

EXHIBIT J

**Table E-13 and Table E-14 of
DOE’s 2013 Final Site-Wide
Environmental Impact Statement for the
Continued Operation of the Department
of Energy/National Nuclear Security
Administration Nevada National
Security Site and Off-Site Locations in
the State of Nevada (DOE-EIS-0426)
(DOE’s 2013 EIS) entitled “Risks of
Transporting Radioactive Waste Under
Each Alternative – Constrained Case”
and “Risks of Transporting Radioactive
Materials Under Each Alternative –
Constrained Case”**

EXHIBIT J

Table E-13 Risks of Transporting Radioactive Waste Under Each Alternative – Constrained Case ^a

Region	Transport Mode	Number of Shipments	One-Way Kilometers Traveled (million)	One-Way Miles Traveled (million)	Incident-Free Conditions			Accident Conditions	
					Crew		Radiological Risk ^b	Roundtrip Nonradiological Risk ^b	
					Dose (person-rem)	Risk ^b			Dose (person-rem)
No Action Alternative									
Northeast	Truck	140	0.7	0.4	8.5	5 × 10 ⁻³	2 × 10 ⁻³	3 × 10 ⁻⁶	2 × 10 ⁻²
	Rail only ^c	70	0.4	0.2	2.6	2 × 10 ⁻³	7 × 10 ⁻⁴	1 × 10 ⁻⁶	6 × 10 ⁻²
	Rail/Truck ^d	220	0.4	0.3	3.5	2 × 10 ⁻³	8 × 10 ⁻³	1 × 10 ⁻⁶	6 × 10 ⁻²
South	Truck	9,200	32.2	20	1,500	9 × 10 ⁻¹	1 × 10 ⁻¹	6 × 10 ⁻⁵	1
	Rail only ^c	4,500	17.1	10.6	340	2 × 10 ⁻¹	7 × 10 ⁻²	2 × 10 ⁻⁵	3
	Rail/Truck ^d	13,700	22.1	13.7	560	3 × 10 ⁻¹	9 × 10 ⁻²	3 × 10 ⁻⁵	3
Southeast	Truck	120	0.5	0.3	6.8	4 × 10 ⁻³	1 × 10 ⁻³	2 × 10 ⁻⁶	1 × 10 ⁻²
	Rail only ^c	60	0.2	0.15	1.8	1 × 10 ⁻³	4 × 10 ⁻⁴	7 × 10 ⁻⁷	4 × 10 ⁻²
	Rail/Truck ^d	180	0.3	0.19	2.7	2 × 10 ⁻³	6 × 10 ⁻⁴	8 × 10 ⁻⁷	2 × 10 ⁻³
Upper Midwest	Truck	10,200	34.3	21.3	520	3 × 10 ⁻¹	8 × 10 ⁻²	1 × 10 ⁻⁴	1
	Rail only ^c	5,100	16.7	10.4	120	7 × 10 ⁻²	2 × 10 ⁻²	3 × 10 ⁻⁵	3
