) The value presented is the highest of all NAAQS averaging periods for that pollutant. Stationary-source emissions are assumed to be negligible for all but the Decentralized Alternative.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.

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Table II-18.1-9. WVDP—LLMW—Percent of Standards/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

LLMW Alternatives	Number of Sites		Operations & Maintenance											
	T	D	Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action	3	-	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Decentralized	37	16	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Regionalized-	11	12	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Regionalized-	7	6	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Regionalized-	7	1	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Regionalized-	4	6	0	0	0	- -	- -	0	- -	- -	0	0	0	0
Centralized	1	1	0	0	0	- -	- -	0	- -	- -	0	0	0	0

LLMW Alternatives	Number of Sites		Operations & Maintenance									
	T	D	Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action	3	-	- -	0	0	0	- -	0	0	0	- -	- -
Decentralized	37	16	- -	0	0	0	- -	0	0	0	- -	- -
Regionalized-	11	12	- -	0	0	0	- -	0	0	0	- -	- -
Regionalized-	7	6	- -	0	0	0	- -	0	0	0	- -	- -
Regionalized-	7	1	- -	0	0	0	- -	0	0	0	- -	- -
Regionalized-	4	6	- -	0	0	0	- -	0	0	0	- -	- -
Centralized	1	1	- -	0	0	0	- -	0	0	0	- -	- -

Notes:
T = Treatment
D = Disposal
- - = Emissions of this hazardous or toxic air pollutant are assumed to be negligible.
Percentages <1% are shown as zeros.

Table II-18.1-10. WVDP—LLMW—Impacts on Water Resources Due to Increased Water Use

LLMW Alternatives	Number of Sites		Construction			Operations			
	T	D	Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action	3	-	229	0.3	<0.1	18	<0.1	<0.1	<0.1
Decentralized	37	16	1925	2.8	<0.1	240	0.3	<0.1	<0.1
Regionalized-1	11	12	365	0.5	<0.1	173	0.2	<0.1	<0.1
Regionalized-2	7	6	365	0.5	<0.1	173	0.2	<0.1	<0.1
Regionalized-3	7	1	365	0.5	<0.1	173	0.2	<0.1	<0.1
Regionalized-4	4	6	365	0.5	<0.1	173	0.2	<0.1	<0.1
Centralized	1	1	365	0.5	<0.1	173	0.2	<0.1	<0.1

Notes:
T = Treatment
D = Disposal
Notes: Water supplied by surface water from 2 onsite reservoirs. Current water use = 70,000 gallons/day. Wastewater discharged to Buttermilk Creek. Average flow rate of Buttermilk Creek = 41,000,000 gallons/day.
<0.1 indicates that the percentage is less than 0.1%.

Table II-18.1-11. WVDP—LLMW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal

LLMW Alternatives	Number of Sites		Ac 225	Ac 227	Am 241	Am 242	Am 243	C 14	Cs 135	Cs 137	Cm 242	Cm 244	Cm 245	I 129	Pb 210	Np 237	Ni 59	Ni 63	Pd 107	Pu 238	Pu 239	Pu 240	Pu 241
	T	D																					
No Action	3	-	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1	11	12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-2	7	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	4	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

LLMW Alternatives	Number of Sites		Po 210	K 40	Pa 231	Ra 223	Ra 226	Sm 151	Se 79	Sr 90	Tc 99	Th 227	Th 228	Th 229	Th 230	Th 232	Sn 126	U 233	U 234	U 235	U 236	U 238	Y 90	Zr 93
	T	D																						
No Action	3	-	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Regionalized-1	11	12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-2	7	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-3	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-4	4	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Centralized	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
T = Treatment
D = Disposal
-- = No disposal at this site for this alternative.

Table II-18.1-12. WVDP—LLMW—Socioeconomics Impacts for Treatment and Disposal

LLMW Alternatives	Number of Sites		Effect of Implementation of Alternatives					
				Jobs		Income		
	T	D	Cost (Millions) (1)	Annual Jobs	% Annual Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action	3	-	23	21	0.00	0.2	0.00	0.00
Decentralized	37	16	15	17	0.00	0.2	0.00	0.00
Regionalized-1	11	12	6	7	0.00	0.1	0.00	0.00
Regionalized-2	7	6	6	7	0.00	0.1	0.00	0.00
Regionalized-3	7	1	6	7	0.00	0.1	0.00	0.00
Regionalized-4	4	6	6	7	0.00	0.1	0.00	0.00
Centralized	1	1	6	7	0.00	0.1	0.00	0.00

