This document was too large to scan as a whole document, therefore it required breaking into smaller sections

Document Number DOE/EIS-0200-F

EDMC Number 47371

Sec 4

II.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.

II.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 and Genetic Effects	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	-	3.8E-04	1.4E-02	3.2E-04	2.4E-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	-	6.3E-01	1.1E-03	3.3E-05	6.3E-05	4.7E-03	8.0E-06	2.3E-06	4.7E-07	9.4E-01	1.3E-03	2.4E-06	5.6E-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

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

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	-	6.0E-09	2.1E-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

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				Hypothetical Farm Family Most Exposed 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	-	1.2E-05	2.0E-08	1.1E-09	1.2E-09	4.2E-06	7.1E-09	1.1E-09	4.2E-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	-	7.3E-07	7.3E-07	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.

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).

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	- -	0.2
Regionalized-1	11	12	23556	5.9	- -	4630	1.2	- -	0.3
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
GPD = Gallons per day
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%.

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	0	0	20	0	9	9	0
Regionalized-1	11	12	0	0	0	20	0	9	9	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	7	0	0	8	4	3	0
Regionalized-1	11	12	7	0	0	8	4	3	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-4.1-13. FEMP—LLMW—Socioeconomic 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 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	2.64	7.99	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

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	67	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 1994 dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

II.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
13.	FEMP—LLW—Socioeconomic Impacts for Treatment and Disposal	II-4.2-11	4-28
14.	FEMP—LLW—Infrastructure Impacts for Treatment and Disposal	II-4.2-12	4-29
15.	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.

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.

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			Hypothetical Farm Family 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	3 (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.

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	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 mobile-source 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
GPD = Gallons per day
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
* FEMP is shown as a candidate site for disposal in the Decentralized, Regionalized 1, and Regionalized 2 alternatives; however, this disposal would be for onsite waste only if FEMP is determined to have WM LLW. At present, FEMP does not report WM LLW.
** Ten sites use existing facilities for Volume Reduction
-- = Disposal is not considered for this Alternative.

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
ROI = Region of Influence
(1) In 1990 dollars.
(2) Compared to 1990 baseline.
- - = Treatment and Disposal is not considered under the Alternative.
** Ten sites use existing facilities for Volume Reduction.

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.

-- = Treatment and Disposal is not considered under the alternative.

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 1994 Dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

II.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.

II.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 and Genetic Effects	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
11.	Hanford—LLMW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal (Remote-Handled)	II-5.1-12	5-14
12.	Hanford—LLMW—Percent of Drinking Water Standards for Hazardous Constituents in Groundwater from Disposal (Contact-Handled)	II-5.1-13	5-15
13.	Hanford—LLMW—Percent of Drinking Water Standards for Hazardous Constituents in Groundwater from Disposal (Remote-Handled)	II-5.1-14	5-16

13.	Hanford—LLMW—Socioeconomic Impacts for Treatment and Disposal	II-5.1-15	5-17
14.	Hanford—LLMW—Infrastructure Impacts for Treatment and Disposal	II-5.1-16	5-18
15.	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	-	1.1E-01	3.8E-02	7.6E-03	3.1E-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	-	1.5E+01	2.6E-02	1.2E-05	1.5E-03	6.2E-01	1.1E-03	7.3E-06	6.2E-05	2.6E+02	3.7E-01	5.8E-05	1.6E-02
Decentralized	37	16	2.9E+00	5.0E-03	1.1E-06	2.9E-04	1.0E-01	1.7E-04	6.7E-07	1.0E-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 and Genetic Effects

LLMW Alternatives	Number of Sites		WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	3	-	- -	- -	- -
Decentralized	37	18	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.

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	-	1.6E-07	5.3E-07	- -
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				Hypothetical Farm Family Most Exposed 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	-	3.1E-04	5.3E-07	4.1E-10	3.1E-08	1.1E-03	1.8E-06	1.4E-08	1.1E-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

quotient values for a 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	-	4.5E-07	1.6E-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).

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 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	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	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.

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	100	0	60	0	0
Regionalized-1	11	12	0	0	0	100	0	60	0	0
Regionalized-2	7	6	0	0	0	100	0	60	0	0
Regionalized-3	7	1	--	--	--	--	--	--	--	--
Regionalized-4	4	6	0	0	0	100	0	70	0	0
Centralized	1	1	0	0	0	100	0	100	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	80	0	0	90	0	20	0
Regionalized-1	11	12	70	0	0	90	0	20	0
Regionalized-2	7	6	80	0	0	90	0	30	0
Regionalized-3	7	1	--	--	--	--	--	--	--
Regionalized-4	4	6	80	0	0	100	0	30	0
Centralized	1	1	200	0	0	400	0	40	0

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

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	Cyanide
No Action	3	-	--	--	--	--	--	--	--	--
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	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—Socioeconomic 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 1990 dollars.
(2) Compared to 1990 baseline.

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	0.03	3038	0.00	2573	1.29	1.14	0.21	86	1
Decentralized	37	16	10.2	0.17	17456	0.02	9054	4.53	1.57	0.24	409	3
Regionalized-1	11	12	10.4	0.17	17521	0.02	8801	4.40	1.56	0.28	506	4
Regionalized-2	7	6	10.9	0.18	18548	0.02	10166	5.08	1.58	0.29	667	5
Regionalized-3	7	1	8.1	0.13	13232	0.02	7690	3.85	1.18	0.21	417	3
Regionalized-4	4	6	10.9	0.18	18548	0.02	10166	5.08	1.66	0.30	473	3
Centralized	1	1	50.2	0.83	87637	0.11	43085	21.54	8.33	1.52	2081	14

Notes:
T = Treatment
D = Disposal
GPD = Gallons per day
FTE = Full-time equivalent
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	92	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.

II.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
13.	Hanford—LLW—Socioeconomic Impacts for Treatment and Disposal	II-5.2-11	5-31
14.	Hanford—LLW—Infrastructure Impacts for Treatment and Disposal	II-5.2-12	5-32
15.	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

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.

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.

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	--	--	--	--	--	--
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	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	--	--	--	--	--	--
Regionalized-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.

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
GPD = Gallons per day
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%.

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 226	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		1	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		1	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
ROI = Region of Influence
(1) In 1990 dollars.
(2) Compared to 1990 baseline.
** Ten sites use existing facilities for Volume Reduction.

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	0.37	13096	0.02	13096	6.55	2.00	0.37	295	2
Decentralized		16	10.3	0.17	17930	0.02	8772	4.39	2.70	0.49	287	2
Regionalized-1		12	10.3	0.17	17930	0.02	8772	4.39	2.70	0.49	287	2
Regionalized-2	11	12	11.6	0.19	22349	0.03	10996	5.50	3.40	0.62	564	4
Regionalized-3		6	10.3	0.17	17930	0.02	8772	4.39	2.70	0.49	287	2
Regionalized-4	7	6	12.7	0.21	22172	0.03	11331	5.67	3.50	0.64	591	4
Regionalized-5	4	6	12.7	0.21	22172	0.03	11331	5.67	3.50	0.64	591	4
Regionalized-6		2	15.5	0.25	32371	0.04	12256	6.30	10.98	2.00	663	5
Regionalized-7		2	3.7	0.06	6887	0.01	1615	0.81	0.83	0.15	84	1
Centralized-1		1	37.5	0.62	82007	0.10	16522	8.26	33.02	6.00	1238	9
Centralized-2		1	3.7	0.06	6887	0.01	1615	0.81	0.83	0.15	84	1
Centralized-3	7	1	32.7	0.54	86265	0.11	31870	15.94	34.62	6.29	1215	9
Centralized-4	7	1	8.3	0.13	16326	0.02	7153	3.58	1.90	0.35	468	3
Centralized-5	1	1	86.4	1.40	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	881	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	2475	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.

II.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
13.	Hanford—TRUW—Socioeconomic Impacts for Treatment	II-5.3-10	5-44
14.	Hanford—TRUW—Infrastructure Impacts for Treatment	II-5.3-11	5-45
15.	Hanford—TRUW—Cost	II-5.3-12	5-46

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

40 TRUW Alternatives	Treatment						
	Number of Sites		Treatment Standard	WM Worker		Offsite Population Radiation Exposure	Noninvolved Workers Radiation Exposure
	CH Treat	RH Treat		Radiation Exposure	Physical Hazards		
No Action **	16	5	WIPP WAC	1.2E-01	7.0E-02	5.3E-06	3.5E-07
Decentralized ***	16	5	WIPP WAC	1.3E-01	2.6E-01	2.3E-05	1.1E-06
Regionalized-1	5	2	Reduce Gas	1.3E-01	3.9E-01	4.1E-05	2.0E-06
Regionalized-2	5	2	LDR	1.3E-01	5.1E-01	1.7E-01	8.2E-03
Regionalized-3	3	2	LDR	1.3E-01	5.1E-01	1.7E-01	8.2E-03
Centralized	WIPP	2	LDR	1.6E-01	3.2E-01	6.5E-04	3.1E-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 16 sites, then transfered to interim storage at 10 sites, then to WIPP.

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

TRUW Alternatives	Number of Sites		Treatment Standard	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	1.5E-02	2.5E-05	2.6E-11	1.5E-06	7.0E-04	1.2E-06	1.6E-11	7.0E-08	3.1E+02	4.3E-01	1.8E-08	1.8E-02
Decentralized***	16	5	WIPP WAC	4.6E-02	7.9E-05	8.4E-11	4.6E-06	2.3E-03	3.8E-06	5.0E-11	2.3E-07	3.1E+02	4.4E-01	2.2E-08	1.9E-02
Regionalized-1	5	2	Reduce Gas	8.2E-02	1.4E-04	1.3E-10	8.2E-06	4.0E-03	6.8E-06	7.9E-11	4.0E-07	3.3E+02	4.5E-01	1.1E-07	2.0E-02
Regionalized-2	5	2	LDR	3.3E+02	5.7E-01	1.3E-10	3.3E-02	1.6E+01	2.8E-02	7.5E-11	1.6E-03	3.2E+02	4.5E-01	1.9E-07	1.9E-02
Regionalized-3	3	2	LDR	3.3E+02	5.7E-01	1.3E-10	3.3E-02	1.6E+01	2.8E-02	7.5E-11	1.6E-03	3.2E+02	4.5E-01	1.9E-07	1.9E-02
Centralized	WIPP	2	LDR	1.3E+00	2.2E-03	7.9E-11	1.3E-04	6.2E-02	1.1E-04	4.7E-11	6.2E-06	4.1E+02	5.8E-01	7.1E-08	2.5E-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		Treatment Standard	Treatment	
	CH Treat	RH Treat		Offsite MEI Cancer Fatality Probability	Noninvolved Worker MEI Cancer Fatality Probability
No Action**	16	5	WIPP WAC	1.5E-10	6.1E-10
Decentralized***	16	5	WIPP WAC	4.8E-10	1.9E-09
Regionalized-1	5	2	Reduce Gas	8.5E-10	3.4E-09
Regionalized-2	5	2	LDR	3.4E-06	1.4E-05
Regionalized-3	3	2	LDR	3.4E-06	1.4E-05
Centralized	WIPP	2	LDR	1.3E-08	5.3E-08

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 to WIPP.

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

TRUW Alternatives	Number of Sites		Treatment Standard	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	3.0E-07	5.1E-10	<9.9E-14	3.0E-11	1.2E-09	2.1E-06	3.1E-14	1.2E-10
Decentralized ***	16	5	WIPP WAC	9.6E-07	1.6E-09	<9.9E-14	9.6E-11	3.9E-06	6.6E-09	9.8E-14	3.9E-10
Regionalized-1	5	2	Reduce Gas	1.7E-06	2.9E-09	<9.9E-14	1.7E-10	6.9E-06	1.2E-08	1.6E-13	6.9E-10
Regionalized-2	5	2	LDR	6.8E-03	1.2E-05	<9.9E-14	6.8E-07	2.8E-02	4.8E-05	1.5E-13	2.8E-06
Regionalized-3	3	2	LDR	6.8E-03	1.2E-05	<9.9E-14	6.8E-07	2.8E-02	4.8E-05	1.5E-13	2.8E-06
Centralized	WIPP	2	LDR	2.7E-05	4.6E-08	<9.9E-14	2.7E-09	1.1E-04	1.8E-07	9.2E-14	1.1E-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

Exposure Index = TRUW Alternatives	Number of Sites		Treatment Standard	Treatment		
	CH Treat	RH Treat		Offsite MEI Hazard Index	Noninvolved Worker MEI Hazard Index	WM Worker Exposure Index
No Action**	16	5	WIPP WAC	7.2E-13	2.5E-11	8.0E-07
Decentralized***	16	5	WIPP WAC	4.5E-12	1.6E-10	1.6E-06
Regionalized-1	5	2	Reduce Gas	7.2E-12	2.5E-10	1.6E-06
Regionalized-2	5	2	LDR	7.0E-12	2.5E-10	1.4E-05
Regionalized-3	3	2	LDR	7.0E-12	2.5E-10	1.4E-05
Centralized	WIPP	2	LDR	5.1E-12	1.8E-10	1.6E-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 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		Treatment Standard	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)	17 (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	7 (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	7 (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	6 (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		Treatment Standard	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.