	Rail/Truck ^d	15,300	22.2	13.8	210	1 × 10 ⁻¹	3 × 10 ⁻²	4 × 10 ⁻⁵	3
Southwest	Truck	3,100	4.4	2.7	65	4 × 10 ⁻²	2 × 10 ⁻²	9 × 10 ⁻⁶	1 × 10 ⁻¹
	Rail only ^c	1,600	2.7	1.7	22	1 × 10 ⁻²	4 × 10 ⁻³	3 × 10 ⁻⁶	4 × 10 ⁻¹
	Rail/Truck ^d	4,700	4.4	2.8	42	3 × 10 ⁻²	9 × 10 ⁻³	5 × 10 ⁻⁶	5 × 10 ⁻¹
Mountain West	Truck	1,200	1.6	1.0	28	2 × 10 ⁻²	4 × 10 ⁻³	2 × 10 ⁻⁶	5 × 10 ⁻²
	Rail only ^c	620	0.3	0.2	5.7	3 × 10 ⁻³	1 × 10 ⁻³	4 × 10 ⁻⁷	5 × 10 ⁻²
	Rail/Truck ^d	1,900	1.3	0.8	22	1 × 10 ⁻²	3 × 10 ⁻³	6 × 10 ⁻⁷	8 × 10 ⁻²
West	Truck	1,100	1.2	0.8	16	1 × 10 ⁻²	4 × 10 ⁻³	5 × 10 ⁻⁶	4 × 10 ⁻²
	Rail only ^c	530	0.5	0.3	5.2	3 × 10 ⁻³	1 × 10 ⁻³	2 × 10 ⁻⁶	8 × 10 ⁻²
	Rail/Truck ^d	1,600	1.1	0.7	13	8 × 10 ⁻³	3 × 10 ⁻³	3 × 10 ⁻⁶	1 × 10 ⁻¹
Northwest	Truck	7	0.02	0.01	0.25	1 × 10 ⁻⁴	5 × 10 ⁻⁵	1 × 10 ⁻⁷	6 × 10 ⁻⁴
	Rail only ^c	4	0.01	0.01	0.08	5 × 10 ⁻⁵	2 × 10 ⁻⁵	3 × 10 ⁻⁸	2 × 10 ⁻³
	Rail/Truck ^d	10	0.01	0.01	0.13	8 × 10 ⁻⁵	3 × 10 ⁻⁵	4 × 10 ⁻⁸	2 × 10 ⁻³
Total – LLW/MLLW from out-of-state regions	Truck	25,100	74.8	46.48	2,100	1.3	2 × 10 ⁻¹	2 × 10 ⁻⁴	2
	Rail only ^c	12,500	38.0	23.6	500	3 × 10 ⁻¹	1 × 10 ⁻¹	6 × 10 ⁻⁵	6
	Rail/Truck ^d	37,600	51.8	32.2	850	5 × 10 ⁻¹	1 × 10 ⁻¹	8 × 10 ⁻⁵	6
Onsite	Truck	2,000	0.05	0.03	4.0	2 × 10 ⁻³	9 × 10 ⁻⁴	2 × 10 ⁻⁸	1 × 10 ⁻³
	Truck	230	0.09	0.05	0.015	9 × 10 ⁻⁶	1 × 10 ⁻⁶	1 × 10 ⁻¹²	2 × 10 ⁻³
	ER Waste (TTR/Nevada Test and Training Range)								
TRU waste ^e	Truck	22	0.03	0.02	1.1	6 × 10 ⁻⁴	2 × 10 ⁻⁴	5 × 10 ⁻⁸	9 × 10 ⁻⁴
	Truck	3	0.01	0.01	0.37	2 × 10 ⁻⁴	3 × 10 ⁻⁴	2 × 10 ⁻⁸	2 × 10 ⁻³
	RTGs	27,400	75.0	46.6	2,100	1	2 × 10 ⁻¹	2 × 10 ⁻⁴	2
Total – radioactive waste transport	Truck	40,000	52.0	32.3	860	5 × 10 ⁻¹	1 × 10 ⁻¹	8 × 10 ⁻⁵	6
	Rail/Truck ^d	25,100	8.2	5.1	210	1 × 10 ⁻¹	2 × 10 ⁻²	4 × 10 ⁻⁶	2 × 10 ⁻¹
	Truck								