Notes:
T = Treatment
D = Disposal
(1) In current 1990 dollars.
(2) Compared to 1990 baseline

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Table II-18.1-13. WVDP—LLMW—Infrastructure Impacts for Treatment and Disposal

LLMW Alternatives	Number of Sites		Effect of Implementation of Alternatives									
			Land Use		Water		Waste Water		Power		Employment (FTE)	
	T	D	Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	% Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Peak Construction Employment	% of Current Employment (1)
No Action	3	-	0.36	0.221	229	0.21	18	0.03	0.02	0.31	34	5
Decentralized	37	16	1.5	0.908	1925	1.75	240	0.34	0.26	4.03	14	2
Regionalized-1	11	12	0.65	0.393	365	0.33	173	0.25	0.03	0.54	8	1
Regionalized-2	7	6	0.65	0.393	365	0.33	173	0.25	0.03	0.54	8	1
Regionalized-3	7	1	0.65	0.393	365	0.33	173	0.25	0.03	0.54	8	1
Regionalized-4	4	6	0.65	0.393	365	0.33	173	0.25	0.03	0.55	8	1
Centralized	1	1	0.65	0.393	365	0.33	173	0.25	0.03	0.55	8	1

Notes:
T = Treatment
D = Disposal
GPD = Gallons per Day
MW = Megawatts
(1) Based on 1991 Site Employment

Table II-18.1-14. WVDP—LLMW—Cost

LLMW Alternatives	Number of Sites		Total Cost (Millions) (1)	Cost by Life-Cycle Component (1)				Cost by Functional Area (1)		
	T	D		Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Treatment (Millions)	Storage (Millions)	Disposal (Millions)
No Action	3	-	26	9	11	5	1	7	19	0
Decentralized	37	16	17	2	7	6	2	7	0	10
Regionalized-1	11	12	7	2	4	1	1	7	0	0
Regionalized-2	7	6	7	2	4	1	1	7	0	0
Regionalized-3	7	1	7	2	4	1	1	7	0	0
Regionalized-4	4	6	7	2	4	1	1	7	0	0
Centralized	1	1	7	2	4	1	1	7	0	0

Notes:
T = Treatment
D = Disposal
The Life-Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum of these may not reflect the true total cost.
(1) In current 1994 dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

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18.2 WVDP LLW

WVDP is not considered as a site for management of LLW. Therefore, Section 18.3 has been intentionally left blank.

18.3 WVDP TRUW

WVDP is not considered as a site for management of TRUW. Therefore, Section 18.3 has been intentionally left blank.

18.4 WVDP HLW

Nine of the 14 impact categories apply to HLW at WVDP. These impacts are presented in the following tables.

Impact Category

No.	Description	Table No.	Page No.
1.	WVDP—HLW—Storage: Estimated Number of Fatalities	II-18.4-1	18-18
2.	WVDP—HLW—Storage: Estimated Number of Cancer Incidences and Genetic Effects	II-18.4-2	18-19
7.	WVDP—HLW—Emissions in Tons per Year of Criteria Air Pollutants	II-18.4-3	18-20
8.	WVDP—HLW—Percent of Standard/Guideline for Criteria Air Pollutants	II-18.4-4	18-21
9.	WVDP—HLW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-18.4-5	18-22
10.	WVDP—HLW—Impacts on Water Resources Due to Increased Water Use	II-18.4-6	18-23
12.	WVDP—HLW—Socioeconomics Impacts for Storage	II-18.4-7	18-24
13.	WVDP—HLW—Infrastructure Impacts for Storage	II-18.4-8	18-25
14.	WVDP—HLW—Cost	II-18.4-9	18-26

Table II-18.4-1. WVDP—HLW—Storage: Estimated Number of Fatalities

HLW Alternatives	Number of Sites	WM Worker	
	S	Radiation Exposure	Physical Hazards
No Action	4	4.9E-02	1.7E-02
Decentralized	4	4.9E-02	1.7E-02
Regionalized-1	3	3.1E-02	9.2E-03
Regionalized-2	3	4.3E-02	1.5E-02
Centralized	3	4.3E-02	1.5E-02

Note:
S = Storage

Table II-18.4-2. WVDP—HLW—Storage: Estimated Number of Cancer Incidences and Genetic Effects

HLW Alternatives	Number of Sites	WM Worker		
	S	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	4	1.2E+02	1.7E-01	7.3E-03
Decentralized	4	1.2E+02	1.7E-01	7.3E-03
Regionalized-1	3	7.8E+01	1.1E-01	4.7E-03
Regionalized-2	3	1.1E+02	1.5E-01	6.5E-03
Centralized	3	1.1E+02	1.5E-01	6.5E-03