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

TRUW Alternatives	Number of Sites		Treatment Standard	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	7	--	--	--	0	0	--	--	--	--	--	--
Regionalized-3	3	2	LDR	7	--	--	--	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		Treatment Standard	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%.

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	Treatment Standard	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 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		Treatment Standard	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	0.36	52728	0.07	11744	5.87	2.6	0.47	788	5.50
Regionalized-1	5	2	Reduce Gas	23.5	0.39	56413	0.07	13956	6.98	2.6	0.48	986	6.80
Regionalized-2	5	2	LDR	24.7	0.41	64729	0.08	15519	7.76	3.6	0.66	1317	9.10
Regionalized-3	3	2	LDR	24.7	0.41	64729	0.08	15519	7.76	3.6	0.66	1317	9.10
Centralized	WIPP	2	LDR	21.0	0.35	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.

Table II-5.3-12. Hanford—TRUW—Cost

TRUW Alternatives	Number of Sites		Treatment Standard (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 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).

II.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
13.	Hanford—HLW—Socioeconomic Impacts for Storage	II-5.4-7	5-54
14.	Hanford—HLW—Infrastructure Impacts for Storage	II-5.4-8	5-55
15.	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 S	WM Worker Radiation Exposure	WM Worker Physical Hazards
No Action	4	1.1E+00	4.2E-01
Decentralized	4	1.7E+00	6.4E-01
Regionalized-1	3	1.7E+00	6.4E-01
Regionalized-2	3	1.8E+00	6.7E-01
Centralized	1	2.1E+00	7.5E-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 S	WM Worker Dose (person-rem)	WM Worker Radiation Cancer Incidence	WM Worker Radiation Genetic Effects
No Action	4	2.7E+03	3.8E+00	1.6E-01
Decentralized	4	4.4E+03	6.1E+00	2.6E-01
Regionalized-1	3	4.4E+03	6.1E+00	2.6E-01
Regionalized-2	3	4.5E+03	6.4E+00	2.7E-01
Centralized	1	5.2E+03	7.2E+00	3.1E-01

Notes:
S = Storage

Table II-5.4-3. Hanford—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	2 (1/1)	3 (3/0)	0	0	0	0	13 (0/13)	3 (0/3)	0	0	0	2 (0/2)
Decentralized	4	9 (5/4)	14 (14/0)	0	1 (1/0)	1 (1/0)	1 (1/0)	16 (0/16)	3 (0/3)	0	0	0	2 (0/2)
Regionalized-1	3	9 (5/4)	14 (14/0)	0	1 (1/0)	1 (1/0)	1 (1/0)	16 (0/16)	3 (0/3)	0	0	0	2 (0/2)
Regionalized-2	3	9 (5/4)	14 (14/0)	0	1 (1/0)	1 (1/0)	1 (1/0)	16 (0/16)	4 (0/4)	0	0	0	2 (0/2)
Centralized	1	11 (6/5)	15 (15/0)	0	1 (1/0)	1 (1/0)	1 (1/0)	17 (0/17)	4 (0/4)	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 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) 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.

Table II-5.4-5. Hanford—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-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	22	<0.1	<0.1	3,200	<0.1	<0.1	- -
Decentralized	4	27	<0.1	<0.1	8,000	<0.1	<0.1	- -
Regionalized-1	3	27	<0.1	<0.1	8,000	<0.1	<0.1	- -
Regionalized-2	3	27	<0.1	<0.1	8,000	<0.1	<0.1	- -
Centralized	1	28	<0.1	<0.1	8,000	<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%.

Table II-5.4-7. Hanford—HLW—Socioeconomic 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	130	127	0.06	1.4	0.02	0.04
Decentralized	4	292	285	0.13	3.0	0.05	0.08
Regionalized-1	3	292	285	0.13	3.0	0.05	0.08
Regionalized-2	3	298	291	0.14	3.1	0.05	0.08
Centralized	1	318	310	0.14	3.3	0.05	0.08

Notes:
S = Storage
(1) In 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	0.02	3,200	<0.01	3,200	1.6	0.06	0.02	12	0
Decentralized	4	14	0.23	8,000	0.01	8,000	4.0	0.10	0.03	39	0
Regionalized-1	3	14	0.23	8,000	0.01	8,000	4.0	0.10	0.03	39	0
Regionalized-2	3	14	0.23	8,000	0.01	8,000	4.0	0.10	0.03	40	0
Centralized	1	16	0.26	8,000	0.01	8,000	4.0	0.10	0.03	43	0

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

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	1	1734	360	1374	688	1046
Centralized Delayed Acceptance	1	1780	400	1380	730	1050

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 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).

II.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
3.	Hanford—HW—Treatment: Estimated Number of Cancer Incidences	II-5.5-2	5-59
5.	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
13.	Hanford—HW—Socioeconomic Impacts for Treatment	II-5.5-9	5-66
14.	Hanford—HW—Infrastructure Impacts for Treatment	II-5.5-10	5-67
15.	Hanford—HW—Cost	II-5.5-11	5-68

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 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.

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 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.

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	0	8	4	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.

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—Socioeconomic 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 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	0.017	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.

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 1994 Dollars; Total Cost = Sum of the Functional Areas.
(2) Government costs equal to the sum of the life-cycle components.

II.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.

II.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 and Genetic Effects	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
11.	INEL—LLMW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal (Remote-Handled)	II-6.1-12	6-14
12.	INEL—LLMW—Percent of Drinking Water Standards for Hazardous Constituents in Groundwater from Disposal (Contact-Handled)	II-6.1-13	6-15
12.	INEL—LLMW—Percent of Drinking Water Standards for Hazardous Constituents in Groundwater from Disposal (Remote-Handled)	II-6.1-14	6-16

13.	INEL—LLMW—Socioeconomic Impacts for Treatment and Disposal	II-6.1-15	6–17
14.	INEL—LLMW—Infrastructure Impacts for Treatment and Disposal	II-6.1-16	6–18
15.	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	-	1.2E-01	6.0E-02	5.6E-04	1.5E-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.

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-rem)	Radiation Cancer Incidence	Chemical Cancer Incidence	Radiation Genetic Effects
No Action	4	-	1.1E+00	1.9E-03	1.9E-06	1.1E-04	3.0E-01	5.2E-04	2.6E-06	3.0E-05	3.0E+02	4.2E-01	2.2E-05	1.8E-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-6.1-3. INEL—LLMW—Disposal: Estimated Number of Cancer Incidences and Genetic Effects

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.

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	-	7.0E-08	1.3E-07	- -
Decentralized	37	16	6.5E-09	6.0E-09	<9.9E-14
Regionalized-1	11	12	6.5E-09	6.0E-09	<9.9E-14
Regionalized-2	7	6	7.8E-08	3.9E-08	<9.9E-14
Regionalized-3	7	1	7.8E-08	3.9E-08	- -
Regionalized-4	4	6	8.4E-08	4.2E-08	<9.9E-14
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				Hypothetical Farm Family Most Exposed 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	-	1.4E-04	2.4E-07	2.7E-10	1.4E-08	2.6E-04	4.4E-07	2.1E-09	2.6E-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	<9.9E-14	<9.9E-14	7.4E-06	<9.9E-14
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	<9.9E-14	<9.9E-14	7.4E-06	<9.9E-14
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	<9.9E-14	<9.9E-14	7.6E-06	<9.9E-14
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	<9.9E-14	<9.9E-14	4.1E-06	<9.9E-14
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 under the alternative.

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	-	2.6E-07	2.1E-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	113 (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)	88 (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).

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 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	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.

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	1	0	8	0	0
Regionalized-1	11	12	0	0	0	1	0	8	0	0
Regionalized-2	7	6	0	0	0	1	0	8	0	0
Regionalized-3	7	1	--	--	--	--	--	--	--	--
Regionalized-4	4	6	0	0	0	0	0	4	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	4	0	0	10	0	0	0
Regionalized-1	11	12	4	0	0	10	0	0	0
Regionalized-2	7	6	4	0	0	10	0	0	0
Regionalized-3	7	1	--	--	--	--	--	--	--
Regionalized-4	4	6	2	0	0	5	0	0	0
Centralized	1	1	--	--	--	--	--	--	--

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

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	Cyanide
No Action	3	-	--	--	--	--	--	--	--	--
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	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-6.1-15. INEL—LLMW—Socioeconomic 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	-	798	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	1629	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 1990 dollars.
(2) Compared to 1990 baseline

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	0.14	73350	0.24	4304	0.43	10.34	24.73	588	5
Decentralized	37	16	55.6	0.24	110206	0.36	7907	0.74	5.25	12.56	798	7
Regionalized-1	11	12	55.6	0.24	110206	0.36	7907	0.74	5.25	12.56	798	7
Regionalized-2	7	6	23.5	0.10	41313	0.13	8352	0.84	1.70	4.06	716	6
Regionalized-3	7	1	21.6	0.09	38333	0.12	7309	0.73	1.70	4.06	646	5
Regionalized-4	4	6	30.6	0.13	52175	0.17	13239	1.32	2.59	6.20	1055	9
Centralized	1	1	12.2	0.05	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	718	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 1994 dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

II.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
13.	INEL—LLW—Socioeconomic Impacts for Treatment and Disposal	II-6.2-11	6-31
14.	INEL—LLW—Infrastructure Impacts for Treatment and Disposal	II-6.2-12	6-32
15.	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	2.5E-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

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

LLW Alternatives	Number of Sites		Offsite Population			Noninvolved Workers			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.

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	<9.9E-14
Decentralized		16	9.9E-11	2.0E-10	<9.9E-14
Regionalized-1		12	9.9E-11	2.0E-10	<9.9E-14
Regionalized-2	11	12	1.7E-10	3.4E-10	<9.9E-14
Regionalized-3		6	9.9E-11	2.0E-10	<9.9E-14
Regionalized-4	7	6	1.7E-10	3.4E-10	<9.9E-14
Regionalized-5	4	6	5.1E-08	1.0E-07	<9.9E-14
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 Population MEI			Noninvolved Worker MEI			Hypothetical Farm Family 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	<9.9E-14	<9.9E-14	<9.9E-14
Decentralized		16	2.0E-07	3.4E-10	2.0E-11	4.0E-07	6.8E-10	4.0E-11	<9.9E-14	<9.9E-14	<9.9E-14
Regionalized-1		12	2.0E-07	3.4E-10	2.0E-11	4.0E-07	6.8E-10	4.0E-11	<9.9E-14	<9.9E-14	<9.9E-14
Regionalized-2	11	12	3.3E-07	5.7E-10	3.3E-11	6.7E-07	1.1E-09	6.7E-11	<9.9E-14	<9.9E-14	<9.9E-14
Regionalized-3		6	2.0E-07	3.4E-10	2.0E-11	4.0E-07	6.8E-10	4.0E-11	<9.9E-14	<9.9E-14	<9.9E-14
Regionalized-4	7	6	3.3E-07	5.7E-10	3.3E-11	6.7E-07	1.1E-09	6.7E-11	<9.9E-14	<9.9E-14	<9.9E-14
Regionalized-5	4	6	1.0E-04	1.7E-07	1.0E-08	2.0E-04	3.4E-07	2.0E-08	<9.9E-14	<9.9E-14	<9.9E-14
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.

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	68 (9/59)	35 (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	68 (9/59)	35 (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	4 (4/0)	5 (5/0)	20 (5/15)	182 (1/181)	40 (2/38)	0	3 (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.

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
GPD = Gallons per day
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%.

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 245	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 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
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	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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
ROI = Region of Influence
(1) In 1990 dollars.
(2) Compared to 1990 baseline.
** Ten sites use existing facilities for Volume Reduction

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	0.03	4458	0.01	4458	0	1.42	3.4	164	1
Decentralized		16	12.5	0.05	21632	0.07	8483	0	2.41	5.78	488	4
Regionalized-1		12	12.5	0.05	21632	0.07	8483	0	2.41	5.78	488	4
Regionalized-2	11	12	13.9	0.06	21520	0.08	12725	0	2.98	7.14	555	5
Regionalized-3		6	12.5	0.56	21632	0.07	8483	0	2.41	5.78	488	4
Regionalized-4	7	6	13.9	0.06	21520	0.08	12725	0	3.00	7.17	555	5
Regionalized-5	4	6	26.5	0.11	63961	0.21	28247	0	7.30	17.47	2702	23
Regionalized-6		2	7.9	0.03	12191	0.04	4514	0	1.26	3.02	330	3
Regionalized-7		2	7.9	0.03	12191	0.04	4514	0	1.26	3.02	330	3
Centralized-1		1	7.9	0.03	12191	0.04	4514	0	1.26	3.02	330	3
Centralized-2		1	7.9	0.03	12191	0.04	4514	0	1.26	3.02	330	3
Centralized-3	7	1	11.9	0.05	15530	0.06	10059	0	3.00	7.18	454	4
Centralized-4	7	1	11.9	0.05	15530	0.06	10059	0	3.00	7.18	454	4
Centralized-5	1	1	7.9	0.03	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 1994 Dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

II.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
13.	INEL—TRUW—Socioeconomic Impacts for Treatment	II-6.3-10	6-44
14.	INEL—TRUW—Infrastructure Impacts for Treatment	II-6.3-11	6-45
15.	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		Treatment Standard	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		Treatment Standard	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		Treatment Standard	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 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.