Appendix E

Evaluation of Human Health Effects from Transportation

Region	Transport Mode	Number of Shipments	One-Way Kilometers Traveled (million)	One-Way Miles Traveled (million)	Incident-Free Conditions				Accident Conditions		
					Crew	Dose (person-rem)	Risk ^b	Dose (person-rem)	Risk ^b	Radiological Risk ^b	Roundtrip Nonradiological Risk ^b
Expanded Operations Alternative											
Northeast	Truck	300	1.4	0.9	18	1 × 10 ⁻²	5.7	3 × 10 ⁻³	6 × 10 ⁻⁶	5 × 10 ⁻²	
	Rail only ^c	150	0.7	0.5	5.3	3 × 10 ⁻³	2.3	1 × 10 ⁻³	2 × 10 ⁻⁶	1 × 10 ⁻¹	
	Rail/Truck ^d	450	0.9	0.6	7.2	4 × 10 ⁻³	2.8	2 × 10 ⁻³	3 × 10 ⁻⁶	1 × 10 ⁻¹	
South	Truck	19,300	67.3	41.8	3,500	2	470	3 × 10 ⁻¹	4 × 10 ⁻⁵	2	
	Rail only ^c	9,600	36.2	22.5	700	4 × 10 ⁻¹	240	1 × 10 ⁻¹	5 × 10 ⁻⁵	6	
	Rail/Truck ^d	28,900	46.7	29.0	1,200	7 × 10 ⁻¹	310	2 × 10 ⁻¹	6 × 10 ⁻⁵	6	
Southeast	Truck	310	1.2	0.8	17	1 × 10 ⁻²	5.1	3 × 10 ⁻³	5 × 10 ⁻⁶	4 × 10 ⁻²	
	Rail only ^c	160	0.7	0.4	4.8	3 × 10 ⁻³	1.9	1 × 10 ⁻³	2 × 10 ⁻⁶	1 × 10 ⁻¹	
	Rail/Truck ^d	470	0.8	0.5	7.2	4 × 10 ⁻³	2.5	1 × 10 ⁻³	2 × 10 ⁻⁶	5 × 10 ⁻³	
Upper Midwest	Truck	20,100	67.6	42.0	1,000	6 × 10 ⁻¹	260	2 × 10 ⁻¹	2 × 10 ⁻⁴	2	
	Rail only ^c	10,100	32.9	20.4	250	1 × 10 ⁻¹	64	4 × 10 ⁻²	5 × 10 ⁻⁵	5	
	Rail/Truck ^d	30,200	43.8	27.2	410	2 × 10 ⁻¹	100	6 × 10 ⁻²	8 × 10 ⁻⁵	5	
Southwest	Truck	7,800	10.9	6.8	160	1 × 10 ⁻¹	70	4 × 10 ⁻²	2 × 10 ⁻⁵	3 × 10 ⁻¹	
	Rail only ^c	3,900	6.9	4.3	56	3 × 10 ⁻²	15	9 × 10 ⁻³	7 × 10 ⁻⁶	1	
	Rail/Truck ^d	11,700	11.1	6.9	110	6 × 10 ⁻²	37	2 × 10 ⁻²	1 × 10 ⁻⁵	1	
Mountain West	Truck	3,100	4.0	2.5	64	4 × 10 ⁻²	15	9 × 10 ⁻³	6 × 10 ⁻⁶	1 × 10 ⁻¹	
	Rail only ^c	1,600	0.8	0.5	14	8 × 10 ⁻³	5.8	3 × 10 ⁻³	9 × 10 ⁻⁷	1 × 10 ⁻¹	
	Rail/Truck ^d	4,700	3.1	2.0	50	3 × 10 ⁻²	13	8 × 10 ⁻³	2 × 10 ⁻⁶	2 × 10 ⁻¹	
West	Truck	3,000	3.5	2.2	44	3 × 10 ⁻²	18	1 × 10 ⁻²	1 × 10 ⁻⁵	1 × 10 ⁻¹	
	Rail only ^c	1,500	1.5	0.9	15	9 × 10 ⁻³	6.0	4 × 10 ⁻³	4 × 10 ⁻⁶	2 × 10 ⁻¹	
	Rail/Truck ^d	4,500	3.2	2.0	36	2 × 10 ⁻²	14	8 × 10 ⁻³	7 × 10 ⁻⁶	3 × 10 ⁻¹	
Northwest	Truck	24	0.06	0.04	0.7	4 × 10 ⁻⁴	0.3	1 × 10 ⁻⁴	3 × 10 ⁻⁷	2 × 10 ⁻³	
	Rail only ^c	12	0.04	0.02	0.24	1 × 10 ⁻⁴	0.1	6 × 10 ⁻⁵	7 × 10 ⁻⁸	5 × 10 ⁻³	
	Rail/Truck ^d	36	0.05	0.03	0.39	2 × 10 ⁻⁴	0.14	8 × 10 ⁻⁵	9 × 10 ⁻⁸	5 × 10 ⁻³	
Total – LLW/MLLW from out-of-state regions	Truck	54,000	156	96.9	4,900	3	850	5 × 10 ⁻¹	3 × 10 ⁻⁴	5	
	Rail only ^c	26,900	79.7	49.5	1,000	6 × 10 ⁻¹	340	2 × 10 ⁻¹	1 × 10 ⁻⁴	13	
	Rail/Truck ^d	80,900	110	68.4	1,800	1	480	3 × 10 ⁻¹	2 × 10 ⁻⁴	13	
Onsite	Truck	2,300	0.06	0.04	4.2	2 × 10 ⁻³	1.5	9 × 10 ⁻⁴	2 × 10 ⁻⁸	2 × 10 ⁻³	
ER Waste (TTR/Nevada Test and Training Range)	Truck	13,100	4.9	3.0	0.8	5 × 10 ⁻⁴	0.3	2 × 10 ⁻⁴	6 × 10 ⁻¹¹	1 × 10 ⁻¹	
TRU waste ^e	Truck	42	0.05	0.03	2.1	1 × 10 ⁻³	0.7	4 × 10 ⁻⁴	9 × 10 ⁻⁸	2 × 10 ⁻³	
RTGs	Truck	10	0.05	0.03	1.2	7 × 10 ⁻⁴	1.6	1 × 10 ⁻³	5 × 10 ⁻⁸	7 × 10 ⁻³	
Paducah DUF ₆	Truck	7,200	20.4	12.7	120	7 × 10 ⁻²	80	5 × 10 ⁻²	3 × 10 ⁻³	5 × 10 ⁻¹	
DOE/EIS-359 ^g	Rail	2,900	9.9	6.2	370	2 × 10 ⁻¹	14	8 × 10 ⁻³	2 × 10 ⁻³	2 × 10 ⁻¹	
Portsmouth DUF ₆	Truck	5,800	19.6	12.2	120	7 × 10 ⁻²	78	5 × 10 ⁻²	7 × 10 ⁻³	4 × 10 ⁻¹	
DOE/EIS-360 ^g	Rail	2,300	9.4	5.84	330	2 × 10 ⁻¹	14	9 × 10 ⁻³	3 × 10 ⁻³	3 × 10 ⁻¹	

