

EXHIBIT I

**Table E-8 and Table E-12 of
DOE's 2015 EIS entitled "Risks of
Transporting Radioactive Material and
Waste – MOX Fuel Alternative" and
"Estimated Dose to the Population
and to Maximally Exposed Individuals
Under the Maximum Reasonably
Foreseeable Accident"**

EXHIBIT I

Table E-8 Risks of Transporting Radioactive Material and Waste – MOX Fuel Alternative ^a

Route	Transport Mode	Number of Shipments	One-way Kilometers Traveled (million)	Incident-Free			Accident		
				Crew Dose (person-rem)	Risk ^b	Population Dose (person-rem)	Radiological Risk ^b	Non-radiological Risk ^b	
PDCF at F-Area at SRS ^c									
All STA routes	STA	1,400	2.9	65	0.04	77	0.05	2 × 10 ⁻⁶	0.08
SRS to WIPP	Truck	1,600	3.9	150	0.09	72	0.04	1 × 10 ⁻⁶	0.2
SRS to NNSS – LLW	Truck	430	1.7	34	0.02	13	0.008	1 × 10 ⁻⁷	0.08
PDC ^c									
All STA routes	STA	1,400	2.9	65	0.04	77	0.05	2 × 10 ⁻⁶	0.08
SRS to WIPP	Truck	1,600	3.9	150	0.09	73	0.04	1 × 10 ⁻⁶	0.2
SRS to NNSS – LLW	Truck	430	1.7	34	0.02	13	0.008	1 × 10 ⁻⁷	0.08
SRS to NNSS – MLLW	Truck	13	0.050	1.2	0.0007	0.81	0.0005	7 × 10 ⁻⁹	0.002
PF-4 at LANL and MFFF at SRS ^d									
All STA routes	STA	1,700	2.0	28	0.02	47	0.03	3 × 10 ⁻⁵	0.06
LANL to WIPP	Truck	290	0.17	6.5	0.004	3.6	0.002	9 × 10 ⁻⁹	0.006
LANL to NNSS – LLW	Truck	320	0.40	7.9	0.005	3.3	0.002	7 × 10 ⁻⁹	0.008
SRS to WIPP	Truck	1,400	3.3	130	0.08	62	0.04	1 × 10 ⁻⁶	0.2
SRS to NNSS – LLW	Truck	430	1.7	34	0.02	13	0.008	1 × 10 ⁻⁷	0.08
PF-4 at LANL, and H-Canyon/HB-Line and MFFF at SRS ^e									
All STA routes	STA	1,600	2.1	34	0.02	50	0.03	2 × 10 ⁻⁵	0.06
LANL to WIPP	Truck	240	0.14	5.3	0.003	2.9	0.002	7 × 10 ⁻⁹	0.005
LANL to NNSS – LLW	Truck	260	0.33	6.5	0.004	2.7	0.002	6 × 10 ⁻⁹	0.006
SRS to WIPP	Truck	1,400	3.4	130	0.08	64	0.04	1 × 10 ⁻⁶	0.2
SRS to NNSS – LLW	Truck	430	1.7	34	0.02	13	0.008	1 × 10 ⁻⁷	0.08
H-Canyon/HB-Line to WIPP – 2 Metric Tons (2.2 tons)									
SRS to WIPP, including use of POCs	Truck	500	1.2	47	0.03	23	0.01	4 × 10 ⁻⁷	0.08
SRS to WIPP, including use of CCOs and HUFFPs ^f	Truck	230	0.57	21	0.01	10	0.006	7 × 10 ⁻⁷	0.04
SRS to WIPP, direct disposition and HUFFPs ^g	STA/Truck	32	0.17	1.6	0.0009	3.4	0.002	2 × 10 ⁻⁶	0.005
PF-4 at LANL (2 metric tons [2.2 tons] processing)									
All STA routes	STA	26	0.060	0.58	0.0003	1.3	0.0008	1 × 10 ⁻⁶	0.002
LANL to WIPP	Truck	15	0.0090	0.34	0.0002	0.19	0.0001	5 × 10 ⁻¹⁰	0.0003
LANL to NNSS – LLW	Truck	16	0.020	0.40	0.0002	0.17	0.0001	4 × 10 ⁻¹⁰	0.0004
Other Transports									
Portsmouth to AREVA (48G containers)	Truck	180	0.69	1.6	0.001	3.5	0.002	2 × 10 ⁻⁵	0.04
Portsmouth to AREVA (30B containers)	Truck	210	0.78	8.5	0.005	13	0.008	2 × 10 ⁻⁵	0.04
AREVA to SRS (DUO ₂)	Truck	45	0.19	4.6	0.003	2.7	0.002	3 × 10 ⁻⁵	0.01
AREVA to SRS (DUNH)	Truck	6	0.026	0.62	0.0004	0.36	0.0002	2 × 10 ⁻⁵	0.001
SRS to SQN	STA	570	0.29	3.3	0.002	4.6	0.003	1 × 10 ⁻⁷	0.005
SRS to BFN	STA	2,300	1.7	17	0.01	28	0.02	4 × 10 ⁻⁷	0.03
SRS to Generic Reactor ^h	STA	4,500	20	190	0.1	370	0.2	2 × 10 ⁻⁶	0.4