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

TRUW Alternatives	CH Treat	RH Treat	Treatment Standard	Treatment							
				Offsite Population 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	<9.9E-14	1.7E-13	2.9E-09	4.9E-12	<9.9E-14	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		Treatment Standard	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 believed to have no appreciable adverse effects.
Exposure Index = Ratio of exposure concentration to chemical-specific occupational threshold limits.

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

TRUW Alternatives	Number of Sites		Treatment Standard	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		Treatment Standard	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		Treatment Standard	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.

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

TRUW Alternatives	Number of Sites		Treatment Standard	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		Treatment Standard	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		Treatment Standard	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:
GPD = Gallons per day
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.

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	Treatment Standard	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		Treatment Standard	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	0.13	65914	0.22	9723	0.97	1.96	4.69	754	6.40
Regionalized-1	5	2	Reduce Gas	27.8	0.12	67519	0.22	11126	1.11	2.66	6.36	842	7.10
Regionalized-2	5	2	LDR	28.2	0.13	71723	0.23	12400	1.24	2.78	6.64	1015	8.60
Regionalized-3	3	2	LDR	28.2	0.13	77743	0.25	16872	1.69	2.78	6.64	1257	10.60
Centralized	WIPP	2	LDR	28.2	0.13	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.

Table II-6.3-12. INEL—TRUW—Cost

TRUW Alternatives	Number of Sites		Treatment Standard (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).

II.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
13.	INEL—HLW—Socioeconomics Impacts for Storage	II-6.4-7	6-54
14.	INEL—HLW—Infrastructure Impacts for Storage	II-6.4-8	6-55
15.	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 Storage Sites	WM Workers	
		Radiation Exposure	Physical Hazards
No Action	4	- -	- -
Decentralized	4	4.7E-01	3.2E-01
Regionalized-1	3	4.7E-01	3.2E-01
Regionalized-2	3	4.7E-01	3.3E-01
Centralized	1	4.7E-01	3.5E-01

Notes:
- - = 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 Storage Sites	WM Workers		
		Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	4	- -	- -	- -
Decentralized	4	1.2E+03	1.6E+00	7.1E-02
Regionalized-1	3	1.2E+03	1.6E+00	7.1E-02
Regionalized-2	3	1.2E+03	1.6E+00	7.1E-02
Centralized	1	1.2E+03	1.6E+00	7.1E-02

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

Table II-6.4-3. INEL—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	0	0	0	0	0	0
Decentralized	4	4 (2/2)	4 (4/0)	0	0	0	0	4 (0/4)	1 (0/1)	0	0	0	0
Regionalized-1	3	4 (2/2)	4 (4/0)	0	0	0	0	4 (0/4)	1 (0/1)	0	0	0	0
Regionalized-2	3	4 (2/2)	4 (4/0)	0	0	0	0	4 (0/4)	1 (0/1)	0	0	0	0
Centralized	1	4 (2/2)	4 (4/0)	0	0	0	0	4 (0/4)	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-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 (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) INEL 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.

Table II-6.4-5. INEL—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 negligibl

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	23	<0.1	- -	820	<0.1	- -	- -
Regionalized-1	3	23	<0.1	- -	820	<0.1	- -	- -
Regionalized-2	3	23	<0.1	- -	820	<0.1	- -	- -
Centralized	1	23	<0.1	- -	820	<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	33	31	0.03	0.3	0.01	0.07
Regionalized-1	3	33	31	0.03	0.3	0.01	0.07
Regionalized-2	3	33	31	0.03	0.3	0.01	0.07
Centralized	1	33	31	0.03	0.3	0.01	0.07

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	2	<0.01	820	0.00	820	0.0	0.03	0.06	15	0
Regionalized-1	3	2	<0.01	820	0.00	820	0.0	0.03	0.06	15	0
Regionalized-2	3	2	<0.01	820	0.00	820	0.0	0.03	0.06	15	0
Centralized	1	2	<0.01	820	0.00	820	0.0	0.03	0.06	15	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.

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	368	40	328	60	308
Regionalized-1	3	368	40	328	60	308
Regionalized-2	3	368	40	328	60	308
Centralized	1	368	40	328	60	308
Centralized Delayed Acceptance	1	308	0	308	0	308

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).

II.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
5.	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
13.	INEL—HW—Socioeconomic Impacts for Treatment	II-6.5-9	6-66
14.	INEL—HW—Infrastructure Impacts for Treatment	II-6.5-10	6-67
15.	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 Treatment Sites	WM Workers Physical Hazards
No Action	2	2.6E-03
Decentralized	3	- -
Regionalized 1	5	6.8E-03
Regionalized 2	2	3.1E-02

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

HW Alternatives	Number of Treatment Sites	Treatment		
		Offsite Population Chemical Cancer Incidence	Noninvolved 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:
- - = Treatment is not considered for this alternative.

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

HW Alternatives	Number of Treatment Sites	Treatment	
		Offsite MEI Cancer Incidence Probability	Noninvolved Worker 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:
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 Treatment Sites	Treatment		
		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:
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.

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	1	0	0	0	0	0	0	0
Decentralized	3	--	--	--	--	--	--	--	--	--	--	--	--
Regionalized-1	5	0	0	0	2	1	0	0	0	0	0	0	0
Regionalized-2	2	0	1	0	17	9	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.
NAAQS = National Ambient Air Quality Standard.
VOC = volatile organic compounds.
(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 assumed to be negligible since 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.

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	0
Regionalized - 2	2	- -	0	- -	- -	0	- -	0	0	0	1

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
GPD = Gallons per day.
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%.

Table II-6.5-9. INEL—HW—Socioeconomic 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	0.005	516	0.00	313	0.00	0.13	0.30	9	0
Regionalized-2	2	3	0.016	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.

II.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:

II.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
9.	LANL—LLMW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants	II-7.1-9	7-10
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 (Contact-Handled)	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
13.	LANL—LLMW—Socioeconomic Impacts for Treatment and Disposal	II-7.1-13	7-14
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 Workers		Offsite Population	Noninvolved Workers	WM Workers	
	T	D	Radiation Exposure	Physical Hazards	Radiation Exposure	Radiation Exposure	Radiation Exposure	Physical Hazards
No Action	3	-	8.4E-04	1.1E-02	7.5E-05	6.7E-06	- -	- -
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 Workers			
	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	3.9E-06	1.5E-05	1.3E-02	2.3E-05	2.0E-06	1.3E-06	2.1E+00	2.9E-03	3.8E-07	1.3E-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

Table II-7.1-3. LANL—LLMW—Disposal: Estimated Number of Cancer Incidences and Genetic Effects

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	-	8.0E-09	5.1E-09	- -
Decentralized	37	16	6.2E-08	8.7E-09	<9.9E-14
Regionalized-1	11	12	6.4E-08	9.0E-09	<9.9E-14
Regionalized-2	7	6	9.1E-08	1.3E-08	<9.9E-14
Regionalized-3	7	1	9.1E-08	1.3E-08	- -
Regionalized-4	4	6	4.0E-09	5.5E-10	<9.9E-14
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

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				Hypothetical Farm Family Most Exposed 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	-	1.6E-05	2.7E-08	4.8E-10	1.6E-09	1.0E-05	1.7E-08	1.2E-09	1.0E-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	<9.9E-14	<9.9E-14	7.7E-05	<9.9E-14
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	<9.9E-14	<9.9E-14	7.7E-05	<9.9E-14
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	<9.9E-14	<9.9E-14	4.3E-05	<9.9E-14
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	<9.9E-14	<9.9E-14	1.2E-07	<9.9E-14
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	-	7.7E-07	1.9E-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.

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.

Table II-7.1-9. LANL—LLMW—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	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-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%.

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	0	0	0	0	0
Regionalized-1	11	12	0	0	0	0	0	0	0	0
Regionalized-2	7	6	0	0	0	2	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	50	0	0	200	0	0	0
Regionalized-1	11	12	50	0	0	200	0	0	0
Regionalized-2	7	6	30	0	0	70	0	0	0
Regionalized-3	7	1	--	--	--	--	--	--	--
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-7.1-13. LANL—LLMW—Socioeconomic 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 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

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	72	79	6	46	131	0
Decentralized	37	16	474	46	179	228	20	395	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	187	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 1994 dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

II.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
13.	LANL—LLW—Socioeconomic Impacts for Treatment and Disposal	II-7.2-11	7-28
14.	LANL—LLW—Infrastructure Impacts for Treatment and Disposal	II-7.2-12	7-29
15.	LANL—LLW—Cost	II-7.2-13	7-30

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.

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	<9.9E-14
Decentralized		16	2.2E-08	1.1E-08	<9.9E-14
Regionalized-1		12	2.2E-08	1.1E-08	<9.9E-14
Regionalized-2	11	12	8.2E-07	5.3E-07	<9.9E-14
Regionalized-3		6	2.2E-08	1.1E-08	<9.9E-14
Regionalized-4	7	6	8.2E-07	5.3E-07	<9.9E-14
Regionalized-5	4	6	2.2E-08	1.1E-08	<9.9E-14
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.

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 Population MEI			Noninvolved Worker MEI			Hypothetical Farm Family 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	<9.9E-14	<9.9E-14	<9.9E-14
Decentralized		16	4.4E-05	7.5E-08	4.4E-09	2.2E-05	3.7E-08	2.2E-09	<9.9E-14	<9.9E-14	<9.9E-14
Regionalized-1		12	4.4E-05	7.5E-08	4.4E-09	2.2E-05	3.7E-08	2.2E-09	<9.9E-14	<9.9E-14	<9.9E-14
Regionalized-2	11	12	1.6E-03	2.8E-06	1.6E-07	1.1E-03	1.8E-06	1.1E-07	<9.9E-14	<9.9E-14	<9.9E-14
Regionalized-3		6	4.4E-05	7.5E-08	4.4E-09	2.2E-05	3.7E-08	2.2E-09	<9.9E-14	<9.9E-14	<9.9E-14
Regionalized-4	7	6	1.6E-03	2.8E-06	1.6E-07	1.1E-03	1.8E-06	1.1E-07	<9.9E-14	<9.9E-14	<9.9E-14
Regionalized-5	4	6	4.4E-05	7.5E-08	4.4E-09	2.2E-05	3.7E-08	2.2E-09	<9.9E-14	<9.9E-14	<9.9E-14
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	28 (10/18)	29 (25/4)	0	2 (2/0)	2 (2/0)	4 (2/2)	68 (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	66 (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)	19 (1/18)	0	0	0	10 (0/10)
Regionalized-4	7	6	118 (12/106)	52 (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)	43 (0/43)	9 (0/9)	0	0	0	5 (0/5)
Regionalized-6		2	19 (2/17)	8 (5/3)	0	0	0	2 (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	2 (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	2 (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	2 (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)	15 (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)	15 (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	2 (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.

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.

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		1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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-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 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.

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		16	1213	95	162	766	190	287	0	925
Regionalized 1		12	1495	121	191	994	190	287	0	1208
Regionalized 2	11	12	1413	140	244	888	141	812	0	602
Regionalized 3		6	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	1	1	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 1994 Dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

II.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 Increased Water Use	II-7.3-9	7-40
13.	LANL—TRUW—Socioeconomic Impacts for Treatment	II-7.3-10	7-41
14.	LANL—TRUW—Infrastructure Impacts for Treatment	II-7.3-11	7-42
15.	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		Treatment Standard	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-06
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		Treatment Standard	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

Table II-7.3-3. LANL—TRUW—Treatment: MEI Probability of Cancer Fatality

TRUW Alternatives	Number of Sites		Treatment Standard	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 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.

Table II-7.3–4. LANL—TRUW—Treatment: MEI Probability of Cancer Incidences and Genetic Effects

TRUW Alternatives	Number of Sites		Treatment Standard	Treatment							
				Offsite Population 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	<9.9E-14	8.7E-11	5.7E-07	9.7E-10	<9.9E-14	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 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.
MEI = Maximally Exposed Individual

Table II-7.3-5. LANL—TRUW—Treatment: Noncancer Health Risk From Chemical Exposure

TRUW Alternatives	Number of Sites		Treatment Standard	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 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.
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-7.3–6. LANL—TRUW—Emissions in Tons per Year of Criteria Air Pollutants

TRUW Alternatives	Number of Sites		Treatment Standard	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	5 (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 (55/9)	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.

Table II-7.3-7. LANL—TRUW—Percent of Standard/Guideline for Criteria Air Pollutants

TRUW Alternatives	Number of Sites		Treatment Standard	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		Treatment Standard	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		Treatment Standard	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		Treatment Standard	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		Treatment Standard	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 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.
- - = 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	Treatment Standard	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 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.