Region	Transport Mode	Number of Shipments	One-Way Kilometers Traveled (million)	One-Way Miles Traveled (million)	Incident-Free Conditions				Accident Conditions	
					Crew		Population		Radiological Risk ^b	Roundtrip Nonradiological Risk ^b
					Dose (person-rem)	Risk ^b	Dose (person-rem)	Risk ^b		
West Valley	Truck	12,000	48.0	29.9	230	1×10^{-1}	64	4×10^{-2}	9×10^{-6}	9×10^{-1}
DOE/EIS-0226 ^g	Rail	6,100	26.5	16.5	9.3	6×10^{-3}	14	8×10^{-3}	3×10^{-6}	2
ORNL (uranium-233)	Truck	367	No data	No data	No data	No data	9.5	6×10^{-3}	7×10^{-12}	<1
DOE/EA-1651 ^h										
Total – radioactive waste transport	Truck	94,800	249	155	5,300	3.1	1,100	7×10^{-1}	1×10^{-2}	7
Transport through Nevada ^f	Rail/Truck	108,000	160	100	2,500	1.5	530	3×10^{-1}	5×10^{-3}	16
	Truck	54,100	17.9	11.1	430	3×10^{-1}	84	5×10^{-2}	9×10^{-6}	5×10^{-1}
Reduced Operations Alternative										
Total – LLW/MLLW from out-of-state regions	Truck									
	Rail									
	Rail/Truck									
TRU waste ^e	Truck	17	0.02	0.01	0.8	5×10^{-4}	0.3	2×10^{-4}	4×10^{-8}	7×10^{-4}
Onsite	Truck									
RTGs	Truck									
ER Waste (TTR/Nevada Test and Training Range)	Truck									
Transport through Nevada ^f	Truck									

^a LLW and MLLW were assumed to be transported in 55-gallon drums, B-25 boxes, B-12 boxes, and 20-foot ISO (Sealand) containers based on historical information regarding prevalence of use.

^b Risk is expressed in terms of LCFs, except for nonradiological risk, where it refers to the number of traffic accident fatalities. Accident dose risk can be calculated by dividing the risk values by 0.0006 (DOE 2003a).

^c These values reflect only the portion of the routes traveled by railcar.

^d These values reflect the combined use of rail and truck after rail transporting radioactive waste to the NNSS vicinity.

^e Transuranic waste is first transported to Idaho National Laboratory for characterization and then transported back to the NNSS with final disposal at the Waste Isolation Pilot Plant.

^f The cited risk values are representative of the portion of the routes for transporting LLW and MLLW within Nevada to the NNSS, excluding shipments identified in other NEPA documentation. The stated risks for travel within Nevada are included in the risks for the regional routes shown in the table. The values for the Reduced Operations Alternative are similar to those for the No Action Alternative.