Notes:
S = Storage

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Table II-18.4-3. WVDP—HLW—Emissions in Tons per Year of Criteria Air Pollutants

HLW Alternatives	Number of Sites S	Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
		CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action	4	0	0	0	0	0	0	3 (0/3)	1 (0/1)	0	0	0	0
Decentralized	4	0	0	0	0	0	0	3 (0/3)	1 (0/1)	0	0	0	0
Regionalized-1	3	0	0	0	0	0	0	3 (0/3)	1 (0/1)	0	0	0	0
Regionalized-2	3	0	0	0	0	0	0	3 (0/3)	1 (0/1)	0	0	0	0
Centralized	3	0	0	0	0	0	0	3 (0/3)	1 (0/1)	0	0	0	0

Notes:
S = Storage
Data is based on repository beginning to accept HLW canisters in 2015.
Emissions <1 ton per year are shown as zeros. VOC = Volatile Organic Compounds.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
(1) Values = total emissions (equipment emissions/worker vehicles emission)
(2) Values = total emissions (stationary-source emissions/mobile-source emission)

Table II-18.4-4. WVDP—HLW—Percent of Standard/Guideline for Criteria Air Pollutants

HLW Alternatives	Number of Sites S	Construction: Percent of Tons/Year General Conformity Rule (1)					
		CO	NO2	Pb	PM10	SO2	VOC
No Action	4	--	--	--	--	--	--
Decentralized	4	--	--	--	--	--	--
Regionalized - 1	3	--	--	--	--	--	--
Regionalized - 2	3	--	--	--	--	--	--
Centralized	1	--	--	--	--	--	--

HLW Alternatives	Number of Sites S	Operations & Maintenance: Percent of Tons/Year Standard or Guideline (2)						Percent of NAAQS Concentration (3)				
		CO (4)	NO2 (4)	Pb (4)	PM10 (4)	SO2 (4)	VOC (4)	CO	NO2	Pb	PM10	SO2
No Action	4	--	--	--	--	--	--	--	--	--	--	--
Decentralized	4	--	--	--	--	--	--	--	--	--	--	--
Regionalized - 1	3	--	--	--	--	--	--	--	--	--	--	--
Regionalized - 2	3	--	--	--	--	--	--	--	--	--	--	--
Centralized	1	--	--	--	--	--	--	--	--	--	--	--

Notes:
S = Storage
Percentages <1% are shown as zeros. PSD = Prevention of Significant Deterioration. GCR = General Conformity Rule.
CO = carbon monoxide. NO2 = nitrogen dioxide. Pb = lead. PM10 = particulate matter less than 10 microns in diameter. SO2 = sulfur dioxide.
VOC = volatile organic compounds. NAAQS = National Ambient Air Quality Standard.
(1) WVDP is in an attainment area for all criteria pollutants, therfore the GCR does not apply.
(2) Stationary-source emissions from HLW storage facilities are assumed to be negligible.
(3) Stationary-source emissions from HLW storage facilities are assumed to be negligible.
(4) Attainment area for this pollutant, therefore PSD increment levels are applied. Values are for stationary-source emissions only.

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Table II-18.4-5. WVDP—HLW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

HLW Alternatives	Number of Sites	Operations & Maintenance											
	S	Total Radio-nuclides	Acetone	Benzene	Bromo-dichloro-methane	Butyl Alcohol	Carbon Tetra-chloride	Chloro-form	Chloro-methane	Chromium VI	Cyanide	1,2-Dichloro-ethane	Lead
No Action	4	--	--	--	--	--	--	--	--	--	--	--	--
Decentralized	4	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-1	3	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-2	3	--	--	--	--	--	--	--	--	--	--	--	--
Centralized	1	--	--	--	--	--	--	--	--	--	--	--	--

HLW Alternatives	Number of Sites	Operations & Maintenance									
	S	Methanol	Methylene Chloride	Selenium	Silver	1,1,2,2-Tetrachloro-ethane	1,2,2-Trichloro, 1,1-Trifluoro-ethane	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Triochloro-fluoro-methane	Vinyl Chloride
No Action	4	--	--	--	--	--	--	--	--	--	--
Decentralized	4	--	--	--	--	--	--	--	--	--	--
Regionalized-1	3	--	--	--	--	--	--	--	--	--	--
Regionalized-2	3	--	--	--	--	--	--	--	--	--	--
Centralized	1	--	--	--	--	--	--	--	--	--	--

Notes:
S = Storage
-- = Emissions of hazardous and toxic air pollutants, including radionuclides, from HLW storage facilities are assumed to be negligible.