Table II-7.3-11. LANL—TRUW—Infrastructure Impacts for Treatment

TRUW Alternatives	Number of Sites		Treatment Standard	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 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.

Table II-7.3-12. LANL—TRUW—Cost

TRUW Alternatives	Number of Sites		Treatment Standard (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 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 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).

II.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.

II.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
3.	LANL—HW—Treatment: Estimated Number of Cancer Incidences	II-7.5-2	7-47
5.	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
13.	LANL—HW—Socioeconomic Impacts for Treatment	II-7.5-9	7-54
14.	LANL—HW—Infrastructure Impacts for Treatment	II-7.5-10	7-55
15.	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 Treatment Sites	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

Table II-7.5-2. LANL—HW—Treatment: Estimated Number of Cancer Incidences

HW Alternatives	Number of Treatment Sites	Treatment		
		Offsite Population Chemical Cancer Incidences	Noninvolved Worker Chemical Cancer Incidences	WM Worker Chemical Cancer Incidences
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:
- - = Treatment is not considered for this alternative.

Table II-7.5-3. LANL—HW—Treatment: MEI Probability of Cancer Incidences

HW Alternatives	Number of Treatment Sites	Treatment	
		Offsite MEI Chemical Cancer Incidence Probability	Noninvolved MEI Chemical 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:
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 Treatment Sites	Treatment		
		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:
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.

Table II-7.5-5. LANL—HW—Emissions in Tons per Year of Criteria Air Pollutants

HW Alternatives	Number of Treatment Sites	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)	4 (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:
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 Treatment Sites	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 Treatment Sites	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	1	0	0	0	0	0	0	0
Regionalized-1	5	0	1	0	8	4	0	0	0	0	0	0	0
Regionalized-2	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) 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.

Table II-7.5–7. LANL—HW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

HW Alternatives	Number of Treatment Sites	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 Treatment Sites	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:
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 Treatment Sites	Construction			Operations			
		Water Use GPD	% Current Use	% Stream Flow	Water Use GPD	% Current Use	% Stream Flow	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:
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%.

Table II-7.5-9. LANL—HW—Socioeconomic Impacts for Treatment

HW Alternatives	Number of Treatment Sites	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	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:
- - = Treatment is not considered for this alternative.
(1) In 1990 dollars.
(2) Compared to 1990 baseline.

Table II-7.5-10. LANL—HW—Infrastructure Impacts for Treatment

HW Alternatives	Number of Treatment Sites	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	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:
FTE = Full-Time Equivalent
GPD = Gallons per Day
MW = Megawatts Electric
- - = Treatment is not considered for this alternative
(1) Based on 1994 Site Employment.

Table II-7.5-11. LANL—HW—Cost

HW Alternatives	Number of Treatment Sites	Total Cost (Millions) (1)	Government Cost by Life-Cycle Component (1)				Cost by Functional Area (1)	
			Pre-Operations (Millions)	Construction (Millions)	Operations & Maintenance (Millions)	Decontamination & Decommissioning (Millions)	Treatment & Disposal	
							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:
- - = 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 1994 Dollars; Total Cost = Sum of the Functional Areas.
(2) Government costs equal to the sum of the life-cycle components.

II.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.

II.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 and Genetic Effects	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	-	8.2E-04	1.8E-02	9.5E-04	4.4E-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	-	1.9E+00	3.2E-03	9.1E-05	1.9E-04	8.8E-02	1.6E-04	2.2E-05	8.8E-06	2.1E+00	2.9E-03	4.2E-06	1.2E-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

Table II-8.1-3. LLNL—LLMW—Disposal: Estimated Number of Cancer Incidences and Genetic Effects

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	-	1.6E-08	1.5E-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				Hypothetical Farm Family Most Exposed 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	-	3.1E-05	5.3E-08	2.0E-09	3.1E-09	3.0E-05	5.1E-08	6.4E-09	3.0E-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	-	1.2E-06	3.8E-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.

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)	34 (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	-	--	--	--	--	--	--
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	8	0	3	0	1	--	--	--	--	--	--
Decentralized	37	16	0	3	0	5	0	0	0	0	0	1	3	0
Regionalized-1	11	12	0	4	0	5	0	0	0	0	0	1	3	0
Regionalized-2	7	6	0	1	0	0	0	0	--	--	--	--	--	--
Regionalized-3	7	1	0	1	0	0	0	0	--	--	--	--	--	--
Regionalized-4	4	6	0	1	0	0	0	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) 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 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.

Table II-8.1-9. LLNL—LLMW—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	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.

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	1	0	0	0	0
Regionalized-1	11	12	0	0	0	1	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	1	0	0	1	0	0	0
Regionalized-1	11	12	1	0	0	1	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-8.1-13. 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 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

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 1994 dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

II.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
13.	LLNL—LLW—Socioeconomic Impacts for Treatment and Disposal	II-8.2-11	8-28
14.	LLNL—LLW—Infrastructure Impacts for Treatment and Disposal	II-8.2-12	8-29
15.	LLNL—LLW—Cost	II-8.2-13	8-30

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.

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			Hypothetical Farm Family 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	8.8E-03	1.5E-05	8.8E-07
Regionalized-1		12	3.3E-04	5.5E-07	3.3E-08	9.4E-05	1.6E-07	9.4E-09	8.8E-03	1.5E-05	8.8E-07
Regionalized-2	11	12	1.3E-02	2.1E-05	1.3E-06	3.6E-03	6.2E-06	3.6E-07	8.8E-03	1.5E-05	8.8E-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	1 (1/0)	2 (2/0)	4 (2/2)	29 (0/29)	6 (0/6)	0	0	0	3 (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.

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	--	--	--	--	--	--
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	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	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	--	--	--	--	--	--
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) 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 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-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.

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		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.

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 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	168	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.

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	7	6	214	17	58	117	22	214	0	0
Regionalized-5	4	6	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	7	1	214	17	58	117	22	214	0	0
Centralized-4	7	1	214	17	58	117	22	214	0	0
Centralized-5	1	1	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 1994 Dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

II.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
13.	LLNL—TRUW—Socioeconomic Impacts for Treatment	II-8.3-10	8-41
14.	LLNL—TRUW—Infrastructure Impacts for Treatment	II-8.3-11	8-42
15.	LLNL—TRUW—Cost	II-8.3-12	8-43

Table II-8.3-1. LLNL—TRUW—Treatment: Estimated Number of Fatalities

TRUW Alternatives	Treatment						
	Number of Sites		Treatment Standard	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		Treatment Standard	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		Treatment Standard	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 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.

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 Population 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 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.
MEI = Maximally Exposed Individual

Table II-8.3-5. LLNL—TRUW—Treatment: Noncancer Health Risk From Chemical Exposure

TRUW Alternatives	Number of Sites		Treatment Standard	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 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 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	- -	- -	- -	- -	- -	- -	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	1 (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	1 (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	1 (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	1 (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	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)
(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.*

Table II-8.3-7. LLNL—TRUW—Percent of Standard/Guideline for Criteria Air Pollutants

TRUW Alternatives	Number of Sites		Treatment Standard	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	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) 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.
** 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		Treatment Standard	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-8.3-9. LLNL—TRUW—Impacts on Water Resources Due to Increased Water Use

TRUW Alternatives	Number of Sites		Treatment Standard	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 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.
- - = 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	Treatment Standard	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 1990 dollars.
(2) Compared to 1990 baseline.
** 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.

Table II-8.3-11. LLNL—TRUW—Infrastructure Impacts for Treatment

TRUW Alternatives	Number of Sites		Treatment Standard	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 1990 Site Employment.
** 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.

Table II-8.3-12. LLNL—TRUW—Cost

TRUW Alternatives	Number of Sites		Treatment Standard (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**	16	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 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.
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 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).

II.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.

II.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 and Genetic Effects	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

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	-	1.2E-02	2.7E-02	5.8E-06	1.5E-05	- -	- -
Decentralized	37	16	1.4E-02	9.9E-02	7.9E-07	2.1E-06	1.3E-02	1.4E-02
Regionalized-1	11	12	2.9E-03	4.6E-02	6.4E-09	8.7E-09	7.8E-06	2.4E-04
Regionalized-2	7	6	2.9E-03	4.6E-02	6.4E-09	8.7E-09	- -	- -
Regionalized-3	7	1	2.9E-03	4.6E-02	6.4E-09	8.7E-09	3.9E-01	8.4E-02
Regionalized-4	4	6	2.9E-03	4.6E-02	6.4E-09	8.7E-09	- -	- -
Centralized	1	1	2.9E-03	4.6E-02	6.4E-09	8.7E-09	- -	- -

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	-	1.2E-02	2.0E-05	4.7E-08	1.2E-06	3.1E-02	5.2E-05	6.2E-07	3.1E-06	3.0E+01	4.2E-02	4.5E-07	1.8E-03
Decentralized	37	16	1.6E-03	2.7E-06	2.1E-09	1.6E-07	4.1E-03	7.0E-06	2.8E-08	4.1E-07	3.4E+01	4.8E-02	5.4E-05	2.1E-03
Regionalized -1	11	12	1.3E-05	2.2E-08	1.5E-11	1.3E-09	1.7E-05	3.0E-08	2.1E-10	1.7E-09	7.2E+00	1.0E-02	2.0E-07	4.4E-04
Regionalized-2	7	6	1.3E-05	2.2E-08	1.5E-11	1.3E-09	1.7E-05	3.0E-08	2.1E-10	1.7E-09	7.2E+00	1.0E-02	2.0E-07	4.4E-04
Regionalized-3	7	1	1.3E-05	2.2E-08	1.5E-11	1.3E-09	1.7E-05	3.0E-08	2.1E-10	1.7E-09	7.2E+00	1.0E-02	2.0E-07	4.4E-04
Regionalized-4	4	6	1.3E-05	2.2E-08	1.5E-11	1.3E-09	1.7E-05	3.0E-08	2.1E-10	1.7E-09	7.2E+00	1.0E-02	2.0E-07	4.4E-04
Centralized	1	1	1.3E-05	2.2E-08	1.5E-11	1.3E-09	1.7E-05	3.0E-08	2.1E-10	1.7E-09	7.2E+00	1.0E-02	2.0E-07	4.4E-04

Notes:
T = Treatment
D = Disposal

Table II-9.1-3. NTS—LLMW—Disposal: Estimated Number of Cancer Incidences and Genetic Effects

LLMW Alternatives	Number of Sites		WM Workers		
	T	D	Dose (person-rem)	Radiation Cancer Incidence	Radiation Genetic Effects
No Action	3	-	- -	- -	- -
Decentralized	37	16	3.2E+01	4.5E-02	1.9E-03
Regionalized-1	11	12	2.0E-02	2.7E-05	1.2E-06
Regionalized-2	7	6	- -	- -	- -
Regionalized-3	7	1	9.8E+02	1.4E+00	5.9E-02
Regionalized-4	4	6	- -	- -	- -
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	-	1.5E-09	7.1E-08	- -
Decentralized	37	16	2.0E-10	9.6E-09	<9.9E-14
Regionalized-1	11	12	1.6E-12	4.0E-11	<9.9E-14
Regionalized-2	7	6	1.6E-12	4.0E-11	- -
Regionalized-3	7	1	1.6E-12	4.0E-11	<9.9E-14
Regionalized-4	4	6	1.6E-12	4.0E-11	- -
Centralized	1	1	1.6E-12	4.0E-11	- -

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

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				Hypothetical Farm Family Most Exposed 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	-	3.0E-06	5.1E-09	1.2E-11	3.0E-10	1.4E-04	2.4E-07	2.6E-09	1.4E-08	--	--	--	--
Decentralized	37	16	4.1E-07	6.9E-10	5.3E-13	4.1E-11	1.9E-05	3.3E-08	1.2E-10	1.9E-09	<9.9E-14	<9.9E-14	2.0E-06	<9.9E-14
Regionalized-1	11	12	3.2E-09	5.4E-12	<9.9E-14	3.2E-13	8.0E-08	1.4E-10	8.6E-13	8.0E-12	<9.9E-14	<9.9E-14	2.0E-06	<9.9E-14
Regionalized-2	7	6	3.2E-09	5.4E-12	<9.9E-14	3.2E-13	8.0E-08	1.4E-10	8.6E-13	8.0E-12	--	--	--	--
Regionalized-3	7	1	3.2E-09	5.4E-12	<9.9E-14	3.2E-13	8.0E-08	1.4E-10	8.6E-13	8.0E-12	<9.9E-14	<9.9E-14	2.0E-06	<9.9E-14
Regionalized-4	4	6	3.2E-09	5.4E-12	<9.9E-14	3.2E-13	8.0E-08	1.4E-10	8.6E-13	8.0E-12	--	--	--	--
Centralized	1	1	3.2E-09	5.4E-12	<9.9E-14	3.2E-13	8.0E-08	1.4E-10	8.6E-13	8.0E-12	--	--	--	--

Notes:
T = Treatment
D = Disposal
MEI = Maximally Exposed Individual
-- = Treatment and/or disposal is not considered for this alternative.
* The values for NTS overestimate potential risks because the travel time through the vadose zone to the aquifer has been estimated from field-measured properties to be more than 2 million years.