^g The risks from transporting Paducah and Portsmouth DUF₆ conversion wastes and the West Valley wastes to the NNSS are directly from their respective site EISs (DOE 2004a, 2004b, 2010b), proportionally adjusted for a 10-year period. The rail transport risk values for these analyses consider direct transport to the NNSS; therefore, the risks do not include truck transport from a transfer station. If rail-to-truck transport was used for these shipments, the incident-free risk would be lower, while the accident risk would be slightly higher, given the results of transporting LLW and MLLW. Transportation risks from transporting wastes associated with these waste streams generated beyond this 10-year period are included in the cumulative impacts (see Chapter 6 of this NNSS SWEIS).

^h DOE 2010a.

Note: To convert kilometers to miles, multiply by 0.62137. Total may not equal the sum of the contributions due to rounding. Also due to rounding, the cited risk values are different from multiplication of dose by the dose risk factor of 0.0006 LCFs per person-rem.

Appendix E

Evaluation of Human Health Effects from Transportation

Table E-14 Risks of Transporting Radioactive Materials Under Each Alternative – Constrained Case

Material	Number of Shipments	One-Way Kilometers Traveled (million)	One-Way Miles Traveled (million)	Incident-Free Conditions				Accident Conditions	
				Crew		Population		Radiological Risk ^b	Roundtrip Nonradiological Risk ^a
				Dose (person-rem)	Risk ^b	Dose (person-rem)	Risk ^a		
No Action Alternative									
Special Nuclear Material	120	0.1	0.09	0.13	8×10^{-5}	0.09	6×10^{-5}	8×10^{-8}	5×10^{-3}
Special Nuclear Material – in Nevada	120	0.04	0.02	0.028	2×10^{-5}	0.015	9×10^{-6}	1×10^{-8}	9×10^{-5}
Sealed Sources	120	0.3	0.2	17	1×10^{-2}	4.3	3×10^{-3}	1×10^{-7}	9×10^{-3}
Sealed Sources – in Nevada	120	0.04	0.02	2.2	1×10^{-3}	0.55	3×10^{-4}	3×10^{-9}	1×10^{-3}
Expanded Operations Alternative									
Special Nuclear Material	290	0.4	0.3	1.3	8×10^{-4}	0.77	5×10^{-4}	2×10^{-7}	1×10^{-2}
Special Nuclear Material – in Nevada	290	0.09	0.06	0.17	1×10^{-4}	0.11	7×10^{-5}	2×10^{-8}	2×10^{-4}
Weapon Component Disposition	2,000	3.5	2.2	10	6×10^{-3}	12	7×10^{-3}	7×10^{-7}	1×10^{-2}
Weapon Component Disposition – in Nevada	2,000	0.6	0.38	1.2	7×10^{-4}	1.4	8×10^{-4}	5×10^{-8}	2×10^{-3}
Weapon Transport	8,200	38.2	23.7	210	1×10^{-1}	240	1×10^{-1}	2×10^{-5}	1×10^{-1}
Weapon Transport – in Nevada	8,200	2.5	1.6	14	9×10^{-3}	16	1×10^{-2}	4×10^{-7}	6×10^{-3}
Sealed Sources	240	0.5	0.34	33	2×10^{-2}	8.5	5×10^{-3}	2×10^{-7}	2×10^{-2}
Sealed Sources – in Nevada	240	0.07	0.05	4.4	3×10^{-3}	1.1	7×10^{-4}	6×10^{-9}	2×10^{-3}
Reduced Operations Alternative									
Special Nuclear Material	60	0.07	0.05	0.083	5×10^{-5}	0.069	4×10^{-5}	4×10^{-8}	5×10^{-3}
Special Nuclear Material – in Nevada	60	0.02	0.01	0.015	9×10^{-6}	0.0084	5×10^{-6}	7×10^{-9}	5×10^{-5}
Sealed Sources	See No Action Alternative								
Sealed Sources – in Nevada	See No Action Alternative								

rem = roentgen equivalent man.

^a Risk is expressed in terms of latent cancer fatalities, except for the nonradiological risk, where it refers to the number of traffic accident fatalities. Accident dose risk can be calculated by dividing the risk values by 0.0006 (DOE 2003a).