Table II-18.4-6. WVDP—HLW—Impacts on Water Resources Due to Increased Water Use

HLW Alternatives	Number of Sites	Construction			Operations			
	S	Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	Waste Water % Stream Flow
No Action	4	- -	- -	- -	1300	1.9	<0.1	<0.1
Decentralized	4	- -	- -	- -	1300	1.9	<0.1	<0.1
Regionalized-1	3	- -	- -	- -	1300	1.9	<0.1	<0.1
Regionalized-2	3	- -	- -	- -	1300	1.9	<0.1	<0.1
Centralized	3	- -	- -	- -	1300	1.9	<0.1	<0.1

Notes:
S = Storage
Water supplied by surface water from 2 onsite reservoirs. Current water use = 70,000 gallons/day.
Wastewater discharged to Buttermilk Creek. Average flow rate of Buttermilk Creek = 41,000,000 gallons/day.
Data is based on repository beginning to accept HLW canisters in 2015.
- - = Construction is not considered at WVDP.
<0.1 indicates that the percentage is less than 0.1%.

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Table II-18.4-5. WVDP—HLW—Socioeconomics Impacts for Storage

HLW Alternatives	S	Effect of Implementation of Alternatives					
			Jobs		Income		
		Cost (Millions) (1)	Annual Jobs	% Annual Change in ROI (2)	ROI Annual Income (Millions) (1)	% Change in Annual Income (Millions) (1)	% ROI Population Increase (2)
No Action	4	11	12	0.00	0.1	0.00	0.00
Decentralized	4	25	28	0.00	0.3	0.00	0.00
Regionalized-1	3	25	28	0.00	0.3	0.00	0.00
Regionalized-2	3	25	28	0.00	0.3	0.00	0.00
Centralized	3	25	28	0.00	0.3	0.00	0.00

Notes:
S = Storage
(1) In current 1990 dollars. The economic multiplies analysis only was applied to costs through 2015.
(2) Compared to 1990 baseline.

Table II-18.4–8. WVDP—HLW—Infrastructure Impacts for Storage

HLW Alternatives	Number of Sites	Effect of Implementation of Alternatives									
		Land Use		Water		Waste Water		Power		Employment (FTE)	
	S	Acres Required	% of Designated or Suitable Land Area	Demand (GPD)	Current Capacity	Demand (GPD)	% Current Capacity	Power Required (MW)	% Current Capacity	Construction Employment	% of Current Employment (1)
No Action	4	- -	- -	1300	1.19	1300	1.9	0.04	0.57	- -	- -
Decentralized	4	- -	- -	1300	1.19	1300	1.9	0.04	0.57	- -	- -
Regionalized-1	3	- -	- -	1300	1.19	1300	1.9	0.04	0.57	- -	- -
Regionalized-2	3	- -	- -	1300	1.19	1300	1.9	0.04	0.57	- -	- -
Centralized	3	- -	- -	1300	1.19	1300	1.9	0.04	0.57	- -	- -

Notes:
S = Storage
GPD = Gallons per Day
MW = Megawatts Electric
FTE = Full Time Equivalent
(1) Based on 1991 Site Employment.
- - = Construction is not considered at WVDP.

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Table II-18.4-9. WVDP—HLW—Cost

HLW Alternatives	Number of Sites	Total Cost (Millions) (1)	Cost by Life-Cycle Component (1)		Cost by Functional Area (1)	
	S		Construction (Millions) (2)	Operations & Maintenance (3) (Millions)	Storage (Millions)	Handling (Millions)
No Action	4	30	10	20	12	18
Decentralized	4	29	10	19	11	18
Regionalized-1	3	29	10	19	11	18
Regionalized-2	3	29	10	19	11	18
Centralized	3	29	10	19	11	18
Centralized Delayed Acceptance	3	29	10	19	11	18

Notes:
S = Storage
The Life Cycle Components and the Functional Area have been rounded to the nearest million, and therefore the sum may not reflect the true total cost.
(1) In current 1994 Dollars; Total Cost = Sum of Life Cycle Components = Sum of Functional Areas.
(2) Construction costs are for the interim storage facilities.
(3) Operations and maintenance costs include operation and maintenance of the interim storage facilities, and the handling of canisters (unloading/loading of canisters into or out of the interim storage facilities).