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	-	2.4E-09	5.2E-07	1.2E-06	- -
Decentralized	37	16	3.0E-10	6.6E-08	2.0E-04	2.3E-02
Regionalized-1	11	12	1.1E-12	2.3E-10	8.6E-07	1.0E-03
Regionalized-2	7	6	1.1E-12	2.3E-10	8.6E-07	- -
Regionalized-3	7	1	1.1E-12	2.3E-10	8.6E-07	8.1E-01
Regionalized-4	4	6	1.1E-12	2.3E-10	8.6E-07	- -
Centralized	1	1	1.1E-12	2.3E-10	8.6E-07	- -

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			Construction Emissions in Tons/Year (1)						Operations & Maintenance Emissions in Tons/Year (2)					
Alternatives	T	D	CO	NO2	Pb	PM10	SO2	VOC	CO	NO2	Pb	PM10	SO2	VOC
No Action	3	-	25(18/7)	48 (47/1)	0	4 (4/0)	4 (4/0)	6 (5/1)	3 (0/3)	2 (1/1)	0	0	0	0
Decentralized	37	16	94 (64/30)	172 (166/6)	0	13 (13/0)	16 (16/0)	20 (16/4)	21 (1/20)	8 (4/4)	0	1 (1/0)	0	2 (0/2)
Regionalized-1	11	12	26 (12/14)	33 (30/3)	0	2 (2/0)	3 (3/0)	5 (3/2)	9 (0/9)	2 (0/2)	0	0	0	1 (0/1)
Regionalized-2	7	6	25 (12/13)	33 (30/3)	0	2 (2/0)	3 (3/0)	5 (3/2)	8 (0/8)	2 (0/2)	0	0	0	1 (0/1)
Regionalized-3	7	1	73 (41/32)	112 (106/6)	0.	8 (8/0)	10 (10/0)	14 (10/4)	39 (0/39)	8 (0/8)	0	0	0	5 (0/5)
Regionalized-4	4	6	25 (12/13)	33 (30/3)	0	2 (2/0)	3 (3/0)	5 (3/2)	8 (0/8)	2 (0/2)	0	0	0	1 (0/1)
Centralized	1	1	25 (12/13)	33 (30/3)	0	2 (2/0)	3 (3/0)	5 (3/2)	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-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	-	25 (18/7)	--	--	4 (4/0)	--	--
Decentralized	37	16	94 (64/30)	--	--	13 (13/0)	--	--
Regionalized-1	11	12	26 (12/14)	--	--	2 (2/0)	--	--
Regionalized-2	7	6	25 (12/13)	--	--	2 (2/0)	--	--
Regionalized-3	7	1	73 (41/32)	--	--	8 (8/0)	--	--
Regionalized-4	4	6	25 (12/13)	--	--	2 (2/0)	--	--
Centralized	1	1	25 (12/13)	--	--	2 (2/0)	--	--

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	-	3 (3/0)	2	0	0	0	0	--	--	--	--	--	--
Decentralized	37	16	21 (1/20)	10	0	1 (1/0)	0	1 (1/0)	0	0	0	0	0	0
Regionalized-1	11	12	9 (0/9)	0	0	0	0	0	--	--	--	--	--	--
Regionalized-2	7	6	8 (0/8)	0	0	0	0	0	--	--	--	--	--	--
Regionalized-3	7	1	39 (0/39)	1	0	0	0	0	--	--	--	--	--	--
Regionalized-4	4	6	8 (0/8)	0	0	0	0	0	--	--	--	--	--	--
Centralized	1	1	8 (0/8)	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 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	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	-	17,781	1.3	- -	775	0.1	- -	- -
Decentralized	37	16	52,726	3.9	- -	18,706	1.4	- -	- -
Regionalized-1	11	12	6,690	0.5	- -	939	0.1	- -	- -
Regionalized-2	7	6	6,593	0.5	- -	936	0.1	- -	- -
Regionalized-3	7	1	32,155	2.4	- -	8,685	0.6	- -	- -
Regionalized-4	4	6	6,593	0.5	- -	936	0.1	- -	- -
Centralized	1	1	6,593	0.5	- -	936	0.1	- -	- -

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 considered 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-9.1-11. NTS—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	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		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	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)[a]

LLMW Alternatives	T	D	Acetone	Arsenic	Barium	Benzene	Cadmium	Carbon Tetrachloride	Chromium	Cyanide
No Action	3	-	--	--	--	--	--	--	--	--
Decentralized	37	16	0	0	0	50	0	0	0	0
Regionalized-1	11	12	0	0	0	1	0	0	0	0
Regionalized-2	7	6	0	0	0	0	0	0	0	0
Regionalized-3	7	1	0	0	0	3000	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	10	0	0	40	0	0	0
Regionalized-1	11	12	10	0	0	40	0	0	0
Regionalized-2	7	6	0	0	0	0	0	0	0
Regionalized-3	7	1	1000	0	0	4000	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.
a The values for NTS overestimate potential risks since the travel time through the vadose zone to the aquifer has been estimated from field-measured properties to be over 2 million years.

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	% ROI Population Increase (2)
No Action	3	-	67	80	0.02	0.8	<0.01	0.01
Decentralized	37	16	417	407	0.09	4.6	0.03	0.04
Regionalized-1	11	12	172	168	0.04	1.9	0.01	0.02
Regionalized-2	7	6	161	156	0.03	1.8	0.01	0.02
Regionalized-3	7	1	620	605	0.13	6.8	0.05	0.07
Regionalized-4	4	6	161	156	0.03	1.8	0.01	0.02
Centralized	1	1	161	156	0.03	1.8	0.01	0.02

Notes:
T = Treatment
D = Disposal
(1) In 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	3	-	7.1	0.001	17,781	0.64	775	0.23	2.57	8.55	210	3
Decentralized	37	16	25.2	0.003	52,725	1.90	9,352	2.77	6.52	14.30	235	3
Regionalized-1	11	12	5.8	0.0009	6,593	0.24	939	0.28	0.46	1.54	102	1
Regionalized-2	7	6	20.5	0.0009	6,593	0.24	936	0.28	0.46	1.54	102	1
Regionalized-3	7	1	20.5	0.0032	32,155	1.16	8,685	2.57	2.34	7.80	249	4
Regionalized-4	4	6	5.7	0.0009	6,593	0.24	936	0.28	0.46	1.54	102	1
Centralized	1	1	5.7	0.0009	6,593	0.24	936	0.28	0.46	1.54	102	1

Notes:
(1) T is defined as Treatment, D is defined as Disposal

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	-	120	10	35	72	3	64	56	0
Decentralized	37	16	472	45	150	252	25	419	0	55
Regionalized-1	11	12	194	17	68	99	10	182	0	12
Regionalized-2	7	6	182	17	62	94	9	182	0	0
Regionalized-3	7	1	702	60	122	439	81	182	0	520
Regionalized-4	4	6	182	17	62	94	9	182	0	0
Centralized	1	1	182	17	62	94	9	182	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 1994 dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

II.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
13.	NTS—LLW—Socioeconomic Impacts for Treatment and Disposal	II-9.2-11	9-28
14.	NTS—LLW—Infrastructure Impacts for Treatment and Disposal	II-9.2-12	9-29
15.	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	3.6E-04	5.1E-03	1.3E-12	3.0E-12	1.6E-02	1.9E-01
Decentralized		16	3.0E-04	6.2E-03	1.4E-12	3.2E-12	4.4E-04	1.4E-02
Regionalized-1		12	3.0E-04	6.2E-03	1.4E-12	3.2E-12	4.4E-04	1.4E-02
Regionalized-2	11	12	3.0E-04	1.3E-02	1.6E-12	3.6E-12	1.2E-04	3.7E-03
Regionalized-3		6	3.0E-04	6.2E-03	1.4E-12	3.2E-12	3.6E-02	4.4E-02
Regionalized-4	7	6	3.0E-04	1.3E-02	1.6E-12	3.6E-12	7.6E-03	1.5E-02
Regionalized-5	4	6	3.0E-04	1.3E-02	1.6E-12	3.6E-12	7.6E-03	1.5E-02
Regionalized-6		2	3.0E-04	1.3E-02	1.6E-12	3.6E-12	- -	- -
Regionalized-7		2	3.0E-04	6.2E-03	1.4E-12	3.2E-12	8.1E-01	2.4E-01
Centralized-1		1	3.0E-04	1.3E-02	1.6E-12	3.6E-12	- -	- -
Centralized-2		1	3.0E-04	6.2E-03	1.4E-12	3.2E-12	2.2E+00	6.1E-01
Centralized-3	7	1	3.0E-04	1.3E-02	1.6E-12	3.6E-12	- -	- -
Centralized-4	7	1	3.0E-04	1.3E-02	1.6E-12	3.6E-12	1.6E+00	4.0E-01
Centralized-5	1	1	3.0E-04	1.3E-02	1.6E-12	3.6E-12	- -	- -

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	2.6E-09	4.5E-12	2.6E-13	6.0E-09	1.0E-11	6.0E-13	9.0E-01	1.3E-03	5.4E-05
Decentralized		16	2.9E-09	4.9E-12	2.9E-13	6.4E-09	1.1E-11	6.4E-13	7.4E-01	1.0E-03	4.4E-05
Regionalized-1		12	2.9E-09	4.9E-12	2.9E-13	6.4E-09	1.1E-11	6.4E-13	7.4E-01	1.0E-03	4.4E-05
Regionalized-2	11	12	3.2E-09	5.5E-12	3.2E-13	7.2E-09	1.2E-11	7.2E-13	7.4E-01	1.0E-03	4.4E-05
Regionalized-3		6	2.9E-09	4.9E-12	2.9E-13	6.4E-09	1.1E-11	6.4E-13	7.4E-01	1.0E-03	4.4E-05
Regionalized-4	7	6	3.2E-09	5.5E-12	3.2E-13	7.2E-09	1.2E-11	7.2E-13	7.4E-01	1.0E-03	4.4E-05
Regionalized-5	4	6	3.2E-09	5.5E-12	3.2E-13	7.2E-09	1.2E-11	7.2E-13	7.4E-01	1.0E-03	4.4E-05
Regionalized-6		2	3.2E-09	5.5E-12	3.2E-13	7.2E-09	1.2E-11	7.2E-13	7.4E-01	1.0E-03	4.4E-05
Regionalized-7		2	2.9E-09	4.9E-12	2.9E-13	6.4E-09	1.1E-11	6.4E-13	7.4E-01	1.0E-03	4.4E-05
Centralized-1		1	3.2E-09	5.5E-12	3.2E-13	7.2E-09	1.2E-11	7.2E-13	7.4E-01	1.0E-03	4.4E-05
Centralized-2		1	2.9E-09	4.9E-12	2.9E-13	6.4E-09	1.1E-11	6.4E-13	7.4E-01	1.0E-03	4.4E-05
Centralized-3	7	1	3.2E-09	5.5E-12	3.2E-13	7.2E-09	1.2E-11	7.2E-13	7.4E-01	1.0E-03	4.4E-05
Centralized-4	7	1	3.2E-09	5.5E-12	3.2E-13	7.2E-09	1.2E-11	7.2E-13	7.4E-01	1.0E-03	4.4E-05
Centralized-5	1	1	3.2E-09	5.5E-12	3.2E-13	7.2E-09	1.2E-11	7.2E-13	7.4E-01	1.0E-03	4.4E-05

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-9.2-3. 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	4.0E+01	5.7E-02	2.4E-03
Decentralized		16	1.1E+00	1.5E-03	6.6E-05
Regionalized-1		12	1.1E+00	1.5E-03	6.6E-05
Regionalized-2	11	12	2.9E-01	4.0E-04	1.7E-05
Regionalized-3		6	9.0E+02	1.3E-01	5.4E-03
Regionalized-4	7	6	1.9E+01	2.7E-02	1.1E-03
Regionalized-5	4	6	1.9E+01	2.7E-02	1.1E-03
Regionalized-6		2	- -	- -	- -
Regionalized-7		2	2.0E+03	2.8E+00	1.2E-01
Centralized-1		1	- -	- -	- -
Centralized-2		1	5.5E+03	7.7E+00	3.3E-01
Centralized-3	7	1	- -	- -	- -
Centralized-4	7	1	3.9E+03	5.5E+00	2.3E-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	<9.9E-14	1.4E-14	<9.9E-14
Decentralized		16	<9.9E-14	1.5E-14	<9.9E-14
Regionalized-1		12	<9.9E-14	1.5E-14	<9.9E-14
Regionalized-2	11	12	<9.9E-14	1.7E-14	<9.9E-14
Regionalized-3		6	<9.9E-14	1.5E-14	<9.9E-14
Regionalized-4	7	6	<9.9E-14	1.7E-14	<9.9E-14
Regionalized-5	4	6	<9.9E-14	1.7E-14	<9.9E-14
Regionalized-6		2	<9.9E-14	1.7E-14	- -
Regionalized-7		2	<9.9E-14	1.5E-14	<9.9E-14
Centralized-1		1	<9.9E-14	1.7E-14	- -
Centralized-2		1	<9.9E-14	1.5E-14	<9.9E-14
Centralized-3	7	1	<9.9E-14	1.7E-14	- -
Centralized-4	7	1	<9.9E-14	1.7E-14	<9.9E-14
Centralized-5	1	1	<9.9E-14	1.7E-14	- -