Appendix E – Evaluation of Human Health Effects from Transportation

Route	Transport Mode	Number of Shipments	One-way Kilometers Traveled (million)	Incident-Free			Accident		
				Crew Dose (person-rem)	Risk ^b	Population		Radiological Risk ^b	Non-radiological Risk ^b
						Dose (person-rem)	Risk ^b		
Totals									
PDCF with TVA Reactors	-	7,300	13	330	0.2	240	0.1	0.00009	0.6
PDCF/CCO option with TVA Reactors	-	7,000	13	300	0.2	230	0.1	0.00009	0.6
PDCF/direct disposition option with TVA Reactors	-	6,800	12	290	0.2	220	0.1	0.00009	0.5
PDC with TVA Reactors	-	7,300	14	330	0.2	240	0.1	0.00009	0.6
PDC/CCO option with TVA Reactors	-	7,100	13	310	0.2	230	0.1	0.00009	0.6
PDC/direct disposition option with TVA Reactors	-	6,900	12	290	0.2	220	0.1	0.00009	0.5
PF-4/MFFF with TVA Reactors	-	7,900	12	290	0.2	200	0.1	0.0001	0.6
PF-4/MFFF/CCO option with TVA Reactors	-	7,700	12	260	0.2	190	0.1	0.0001	0.5
PF-4/MFFF/direct disposition option with TVA Reactors	-	7,500	11	240	0.1	180	0.1	0.0001	0.5
PF-4/H-Canyon/HB-Line/MFFF with TVA Reactors	-	7,800	13	290	0.2	210	0.1	0.0001	0.6
PF-4/H-Canyon/HB-Line/MFFF/CCO option with TVA Reactors	-	7,500	12	270	0.2	190	0.1	0.0001	0.5
PF-4/H-Canyon/HB-Line/MFFF/direct disposition option with TVA Reactors	-	7,300	11	250	0.1	190	0.1	0.0001	0.5
PDCF with Generic Reactor	-	8,900	31	510	0.3	580	0.3	0.00009	1
PDCF/CCO option with Generic Reactor	-	8,700	31	480	0.3	560	0.3	0.00009	0.9
PDCF/direct disposition option with Generic Reactor	-	8,500	30	460	0.3	560	0.3	0.00009	0.9
PDC with Generic Reactor	-	9,000	31	510	0.3	580	0.3	0.00009	1
PDC/CCO option with Generic Reactor	-	8,700	31	480	0.3	570	0.3	0.00009	0.9
PDC/direct disposition option with Generic Reactor	-	8,500	30	460	0.3	560	0.3	0.00009	0.9
PF-4/MFFF with Generic Reactor	-	9,500	30	460	0.3	540	0.3	0.0001	0.9
PF-4/MFFF/CCO option with Generic Reactor	-	9,300	30	430	0.3	530	0.3	0.0001	0.9
PF-4/MFFF/direct disposition option with Generic Reactor	-	9,100	29	410	0.2	520	0.3	0.0001	0.9
PF-4/H-Canyon/HB-Line/MFFF with Generic Reactor	-	9,400	30	470	0.3	540	0.3	0.0001	0.9
PF-4/H-Canyon/HB-Line/MFFF/CCO option with Generic Reactor	-	9,100	30	440	0.3	530	0.3	0.0001	0.9
PF-4/H-Canyon/HB-Line/MFFF/direct disposition option with Generic Reactor	-	8,900	29	420	0.3	530	0.3	0.0001	0.9
PDCF	-	4,400	11	320	0.2	210	0.1	0.00009	0.6
PDCF/CCO option	-	4,200	11	290	0.2	190	0.1	0.00009	0.5
PDCF/direct disposition option	-	4,000	10	270	0.2	190	0.1	0.00009	0.5
PDC	-	4,500	12	320	0.2	210	0.1	0.00009	0.6
PDC/CCO option	-	4,200	11	290	0.2	200	0.1	0.00009	0.5
PDC/direct disposition option	-	4,000	11	270	0.2	190	0.1	0.00009	0.5
PF-4/MFFF	-	5,000	10	270	0.2	170	0.1	0.0001	0.5
PF-4/MFFF/CCO option	-	4,800	9.8	240	0.1	160	0.1	0.0001	0.5
PF-4/MFFF/direct disposition option	-	4,600	9.4	220	0.1	150	0.09	0.0001	0.4

