Appendix K

Transportation Impacts

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A generic analysis was conducted to develop estimates of a range of human health impacts associated with transporting decontamination and dismantlement wastes from reactor sites to low-level waste (LLW) burial grounds. The RADTRAN 5 computer code (Neuhauser and Kanipe 1996) was used to perform the calculations. RADTRAN 5, originally developed by Sandia National Laboratory to support the NUREG-0170 environment impact analysis, is commonly used for transportation impact calculations in support of environmental documentation (NRC 1977).

The key input values used to model the transportation of decontamination and dismantlement wastes from reactors to LLW disposal facilities and arrive at the results presented in Table K-1 are summarized below:

- Waste volumes: The total volume of LLW generated during reactor decontamination and dismantlement is a function of the alternative being implemented. Waste volume estimates for decommissioning facilities were obtained for eight facilities from Post Shutdown Decommissioning Activity Reports (PSDARs), Environmental Reports (ERs), or data provided by licensees with the assistance of Nuclear Energy Institute (NEI). Because of the small number of facilities from which estimates were obtained, the data tends to be skewed by the unique attributes of the decommissioning process for a given plant. For example, the only pressurized water reactor (PWR) facility with data for the SAFSTOR option is San Onofre, a plant that is removing all their structures.

- Number of shipments: The number of shipments was also determined from PSDARs, ERs, and data provided by NEI. Shipment estimates were obtained from six facilities and ranged from 176 truck shipments for Maine Yankee to 1753 truck shipments and 869 rail shipments for San Onofre. These numbers represent the total number of shipments over the entire decommissioning period, which mostly occurs during decontamination and dismantlement and takes place in a period of 2-6 yrs. Because RADTRAN 5 did not account for rail shipments, additional truck shipments were assumed.

- Shipping distance: Transportation impacts and costs are a function of the distance traveled. Distances for decommissioning facilities range from 8 km (5 mi) to 4540 km (2840 mi). A bounding shipping distance of 4800 km (3000 mi) one-way was assumed.

- Radiation dose rate: The radiation dose rate emitted from the shipping container was assumed to be at the regulatory maximum limit.

- Radioactive material inventory: The inventory of radioactive material in a given shipment is variable. For this assessment, it was assumed that the all shipments contain 100 Ci of cesium-137, although in reality this value is high on average.

Table K-1. Low-Level Waste Shipment Data for Decommissioning Nuclear Power Facilities

Nuclear Plant	Reactor Type	Decommissioning Option	LLW Volume, cubic meters	LLW Shipments	Distance, km (mi)
Maine Yankee	PWR	DECON	5920	176	1900-4600 (1200-2860)
Haddam Neck	PWR	DECON	8017	496-582	1500-4000 (1400-2500)
Trojan	PWR	DECON	9765	470	482 (300)
San Onofre, Unit 1	PWR	SAFSTOR	–	91 (truck) 69 (rail)	–
Saxton	PWR	SAFSTOR	580	100	1000 (620)
Rancho Seco	PWR	SAFSTOR		1250 (truck) <25 (rail)	1000-4300 (620-2700)
Big Rock Point	BWR	DECON	2042	--	–
Millstone, Unit 1	BWR	SAFSTOR	18,014	--	–
Yankee Rowe[(a)]	PWR	DECON	4136	–	

(a) From NUREG-1307, Rev. 9, p. A.3.

K.1 References

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K.2 Related Documents

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