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 Population MEI			Noninvolved Worker MEI			Hypothetical Farm Family 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	6.7E-13	<9.9E-14	<9.9E-14	2.8E-11	4.7E-14	<9.9E-14	<9.9E-14	<9.9E-14	<9.9E-14
Decentralized		16	7.2E-13	<9.9E-14	<9.9E-14	3.0E-11	5.1E-14	<9.9E-14	<9.9E-14	<9.9E-14	<9.9E-14
Regionalized-1		12	7.2E-13	<9.9E-14	<9.9E-14	3.0E-11	5.1E-14	<9.9E-14	<9.9E-14	<9.9E-14	<9.9E-14
Regionalized-2	11	12	8.1E-13	<9.9E-14	<9.9E-14	3.4E-11	5.7E-14	<9.9E-14	<9.9E-14	<9.9E-14	<9.9E-14
Regionalized-3		6	7.2E-13	<9.9E-14	<9.9E-14	3.0E-11	5.1E-14	<9.9E-14	<9.9E-14	<9.9E-14	<9.9E-14
Regionalized-4	7	6	8.1E-13	<9.9E-14	<9.9E-14	3.4E-11	5.7E-14	<9.9E-14	<9.9E-14	<9.9E-14	<9.9E-14
Regionalized-5	4	6	8.1E-13	<9.9E-14	<9.9E-14	3.4E-11	5.7E-14	<9.9E-14	<9.9E-14	<9.9E-14	<9.9E-14
Regionalized-6		2	8.1E-13	<9.9E-14	<9.9E-14	3.4E-11	5.7E-14	<9.9E-14	- -	- -	- -
Regionalized-7		2	7.2E-13	<9.9E-14	<9.9E-14	3.0E-11	5.1E-14	<9.9E-14	<9.9E-14	<9.9E-14	<9.9E-14
Centralized-1		1	8.1E-13	<9.9E-14	<9.9E-14	3.4E-11	5.7E-14	<9.9E-14	- -	- -	- -
Centralized-2		1	7.2E-13	<9.9E-14	<9.9E-14	3.0E-11	5.1E-14	<9.9E-14	<9.9E-14	<9.9E-14	<9.9E-14
Centralized-3	7	1	8.1E-13	<9.9E-14	<9.9E-14	3.4E-11	5.7E-14	<9.9E-14	- -	- -	- -
Centralized-4	7	1	8.1E-13	<9.9E-14	<9.9E-14	3.4E-11	5.7E-14	<9.9E-14	<9.9E-14	<9.9E-14	<9.9E-14
Centralized-5	1	1	8.1E-13	<9.9E-14	<9.9E-14	3.4E-11	5.7E-14	<9.9E-14	- -	- -	- -

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	6 (2/4)	6 (5/1)	0	0	0	0	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)
Regionalized-1		12	6 (2/4)	6 (5/1)	0	0	0	0	5 (0/5)	1 (0/1)	0	0	0	1 (0/1)
Regionalized-2	11	12	6 (2/4)	6 (5/1)	0	0	0	1 (1/0)	3 (3/0)	1 (0/1)	0	0	0	0
Regionalized-3		6	12 (5/7)	14 (13/1)	0	1 (1/0)	1 (1/0)	2 (1/1)	11 (0/8)	2 (0/2)	0	0	0	1 (0/1)
Regionalized-4	7	6	9 (3/6)	8 (7/1)	0	1 (1/0)	1 (1/0)	2 (1/1)	6 (0/6)	1 (0/1)	0	0	0	1 (0/1)
Regionalized-5	4	6	9 (3/6)	8 (7/1)	0	1 (1/0)	1 (1/0)	2 (1/1)	6 (0/6)	1 (0/1)	0	0	0	1 (0/1)
Regionalized-6		2	5 (1/4)	0	0	0	0	0	2 (0/2)	0	0	0	0	0
Regionalzied-7		2	64 (20/44)	61 (52/9)	0	4 (4/0)	5 (5/0)	10 (5/5)	67 (0/67)	17 (0/17)	0	0	0	8 (0/8)
Centralized-1		1	5 (1/4)	0	0	0	0	0	2 (0/2)	0	0	0	0	0
Centralized-2		1	189 (79/110)	228 (206/22)	0	16 (16/0)	20 (20/0)	33 (20/13)	183 (0/183)	55 (1/54)	0	1 (0/1)	0	23 (0/23)
Centralized-3	7	1	5 (1/4)	0	0	0	0	0	2 (0/2)	0	0	0	0	0
Centralized-4	7	1	128 (49/79)	144 (128/16)	0	10 (10/0)	12 (12/0)	21 (12/9)	118 (0/118)	25 (1/24)	0	0	0	14 (0/14)
Centralized-5	1	1	5 (1/4)	0	0	0	0	0	2 (0/2)	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.

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	6 (2/4)	--	--	0	--	--
Regionalized-1		12	6 (2/4)	--	--	0	--	--
Regionalized-2	11	12	6 (2/4)	--	--	0	--	--
Regionalized-3		6	12 (5/7)	--	--	1 (1/0)	--	--
Regionalized-4	7	6	9 (3/6)	--	--	1 (1/0)	--	--
Regionalized-5	4	6	9 (3/6)	--	--	1 (1/0)	--	--
Regionalized-6		2	5 (1/4)	--	--	0	--	--
Regionalzied-7		2	64 (20/44)	--	--	4 (4/0)	--	--
Centralized-1		1	5 (1/4)	--	--	0	--	--
Centralized-2		1	189 (79/110)	--	--	16 (16/0)	--	--
Centralized-3	7	1	5 (1/4)	--	--	0	--	--
Centralized-4	7	1	128 (49/79)	--	--	10 (10/0)	--	--
Centralized-5	1	1	5 (1/4)	--	--	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	5 (0/5)	0	0	0	0	0	--	--	--	--	--	--
Regionalized-1		12	5 (0/5)	0	0	0	0	0	--	--	--	--	--	--
Regionalized-2	11	12	0	0	0	0	0	0	--	--	--	--	--	--
Regionalized-3		6	11 (0/11)	0	0	0	0	0	--	--	--	--	--	--
Regionalized-4	7	6	6 (0/6)	0	0	0	0	0	--	--	--	--	--	--
Regionalized-5	4	6	13 (0/13)	0	0	0	0	0	--	--	--	--	--	--
Regionalized-6		2	2 (0/2)	0	0	0	0	0	--	--	--	--	--	--
Regionalzied-7		2	67 (0/67)	1	0	0	0	0	--	--	--	--	--	--
Centralized-1		2	2 (0/2)	0	0	0	0	0	--	--	--	--	--	--
Centralized-2		1	183 (0/183)	2	0	1	0	0	--	--	--	--	--	--
Centralized-3		2	2 (0/2)	0	0	0	0	0	--	--	--	--	--	--
Centralized-4	7	1	118 (0/118)	1	0	0	0	0	--	--	--	--	--	--
Centralized-5		2	2 (0/2)	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.

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	1416	0.1	- -	480	0.0	- -	- -
Regionalized-1		12	1416	0.1	- -	480	0.0	- -	- -
Regionalized-2	11	12	1183	0.1	- -	324	0.0	- -	- -
Regionalized-3		6	3833	0.3	- -	1500	0.1	- -	- -
Regionalized-4	7	6	7605	0.6	- -	642	0.0	- -	- -
Regionalized-5	4	6	7605	0.6	- -	642	0.0	- -	- -
Regionalized-6		2	554	0.0	- -	252	0.0	- -	- -
Regionalized-7		2	13851	1.0	- -	5428	0.4	- -	- -
Centralized-1		1	554	0.0	- -	252	0.0	- -	- -
Centralized-2		1	54787	4.0	- -	22197	1.6	- -	- -
Centralized-3	7	1	554	0.0	- -	252	0.0	- -	- -
Centralized-4	7	1	33976	2.5	- -	13648	1.0	- -	- -
Centralized-5	1	1	554	0.0	- -	252	0.0	- -	- -

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, percent stream flow and waste water percent stream flow are 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	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centralized-1		1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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	7	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	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	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	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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	7	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.

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	% ROI Population Increase (2)
No Action	10**	6	1196	932	0.21	10.5	0.07	0.19
Decentralized		16	234	228	0.05	2.6	0.02	0.01
Regionalized-1		12	234	228	0.05	2.6	0.02	0.01
Regionalized-2	11	12	66	65	0.01	0.7	<0.01	<0.01
Regionalized-3		6	161	157	0.03	1.8	0.02	0.02
Regionalized-4	7	6	101	98	0.02	1.1	0.01	0.01
Regionalized-5	4	6	101	98	0.02	1.1	0.01	0.01
Regionalized-6		2	48	47	0.01	0.05	<0.01	<0.01
Regionalized-7		2	1004	979	0.22	11.0	0.07	0.11
Centralized-1		1	48	47	0.01	0.5	<0.01	<0.01
Centralized-2		1	2639	2573	0.57	29.0	0.20	0.25
Centralized-3	7	1	48	47	0.01	0.05	<0.01	<0.01
Centralized-4	7	1	1661	1619	0.35	18.2	0.13	0.21
Centralized-5	1	1	48	47	0.01	0.05	<0.01	<0.01

Notes:
T = Treatment
D = Disposal
(1) In 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	0.0002	1426	0.05	1426	0.43	0.21	0.46	0	0
Decentralized		16	1.0	0.0002	1416	0.05	480	0.14	0.16	0.36	29	0.40
Regionalized-1		12	1.0	0.0002	1416	0.05	480	0.14	0.16	0.36	29	0.40
Regionalized-2	11	12	1	0.0002	1182	0.04	324	0.10	0.11	0.25	32	0.45
Regionalized-3		6	2.6	0.0004	3833	0.14	1500	0.44	0.46	1.02	58	0.82
Regionalized-4	7	6	1.4	0.0002	7605	0.27	641	0.19	0.21	0.46	45	0.64
Regionalized-5	4	6	1.4	0.0002	7605	0.27	641	0.19	0.21	0.46	45	0.64
Regionalized-6		2	0.5	0.0001	553	0.02	251	0.07	0.17	0.37	28	0.40
Regionalized-7		2	6.4	0.001	13850	0.50	5427	0.61	1.40	3.11	338	4.77
Centralized-1		1	0.5	0.0001	553	0.02	251	0.07	0.17	0.37	28	0.40
Centralized-2		1	2.4	0.004	54787	1.97	22196	0.80	5.53	12.30	85	1.20
Centralized-3	7	1	0.5	0.0001	553	0.02	251	0.07	0.17	0.37	28	0.40
Centralized-4	7	1	15.2	0.0024	33976	1.22	13647	4.04	3.43	7.61	609	8.59
Centralized-5	1	1	0.5	0.0001	553	0.02	251	0.07	0.17	0.37	28	0.40

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.
- - = Treatment and Disposal is not considered under this alternative.

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	167	0	0	1353
Decentralized		16	265	18	62	168	17	25	0	240
Regionalized 1		12	265	18	62	168	17	25	0	240
Regionalized 2	11	12	75	7	18	44	6	55	0	20
Regionalized 3		6	182	15	28	120	19	36	0	146
Regionalized 4	7	6	114	9	25	71	9	55	0	59
Regionalized 5	4	6	114	9	25	71	9	55	0	59
Regionalized 6		2	55	5	17	31	2	55	0	0
Regionalized 7		2	1136	85	148	729	174	36	0	1100
Centralized 1		1	55	5	17	31	2	55	0	0
Centralized 2		1	2986	220	379	1934	453	36	0	2950
Centralized 3	7	1	55	5	17	31	2	55	0	0
Centralized 4	7	1	1879	157	235	1172	315	55	0	1824
Centralized 5	1	1	55	5	17	31	2	55	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 1994 Dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

II.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	9-32
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
13.	NTS—TRUW—Socioeconomic Impacts for Treatment	II-9.3-10	9-41
14.	NTS—TRUW—Infrastructure Impacts for Treatment	II-9.3-11	9-42
15.	NTS—TRUW—Cost	II-9.3-12	9-43

Table II-9.3-1. NTS—TRUW—Treatment: Estimated Number of Fatalities

TRUW Alternatives	Treatment						
	Number of Sites		Treatment Standard	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	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:
-- = Treatment is not considered for this 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.

Table II-9.3-2. NTS—TRUW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

TRUW Alternatives	Number of Sites		Treatment Standard	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	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:
-- = Treatment is not considered for this 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 all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
T = Treatment
D = Disposal

Table II-9.3-3. NTS—TRUW—Treatment: MEI Probability of Cancer Fatality

TRUW Alternatives	Number of Sites		Treatment Standard	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 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.