Final Surplus Plutonium Disposition Supplemental Environmental Impact Statement

Route	Transport Mode	Number of Shipments	One-way Kilometers Traveled (million)	Incident-Free			Accident		
				Crew		Population		Radiological Risk ^b	Non-radiological Risk ^b
				Dose (person-rem)	Risk ^b	Dose (person-rem)	Risk ^b		
PF-4/H-Canyon/HB-Line/MFFF	-	4,900	11	280	0.2	180	0.1	0.0001	0.5
PF-4/H-Canyon/HB-Line/MFFF/CCO option	-	4,600	9.9	250	0.1	160	0.1	0.0001	0.5
PF-4/H-Canyon/HB-Line/MFFF/direct disposition option	-	4,400	9.5	230	0.1	160	0.1	0.0001	0.5

AREVA = AREVA fuel fabrication facility; BFN = Browns Ferry Nuclear Plant; CCO = criticality control overpack; DUNH = depleted uranyl nitrate, hexahydrate; DUO₂ = depleted uranium oxide; HUFPP = Hanford Unirradiated Fuel Package; LANL = Los Alamos National Laboratory; LLW = low-level radioactive waste; MFFF = Mixed Oxide Fabrication Facility; MLLW = mixed low-level radioactive waste; MOX = mixed oxide; NNSS = Nevada National Security Site; PDC = Pit Disassembly and Conversion Project; PDCF = Pit Disassembly Conversion Facility; PF-4 = Plutonium Facility; POCs = pipe overpack containers; SQN = Sequoyah Nuclear Plant; SRS = Savannah River Site; STA = secure transportation asset; TVA = Tennessee Valley Authority; WIPP = Waste Isolation Pilot Plant.

- ^a For waste shipments, the totals include construction and operations activities.
- ^b Risk is expressed in terms of LCFs, except for the nonradiological risk, where it refers to the number of traffic accident fatalities. Radiological risk is calculated for one-way travel while nonradiological risk is calculated for two-way travel. Accident dose-risk can be calculated by dividing the risk values by 0.0006 (DOE 2003b). The values are rounded to one non-zero digit.
- ^c Includes impacts from WSB and MFFF operations.
- ^d Includes impacts from further processing at the WSB, Metal oxidation at MFFF, and MFFF.
- ^e Includes impacts from further processing at the K-Area Complex, H-Canyon/HB-Line, WSB, metal oxidation at MFFF, and MFFF.
- ^f For the use of CCOs and HUFPPs, non-pit plutonium waste would be packaged in CCOs and not in POCs, reducing the number of shipments. HUFPPs would be used to transport FFFF unirradiated fuel instead of repackaging the fuel in POCs. This option is only applicable to the MOX Fuel Alternative and the WIPP Alternative.
- ^g For direct disposition, non-pit plutonium waste would remain in their storage containers and be transported in approved Type B packagings and transported via STA. HUFPPs would be used to transport FFFF unirradiated fuel instead of repackaging the fuel in POCs.
- ^h For purposes of analysis, it was assumed that the generic commercial nuclear power reactor would be located at the Hanford Reservation, Washington to maximize the distance traveled in order to envelop impacts related to shipping to other possible commercial nuclear power reactor sites. Only shipments of BWR fuel are analyzed because there would be a greater number of shipments to a BWR reactor than a PWR reactor, thus providing a conservative analysis of the distance traveled per alternative that would cover a smaller number of PWR shipments to a generic commercial nuclear power reactor for the same amount of unirradiated MOX fuel, should shipments be made to a PWR.

Note: To convert kilometers to miles, multiply by 0.62137.

are analyzed.) The accident is assumed to involve a severe impact (collision) in conjunction with a long fire duration. The highest consequences for the maximum foreseeable accident based on population dose are from accidents occurring in a suburban area involving the transport of plutonium oxide powder from LANL to SRS.

Table E-12 Estimated Dose to the Population and to Maximally Exposed Individuals Under the Maximum Reasonably Foreseeable Accident

Transport Mode	Material or Waste in the Accident With the Highest Consequences	Applicable Alternatives	Range of Likelihood of the Accident (per year) ^a	Population Zone ^a	Population ^b		MEI ^c	
					Dose (person-rem)	LCF	Dose (rem)	LCF
STA transport from Pantex	Pits	All	5.6×10^{-7} to 7.0×10^{-7}	suburban	83	0.05	0.070	4×10^{-5}
Truck transport to WIPP	Pit weapons-grade TRU waste in a TRUPACT II	All	3.3×10^{-7} to 3.4×10^{-7}	urban	8.7	0.005	0.0011	6×10^{-7}
Truck transport to WIPP	Non-pit KIS TRU waste in a TRUPACT II	H-Canyon/ HB-Line to DWPF, WIPP ^d	2.2×10^{-8} to 2.0×10^{-7}	suburban	1.6	0.001	0.0014	9×10^{-7}
Truck transport to WIPP	Processed non-pit plutonium as TRU waste in POCs	MOX Fuel, WIPP	2.2×10^{-7} to 1.0×10^{-6}	urban	180	0.1	0.022	1×10^{-5}
Truck transport to Browns Ferry	BWR MOX Fuel	All except No Action ^e	4.6×10^{-7} to 5.4×10^{-7}	suburban	4.1	0.002	0.0035	2×10^{-6}
Truck transport to Generic Reactors	BWR MOX Fuel	All	2.8×10^{-6} to 3.3×10^{-6}	suburban	4.0	0.002	0.0035	2×10^{-6}
Truck transport to NNS	LLW in B-25s	All	4.3×10^{-7} to 5.0×10^{-7}	suburban	0.015	9×10^{-6}	0.000012	7×10^{-9}
Truck transport to AREVA	Depleted uranium hexafluoride in 30B containers	All	2.1×10^{-7} to 2.4×10^{-7}	suburban	620	0.4	0.64	4×10^{-4}
Truck transport to AREVA	Depleted uranium hexafluoride in 48G containers	All	1.8×10^{-7} to 2.1×10^{-7}	suburban	750	0.4	0.78	5×10^{-4}
Truck transport to WIPP	Processed non-pit TRU waste in criticality control containers	MOX Fuel, WIPP	7.9×10^{-8} to 3.7×10^{-7}	urban	420	0.3	0.051	3×10^{-5}
STA transport to SRS	Plutonium oxide powder in a Type B package	All except No Action ^e	4.3×10^{-8} to 2.0×10^{-7}	suburban	6,300	4	4.3	3×10^{-3}
STA transport to WIPP	Non-pit TRU waste via direct disposition	WIPP ^d	1.1×10^{-6}	suburban	1,890	3	1.4	9×10^{-4}

AREVA = AREVA fuel fabrication facility; BWR = boiling water reactor; DWPF = Defense Waste Processing Facility; KIS = K-Area Interim Surveillance; LCF = latent cancer fatality; LLW = low-level radioactive waste; MEI = maximally exposed individual; MOX = mixed oxide fuel; NNS = Nevada National Security Site; Pantex = Pantex Plant; POC = pipe overpack container; SRS = Savannah River Site; STA = safeguards transporter; TRU = transuranic; TRUPACT-II = Transuranic Package Transporter Model 2; WIPP = Waste Isolation Pilot Plant.

^a The likelihood shown is the range of likelihood estimated among the alternatives given the number of shipments over a specific time period. If the likelihood of an accident is equal to or greater than 1 in 10 million per year for both suburban and urban population zones, then the consequences are provided for the urban population zone.

^b Population extends at a uniform density to a radius of 80 kilometers (50 miles). The weather condition was assumed to be Pasquill Stability Class D with a wind speed of 4 meters per second (8.8 miles per hour).

^c The MEI is assumed to be 100 meters (330 feet) downwind from the accident and exposed to the entire plume of the radioactive release. The weather condition is assumed to be Pasquill Stability Class F with a wind speed of 1 meter per second (2.2 miles per hour).

^d While these shipments would occur under the MOX Fuel Alternative, the likelihood of an accident in a suburban area would be less than 1 in 10 million per year.

^e For the No Action Alternative, the likelihood of an accident in a suburban area would be less than 1 in 10 million per year.