Table II-9.3-4. NTS—TRUW—Treatment: MEI Probability of Cancer Incidences and Genetic Effects

TRUW Alternatives	Number of Sites		Treatment Standard	Treatment							
				Offsite Population 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	5.9E-11	1.0E-13	<9.9E-14	<9.9E-14	2.9E-09	5.0E-12	2.1E-14	2.9E-13
Regionalized-1	5	2	Reduce Gas	7.8E-11	1.3E-13	<9.9E-14	<9.9E-14	3.9E-09	6.6E-12	6.2E-14	3.9E-13
Regionalized-2	5	2	LDR	7.8E-11	1.3E-13	<9.9E-14	<9.9E-14	3.9E-09	6.6E-12	6.2E-14	3.9E-13
Regionalized-3	3	2	LDR	7.8E-11	1.3E-13	<9.9E-14	<9.9E-14	3.9E-09	6.6E-12	6.2E-14	3.9E-13
Centralized	WIPP	2	LDR	7.8E-11	1.3E-13	<9.9E-14	<9.9E-14	3.9E-09	6.6E-12	6.2E-14	3.9E-13

Notes:
-- = Treatment is not considered for this 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 all 16 sites, then transferred to interim storage at 10 sites, then to WIPP.
MEI = Maximally Exposed Individual

Table II-9.3-5. NTS—TRUW—Treatment: Noncancer Health Risk From Chemical Exposure

TRUW Alternatives	Number of Sites		Treatment Standard	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 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.
- - = 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 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		Treatment Standard	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	- -	- -	- -	- -	- -	- -	2 (0/2)	0	0	0	0	0
Decentralized***	16	5	WIPP WAC	6 (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 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.

Table II-9.3-7. NTS—TRUW—Percent of Standard/Guideline for Criteria Air Pollutants

TRUW Alternatives	Number of Sites		Treatment Standard	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	6 (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 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.

Table II-9.3-8. NTS—TRUW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

TRUW Alternatives	Number of Sites		Treatment Standard	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		Treatment Standard	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 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.

-- = 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-9.3-9. NTS—TRUW—Impacts on Water Resources Due to Increased Water Use

TRUW Alternatives	Number of Sites		Treatment Standard	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 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.
- - = 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	Treatment Standard	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	65	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 1990 dollars.
(2) Compared to 1990 baseline.
** 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.

Table II-9.3-11. NTS—TRUW—Infrastructure Impacts for Treatment

TRUW Alternatives	Number of Sites		Treatment Standard	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 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.

Table II-9.3-12. NTS—TRUW—Cost

TRUW Alternatives	Number of Sites		Treatment Standard (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 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.
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 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).

II.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.

II.10.1 ORR LLMW

1. Seventeen 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 and Genetic Effects	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
11.	ORR—LLMW—Radionuclide Concentrations in Groundwater (Percent of Comparison Criteria) for Disposal (Remote-Handled)	II-10.1-12	10-14
12.	ORR—LLMW—Percent of Drinking Water Standards for Hazardous Constituents in Groundwater from Disposal (Contact-Handled)	II-10.1-13	10-15
12.	ORR—LLMW—Percent of Drinking Water Standards for Hazardous Constituents in Groundwater from Disposal (Remote-Handled)	II-10.1-14	10-16

13.	ORR—LLMW—Socioeconomic Impacts for Treatment and Disposal	II-10.1-15	10-17
14.	ORR—LLMW—Infrastructure Impacts for Treatment and Disposal	II-10.1-16	10-18
15.	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	-	2.0E-01	1.6E-01	1.1E-01	4.8E-03	- -	- -
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.

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	-	2.3E+02	3.9E-01	4.1E-05	2.3E-02	9.6E+00	1.6E-02	1.4E-05	9.6E-04	5.0E+02	7.0E-01	7.1E-03	3.0E-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 and Genetic Effects

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.

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	-	3.5E-06	4.3E-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				Hypothetical Farm Family Most Exposed 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	-	7.0E-03	1.2E-05	2.1E-09	7.0E-07	8.7E-03	1.5E-05	1.3E-08	8.7E-07	- -	- -	- -	- -
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.

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	-	1.7E-06	1.1E-05	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 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-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).

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	3	2	0
Decentralized	37	16	2	33	0	50	2	1	0	0	0	6	3	0
Regionalized - 1	11	12	2	33	0	50	2	1	0	0	0	6	3	0
Regionalized - 2	7	6	2	33	0	50	2	1	0	0	0	6	3	0
Regionalized - 3	7	1	1	26	0	46	1	0	0	0	0	6	3	0
Regionalized - 4	4	6	3	51	0	77	2	1	0	0	0	9	5	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 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	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-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-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	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	1	0	0	0	0	50	30	0
Regionalized-1	11	12	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	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	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.

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	0	50	0	0	0	0
Regionalized-1	11	12	0	0	0	50	0	0	0	0
Regionalized-2	7	6	0	0	0	70	0	0	0	0
Regionalized-3	7	1	--	--	--	--	--	--	--	--
Regionalized-4	4	6	0	0	0	70	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	1000	0	0	1000	0	0	0
Regionalized-1	11	12	1000	0	0	1000	0	0	0
Regionalized-2	7	6	2000	0	0	3000	0	0	0
Regionalized-3	7	1	--	--	--	--	--	--	--
Regionalized-4	4	6	2000	0	0	3000	0	0	0
Centralized	1	1	--	--	--	--	--	--	--

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

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	Cyanide
No Action	3	-	--	--	--	--	--	--	--	--
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	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	1	0	0	2	0	0	0
Regionalized-1	11	12	1	0	0	2	0	0	0
Regionalized-2	7	6	1	0	0	2	0	0	0
Regionalized-3	7	1	1	0	0	2	0	0	0
Regionalized-4	4	6	1	0	0	2	0	0	0
Centralized	1	1	1	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-10.1-15. ORR—LLMW—Socioeconomic 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 1990 dollars.
(2) Compared to 1990 baseline

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	3	-	5.83	0.10	11491	0.03	11491	0.28	2.62	0.4	324	2
Decentralized	37	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:
T is defined as Treatment, D is defined as Disposal
(1) Based on 1991 site employment

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 1994 dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

II.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
13.	ORR—LLW—Socioeconomic Impacts for Treatment and Disposal	II-10.2-11	10-31
14.	ORR—LLW—Infrastructure Impacts for Treatment and Disposal	II-10.2-12	10-32
15.	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	1.1E-01	8.3E-02	4.6E-06	1.5E-07	3.4E-01	1.5E-01
Decentralized		16	6.1E-02	4.8E-02	5.0E-06	1.7E-07	3.0E-01	2.4E-01
Regionalized-1		12	6.1E-02	4.8E-02	5.0E-06	1.7E-07	3.0E-01	2.4E-01
Regionalized-2	11	12	3.1E-01	3.8E-01	8.2E-05	3.4E-06	2.1E-01	1.3E-01
Regionalized-3		6	6.1E-02	2.8E-02	5.0E-06	1.7E-07	5.5E-01	4.0E-01
Regionalized-4	7	6	3.1E-01	3.6E-01	8.2E-05	3.4E-06	4.7E-01	3.0E-01
Regionalized-5	4	6	4.2E-01	4.3E-01	3.0E-01	4.3E-03	4.7E-01	3.0E-01
Regionalized-6		2	7.0E-02	5.2E-02	1.2E-05	3.9E-07	- -	- -
Regionalized-7		2	7.0E-02	5.2E-02	1.2E-05	3.9E-07	- -	- -
Centralized-1		1	7.0E-02	5.2E-02	1.2E-05	3.9E-07	- -	- -
Centralized-2		1	7.0E-02	5.2E-02	1.2E-05	3.9E-07	- -	- -
Centralized-3	7	1	3.2E-01	3.9E-01	8.9E-05	3.6E-06	- -	- -
Centralized-4	7	1	3.2E-01	3.9E-01	8.9E-05	3.6E-06	- -	- -
Centralized-5	1	1	7.0E-02	5.2E-02	1.2E-05	3.9E-07	- -	- -

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

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	9.2E-03	1.6E-05	9.2E-07	3.1E-04	5.2E-07	3.1E-08	2.8E+02	3.9E-01	1.7E-02
Decentralized		16	1.0E-02	1.7E-05	1.0E-06	3.3E-04	5.7E-07	3.3E-08	1.5E+02	2.1E-01	9.1E-03
Regionalized-1		12	1.0E-02	1.7E-05	1.0E-06	3.3E-04	5.7E-07	3.3E-08	1.5E+02	2.1E-01	9.1E-03
Regionalized-2	11	12	1.7E-01	2.8E-04	1.7E-05	6.7E-03	1.1E-05	6.7E-07	7.8E+02	1.1E+00	4.7E-02
Regionalized-3		6	1.0E-02	1.7E-05	1.0E-06	3.3E-04	5.7E-07	3.3E-08	1.5E+02	2.1E-01	9.1E-03
Regionalized-4	7	6	1.7E-01	2.8E-04	1.7E-05	6.7E-03	1.1E-05	6.7E-07	7.7E+02	1.1E+00	4.7E-02
Regionalized-5	4	6	6.0E+02	1.0E+00	6.0E-02	8.7E+00	1.5E-02	8.7E-04	1.1E+03	1.5E+00	6.3E-02
Regionalized-6		2	2.3E-02	3.9E-05	2.3E-06	7.8E-04	1.3E-06	7.8E-08	1.8E+02	2.5E-01	1.1E-02
Regionalized-7		2	2.3E-02	3.9E-05	2.3E-06	7.8E-04	1.3E-06	7.8E-08	1.8E+02	2.5E-01	1.1E-02
Centralized-1		1	2.3E-02	3.9E-05	2.3E-06	7.8E-04	1.3E-06	7.8E-08	1.8E+02	2.5E-01	1.1E-02
Centralized-2		1	2.3E-02	3.9E-05	2.3E-06	7.8E-04	1.3E-06	7.8E-08	1.8E+02	2.5E-01	1.1E-02
Centralized-3	7	1	1.8E-01	3.0E-04	1.8E-05	7.1E-03	1.2E-05	7.1E-07	8.0E+02	1.1E+00	4.8E-02
Centralized-4	7	1	1.8E-01	3.0E-04	1.8E-05	7.1E-03	1.2E-05	7.1E-07	8.0E+02	1.1E+00	4.8E-02
Centralized-5	1	1	2.3E-02	3.9E-05	2.3E-06	7.8E-04	1.3E-06	7.8E-08	1.8E+02	2.5E-01	1.1E-02

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	8.5E+02	1.2E+00	5.1E-02
Decentralized		16	7.6E+02	1.1E+00	4.6E-02
Regionalized-1		12	7.6E+02	1.1E+00	4.6E-02
Regionalized-2	11	12	5.3E+02	7.4E-01	3.2E-02
Regionalized-3		6	1.4E+03	1.9E+00	8.3E-02
Regionalized-4	7	6	1.2E+03	1.7E+00	7.1E-02
Regionalized-5	4	6	1.2E+03	1.7E+00	7.1E-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-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	1.4E-10	1.4E-10	2.2E-07
Decentralized		16	1.6E-10	1.5E-10	1.8E-07
Regionalized-1		12	1.6E-10	1.5E-10	1.8E-07
Regionalized-2	11	12	2.5E-09	3.0E-09	3.9E-07
Regionalized-3		6	1.6E-10	1.5E-10	1.3E-07
Regionalized-4	7	6	2.5E-09	3.0E-09	1.8E-07
Regionalized-5	4	6	9.3E-06	3.9E-06	1.8E-07
Regionalized-6		2	3.5E-10	3.5E-10	- -
Regionalized-7		2	3.5E-10	3.5E-10	- -
Centralized 1		1	3.5E-10	3.5E-10	- -
Centralized 2		1	3.5E-10	3.5E-10	- -
Centralized 3	7	1	2.7E-09	3.2E-09	- -
Centralized 4	7	1	2.7E-09	3.2E-09	- -
Centralized 5	1	1	3.5E-10	3.5E-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-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			Hypothetical Farm Family 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	2.9E-07	4.9E-10	2.9E-11	2.8E-07	4.7E-10	2.8E-11	4.5E-04	7.6E-07	4.5E-08
Decentralized		16	3.1E-07	5.3E-10	3.1E-11	3.0E-07	5.1E-10	3.0E-11	3.7E-04	6.2E-07	3.7E-08
Regionalized-1		12	3.1E-07	5.3E-10	3.1E-11	3.0E-07	5.1E-10	3.0E-11	3.7E-04	6.2E-07	3.7E-08
Regionalized-2	11	12	5.0E-06	8.5E-09	5.0E-10	6.1E-06	1.0E-08	6.1E-10	7.8E-04	1.3E-06	7.8E-08
Regionalized-3		6	3.1E-07	5.3E-10	3.1E-11	3.0E-07	5.1E-10	3.0E-11	2.5E-04	4.3E-07	2.5E-08
Regionalized-4	7	6	5.0E-06	8.5E-09	5.0E-10	6.1E-06	1.0E-08	6.1E-10	3.7E-04	6.3E-07	3.7E-08
Regionalized-5	4	6	1.9E-02	3.2E-05	1.9E-06	7.8E-03	1.3E-05	7.8E-07	3.7E-04	6.3E-07	3.7E-08
Regionalized-6		2	7.1E-07	1.2E-09	7.1E-11	7.0E-07	1.2E-09	7.0E-11	- -	- -	- -
Regionalized-7		2	7.1E-07	1.2E-09	7.1E-11	7.0E-07	1.2E-09	7.0E-11	- -	- -	- -
Centralized-1		1	7.1E-07	1.2E-09	7.1E-11	7.0E-07	1.2E-09	7.0E-11	- -	- -	- -
Centralized-2		1	7.1E-07	1.2E-09	7.1E-11	7.0E-07	1.2E-09	7.0E-11	- -	- -	- -
Centralized-3	7	1	5.4E-06	9.2E-09	5.4E-10	6.5E-06	1.1E-08	6.5E-10	- -	- -	- -
Centralized-4	7	1	5.4E-06	9.2E-09	5.4E-10	6.5E-06	1.1E-08	6.5E-10	- -	- -	- -
Centralized-5	1	1	7.1E-07	1.2E-09	7.1E-11	7.0E-07	1.2E-09	7.0E-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.

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	25 (0/25)
Decentralized		16	153 (106/47)	287 (277/9)	0	22 (22/0)	26 (26/0)	33 (27/6)	112 (4/108)	31 (9/22)	0	2 (1/0)	0	14 (1/13)
Regionalized-1		12	153 (106/47)	287 (277/9)	0	22 (22/0)	26 (26/0)	33 (27/6)	112 (4/108)	31 (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)	185 (2/183)	41 (4/37)	0	1 (1/0)	0	22 (0/22)
Regionalized-3		6	281 (234/47)	619 (610/9)	0	49 (49/0)	58 (58/0)	65 (59/6)	135 (9/126)	49 (19/30)	0	3 (3/0)	0	16 (1/15)
Regionalized-4	7	6	313 (110/203)	326 (286/40)	0	23 (23/0)	27 (27/0)	52 (28/24)	290 (4/286)	70 (9/61)	0	3 (2/1)	0	36 (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	41 (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	220 (17/203)	84 (44/40)	0	3 (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	220 (17/203)	84 (44/40)	0	3 (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 (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	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.

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	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Decentral zed		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%.

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	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	2	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		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	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Decentralized		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		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	11	12	0	0	0	0	0	0	0	0	4	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		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.

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	1349	1500	0.52	16.9	0.21	0.26
Regionalized-1		12	1349	1500	0.52	16.9	0.21	0.26
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	4	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 1990 dollars.
(2) Compared to 1990 baseline.
** Ten sites use existing facilities for Volume Reduction.

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	2076	10
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	0.18	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	1526	118	401	946	61	548	0	978
Regionalized-1		12	1526	118	401	946	61	548	0	978
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 1994 Dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

II.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
13.	ORR—TRUW—Socioeconomic Impacts for Treatment	II-10.3-10	10-44
14.	ORR—TRUW—Infrastructure Impacts for Treatment	II-10.3-11	10-45
15.	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		Treatment Standard	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 transferred to interim storage at 10 sites, then to WIPP.

Table II-10.3-2. ORR—TRUW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

TRUW Alternatives	Number of Sites		Treatment Standard	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		Treatment Standard	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 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.

Table II-10.3–4. ORR—TRUW—Treatment: MEI Probability of Cancer Incidences and Genetic Effects

TRUW Alternatives	Number of Sites		Treatment Standard	Treatment							
				Offsite Population 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 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.
MEI = Maximally Exposed Individual

Table II-10.3-5. ORR—TRUW—Treatment: Noncancer Health Risk From Chemical Exposure

TRUW Alternatives	Number of Sites		Treatment Standard	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 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.
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-10.3-6. ORR—TRUW—Emissions in Tons per Year of Criteria Air Pollutants

TRUW Alternatives	Number of Sites		Treatment Standard	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
No Action**	16	5	WIPP WAC	- -	- -	- -	- -	- -	- -	15 (0/15)	3 (0/3)	0	0	0
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
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
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
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
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

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 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.

Table II-10.3-7. ORR—TRUW—Percent of Standard/Guideline for Criteria Air Pollutants

TRUW Alternatives	Number of Sites		Treatment Standard	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	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 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.

Table II-10.3-8. ORR—TRUW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

TRUW Alternatives	Number of Sites		Treatment Standard	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 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.
-- = 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		Treatment Standard	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 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.
<0.1 indicates that the precentage are less than 0.1%.

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	Treatment Standard	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	0.09
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 1990 dollars.
(2) Compared to 1990 baseline.
** 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.

Table II-10.3-11. ORR—TRUW—Infrastructure Impacts for Treatment

TRUW Alternatives	Number of Sites		Treatment Standard	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 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.

Table II-10.3-12. ORR—TRUW—Cost

TRUW Alternatives	Number of Sites		Treatment Standard (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	109	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 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.
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 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).

II.10.4 ORR HLW

ORR is not one of the sites considered for management of HLW. Therefore, Section 10.4 has been intentionally left blank.

II.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
3.	ORR—HW—Treatment: Estimated Number of Cancer Incidences	II-10.5-2	10-50
5.	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
13.	ORR—HW—Socioeconomics Impacts for Treatment	II-10.5-9	10-57
14.	ORR—HW—Infrastructure Impacts for Treatment	II-10.5-10	10-58
15.	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 Treatment Sites	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

Table II-10.5–2. ORR—HW—Treatment: Estimated Number of Cancer Incidences

HW Alternatives	Number of Treatment Sites	Treatment		
		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

Table II-10.5-3. ORR—HW—Treatment: MEI Probability of Cancer Incidences

HW Alternatives	Number of Treatment Sites	Treatment	
		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:
MEI = Maximally Exposed Individual

Table II-10.5-4. ORR—HW—Treatment: Noncancer Health Risk From Chemical Exposure

HW Alternatives	Number of Treatment Sites	Treatment		
		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:
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-10.5-5. 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)	10 (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)

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	1	0	0	0	0	0	0	0
Decentralized	3	0	0	0	3	1	0	0	0	0	0	0	0
Regionalized-1	5	0	1	0	10	5	0	0	0	0	0	0	0
Regionalized-2	2	0	2	0	13	6	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.

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 1990 dollars.
(2) Compared to 1990 baseline.

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 1994 Dollars; Total Cost = Sum of the Functional Areas.
(2) Government costs equal to the sum of the life-cycle components.

II.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.

II.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 and Genetic Effects	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—Socioeconomic 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	-	1.7E-04	4.6E-03	1.8E-03	1.4E-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	-	3.6E+00	6.1E-03	1.1E-06	3.6E-04	2.8E-01	4.8E-04	5.9E-07	2.8E-05	4.4E-01	6.1E-04	6.2E-07	2.6E-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

Table II-11.1-3. PGDP—LLMW—Disposal: Estimated Number of Cancer Incidences and Genetic Effects

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	-	2.0E-07	1.7E-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

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				Hypothetical Farm Family Most Exposed 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	-	4.0E-04	6.8E-07	1.5E-10	4.0E-08	3.5E-04	6.0E-07	8.9E-10	3.5E-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	-	5.5E-08	3.2E-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 occupationale threshold limits.

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).

Table II-11.1-9. PGDP—LLMW—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	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%.

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
Reg onalized-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	0	0	0	0	0
Regionalized-1	11	12	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	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	--	--	--	--	--	--	--
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—Socioeconomic 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	48	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 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	3	-	0.66	0.025	711	0	298	0.02	0.27	0.01	14	1
Decentralized	37	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:
T is defined as Treatment, D is defined as Disposal
(1) Based on 1991 site employment

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 1994 dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

II.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
13.	PGDP—LLW—Socioeconomic Impacts for Treatment and Disposal	II-11.2-11	11-28
14.	PGDP—LLW—Infrastructure Impacts for Treatment and Disposal	II-11.2-12	11-29
15.	PGDP—LLW—Cost	II-11.2-13	11-30

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

Noninvolved Worke	Number of Sites		Offsite Population			Noninvolved Workers			WM Workers		
LLW Alternatives	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.

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.

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 Population MEI			Noninvolved Worker MEI			Hypothetical Farm Family 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	50 (33/17)	88 (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	50 (33/17)	88 (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	63 (28/35)	81 (74/7)	0	6 (6/0)	7 (7/0)	11 (7/4)	43 (1/42)	10 (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.

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	--	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-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.

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	100	0	0	0	0	0	0	0
Regionalized-1		12	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0
Regionalized-2	11	12	0	0	0	0	0	0	0	0	0	0	0	0	0	200	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.

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	4	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 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.

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		16	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		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		2	276	22	60	174	20	276	0	0
Regionalized-7		2	276	22	60	174	20	276	0	0
Centralized-1		1	276	22	60	174	20	276	0	0
Centralized-2		1	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 1994 Dollars; Total Cost = Sum of the Life Cycle Components = Sum of the Functional Areas.

II.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
13.	PGDP—TRUW—Socioeconomic Impacts for Treatment	II-11.3-10	11-41
14.	PGDP—TRUW—Infrastructure Impacts for Treatment	II-11.3-11	11-42
15.	PGDP—TRUW—Cost	II-11.3-12	11-43

Table II-11.3-1. PGDP—TRUW—Treatment: Estimated Number of Fatalities

TRUW Alternatives	Treatment						
	Number of Sites		Treatment Standard	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	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:
-- = Treatment is not considered for this 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.

Table II-11.3-2. PGDP—TRUW—Treatment: Estimated Number of Cancer Incidences and Genetic Effects

TRUW Alternatives	Number of Sites		Treatment Standard	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	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:
-- = Treatment is not considered for this 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 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		Treatment Standard	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 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.

Table II-11.3-4. PGDP—TRUW—Treatment: MEI Probability of Cancer Incidences and Genetic Effects

TRUW Alternatives	Number of Sites		Treatment Standard	Treatment							
				Offsite Population 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	7.8E-10	1.3E-12	<9.9E-14	7.8E-14	6.7E-10	1.1E-12	<9.9E-14	6.7E-14
Regionalized-1	5	2	Reduce Gas	1.2E-09	2.0E-12	<9.9E-14	1.2E-13	1.0E-09	1.7E-12	<9.9E-14	1.0E-13
Regionalized-2	5	2	LDR	1.2E-09	2.0E-12	<9.9E-14	1.2E-13	1.0E-09	1.7E-12	<9.9E-14	1.0E-13
Regionalized-3	3	2	LDR	1.2E-09	2.0E-12	<9.9E-14	1.2E-13	1.0E-09	1.7E-12	<9.9E-14	1.0E-13
Centralized	WIPP	2	LDR	1.2E-09	2.0E-12	<9.9E-14	1.2E-13	1.0E-09	1.7E-12	<9.9E-14	1.0E-13

Notes:
-- = Treatment is not considered for this 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 all 16 sites, then transferred to interim storage at 10 sites then to WIPP.
MEI = Maximally Exposed Individual

Table II-11.3-5. PGDP—TRUW—Treatment: Noncancer Health Risk From Chemical Exposure

TRUW Alternatives	Number of Sites		Treatment Standard	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	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 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.
- - = 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 believed to have no appreciable adverse effects.
Exposure Index = Ratio of exposure concentration to chemical-specific occupational threshold limits

Table II-11.3-6. PGDP—TRUW—Emissions in Tons per Year of Criteria Air Pollutants

TRUW Alternatives	Number of Sites		Treatment Standard	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 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.

Table II-11.3-7. PGDP—TRUW—Percent of Standard/Guideline for Criteria Air Pollutants

TRUW Alternatives	Number of Sites		Treatment Standard	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 emissions % of mobile-source emissions).
** 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.

Table II-11.3-8. PGDP—TRUW—Percent of Standard/Guideline for Hazardous Air Pollutants and Toxic Air Pollutants

TRUW Alternatives	Number of Sites		Treatment Standard	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 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.

- - = 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-11.3-9. PGDP—TRUW—Impacts on Water Resources Due to Increased Water Use

TRUW Alternatives	Number of Sites		Treatment Standard	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 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.
<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	Treatment Standard	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 1990 dollars.
(2) Compared to 1990 baseline.
** 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.

Table II-11.3-11. PGDP—TRUW—Infrastructure Impacts for Treatment

TRUW Alternatives	Number of Sites		Treatment Standard	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	0.02	880	0.00	200	0.01	0.25	0.01	35	2.00
Regionalized-3	3	2	LDR	0.6	0.02	880	0.00	200	0.01	0.25	0.01	35	2.00
Centralized	WIPP	2	LDR	0.6	0.02	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 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.

Table II-11.3-12. PGDP—TRUW—Cost

TRUW Alternatives	Number of Sites		Treatment Standard (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**	16	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 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.
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 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).